TITLE: COMPUTERWORLD.

REEL NO: 3 of 3

VOLUME: 19 Issues: 40-52

DATE: October 7 - December 30, 1985

PUBLICATION NO: 6206

NOTES: Includes:
SPECIAL ISSUES

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VOL 19
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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | OCTOBER 7, 1985 | VOL. XIX, NO. 40

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Honeywell revamps net architecture

By John Dix

PHOENIX — Honeywell, Inc. provided a gateway to IBM hosts last week with a version of its network architecture and network processors said to improve connectivity.

Release 300 of Honeywell's Distributed Systems Architecture is compatible with, but also supersedes, DSA Release 200 unveiled in 1982 and the initial architecture announced in 1979. The latest DSA version is supported across the Honeywell line under the Gcos operating system.

Architecture improvements provide more communications channels and better management of terminals and secondary networks. These capabilities are realized with a gateway between DSA and IBM's Systems Network Architecture, three new Datanet 8 network processor models, associated operating system software and a release of DSA for Honeywell's DPS 6 family of small processors.

Although acknowledging the importance and need for the network flexibility provided by the Datanet 8 products, consultants said Honeywell's efforts to provide IBM compatibility lag behind those of other minicomputer manufacturers. Even with its improved architecture and new SNA gateway, "Honeywell is 12 to 18 months behind Digital Equipment Corp., [Data General Corp.] and [Wang Laboratories, Inc.]," according to Dale Kutnick, a consultant in Wayland, Mass.

Release 300 is a "natural phase in Honeywell's evolution of DSA to provide increased networking options" but lags behind other vendors, said Eric Killorin, president of Hyatt Research Corp., a research and publishing company in Andover, Mass.

The DSA/SNA gateway is based on a Honeywell DPS 6 mini running the company's

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IBM tackles new market, ties disparate systems

Vector processor takes aim at mid-range mart

By James Connolly

RYE BROOK, N.Y. — IBM dove into the supercomputer market last week, making a noticeable splash if not setting off a tidal wave.

The company introduced a vector processing facility for its 3090 mainframes and vector-processing-oriented software.

IBM spokesmen said the vector processor was not designed to compete with supercomputers from vendors like Cray Research, Inc. and ETA Systems, Inc. — computers offering performance of up to 2 billion floating-point operations per second — but analysts forecast that IBM's entry into the mid-range market, with a processor rated by the analysts at 50M to 100M Flops, means that IBM will go after the full market in the future.

IBM also announced the following:

- Earlier availability of its 3090 Mod-

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Profs versions boost link to Disoss network

By John Desmond

RYE BROOK, N.Y. — Forging a major link in its automated office concept, IBM moved last week to strengthen communications capabilities across its VM, MVS and DOS operating systems and diverse hardware devices. The firm announced versions of its Professional Office System that will allow editable documents to be exchanged with users of its Distributed Office Support System.

In a move to get mainframes involved in a task that has become the province of microcomputers — word processing — IBM also announced Displaywrite/370, a host-based version of its IBM standard word processing software.

The announcements fulfill statements of direction ahd mean that users in the growing VM world, the staple MVS world and the heavily populated DOS world can

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TOP OF THE NEWS

A Software International source said during last week's users group conference (see page 6) that within the next three weeks IBM will announce a new System/38 processor called the Model 60. The source, who works for the Software International division responsible for minicomputer applications products, said the Model 60 will support up to 512 users and will boast 32M bytes of main memory.

■

Hewlett-Packard President John Young was chosen late last week to be the keynote speaker at the computer industry's large trade show, the fall Comdex gathering. Young's address can be heard at 9:30 a.m., Wednesday, Nov. 20, in the main showroom of the Las Vegas Hilton Hotel. For a preview of Young's views, see *Computerworld*'s exclusive interview with the HP leader on page 15.

■

Fairchild Camera and Instrument will jump into the 32-bit microprocessor market tomorrow with the announce-

Continued on page 8

FYI

Premium benefits: Insurer collects from DBMS

By Charles Babcock

NEW YORK — Although many businesses have moved to centralized data base management systems during the last five years, few offer as dramatic a before-and-after contrast as does the State Insurance Fund, the largest insurance carrier in New York state.

Housed in an aging office building in New York's financial district, the State Insurance Fund provides workmen's compensation insurance to a third of the state's employers.

At the agency, MIS managers have accelerated payroll audit reviews, have shifted batch functions on-line and are working to improve cash flow to the agency by cutting seven days off the billing procedure.

These changes are all a result of the nonprofit agency's adoption of a central data base management system, from which it is just beginning to extract full benefit.

"We went from the horse-and-buggy days to the Space Age in five years," said Joseph E. Szymkiewicz, director of data and systems. With the host of applications that will be on-line for the first time this year and next, the State Insurance Fund will have converted 90% of its operation from stand-alone applications to DBMS, he said.

When Szymkiewicz was hired to manage the conversion six years ago, he inherited an agency that was using an IBM 7070 intermediate data processing system, a machine that was first issued in 1958. With no capacity to drive an online printer, the 7070's output took the form of punch cards or tape.

The DP staff "was completely demoralized. Our IBM 370 mainframe didn't know what a 7070 was doing. The staff thought the world had passed them by," he said.

The State Insurance Fund's approach was to retrain people rather than replace them. That may have slowed the process initially, but Szymkiewicz said it smoothed the way for DBMS changes by reducing employee apprehension.

In 1980, the state agency put its hardware needs up for bid, and the winner was Burroughs Corp. The agency installed a Burroughs 6807 that year, up-

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NEWSPAPER

Apple forces rewrite of GEM

By Peggy Watt

MONTEREY, Calif. — Digital Research, Inc. bowed to pressure from Apple Computer, Inc. and agreed last week to revise and rerelease its Graphics Environment Manager system, which Apple charged was too similar to its own Macintosh interface and violated its copyrights.

No legal claim was filed, but the companies signed a formal agreement that also calls for Digital Research to pay Apple an undisclosed sum, provide some Digital Research programmers for Apple projects and let Apple review future GEM advertising, spokeswomen for both companies said. The companies also agreed to pursue some cooperative software ventures.

In question were GEM Desktop, GEM Paint and GEM Draw, which Apple said mimic the Macintosh interface, Macpaint and Macdraw. Apple claimed GEM as a whole was "substantially similar" to its Macintosh interface, according to Kathleen Dixon, a spokeswoman for Apple in Cupertino, Calif. Digital Research's cash payment is intended to compensate Apple for GEM advertisements that Apple claimed unfairly played on the program's similarity to the Macintosh.

Digital Research is required by Nov. 15 to phase out its first version of GEM, which was released in April and is characterized by the company as an operating system extension, and to replace it with another that meets Apple's approval. Digital Research also last week delivered a proposed second version for Apple's review.

The GEM system has been licensed to a number of personal computer manufacturers, who will also be provided with the new design as soon as possible, according to Nan Borrson, the Digital Research spokeswoman. Her company has shipped more than 30,000 retail copies of GEM Desktop and GEM Draw and some 500 tool kits for GEM applications.

Digital Research denied it infringed on Apple's copyright but agreed to the settlement in lieu of a long legal battle. "That's not where we want to spend our time and resources," Borrson said.

Borrson said GEM's user interface will remain much the same, but icon locations and other small aspects may be changed. The current version will be on dealers' shelves until the second release. Owners of the original GEM may opt for an upgrade, and all GEM applications will run under both versions, she said.

Apple persuaded International Microcomputer Software, Inc. of San Rafael, Calif., to change an early advertisement that likened its PC Paintbrush program to the Macintosh and Macpaint when PC Paintbrush first appeared in August 1984.

Likewise, Apple approached Mouse Systems Corp. of Santa Clara, Calif., when it released PC Paint about a year ago, said Barbara Marsh-Wetherell, marketing communications director. The program was deemed "different enough that there wasn't anything they could do."

Xerox Corp. holds copyrights on icons and other features of the Xerox Star, which is similar to the Macintosh interface but was introduced in 1981. The Xerox workstation introduced pull-down menus, multiple-display windows, bit-mapped graphics and a mouse, according to Xerox spokesman Don Ramsey. "We never felt it necessary to go after anyone" that had similar features, Ramsey said.

Layoffs persist in add-on, chip firms

By Clinton Wilder

The prolonged slump in both the semiconductor and computer peripherals industries continued to make its mark last week in the form of further cost cutting.

Motorola, Inc.'s Semiconductor Products Sector instituted a major layoff, and Intel Corp. announced a pay cut and furlough, while Control Data Corp.'s joint venture subsidiary, Magnetic Peripherals, Inc. (MPI), announced plans to close a disk drive plant employing 1,100.

Computervision Corp. also layed off 250 workers, including 180 at a 3½-year-old Sanford, Maine, manufacturing plant that will shut down next week and 70 in various worldwide locations. The Bedford, Mass., computer-aided design and manufacturing vendor laid off 950 employees in April.

Motorola will cut its Phoenix-based staff by 700 to 1,200 workers through various reduction measures. Approximately 200 positions will be cut at the semiconductor plant in Austin, Texas. In addition, the firm will trim its overseas work force in Europe and the Far East by 500 to 600 employees.

The cuts represent an approximate 4% reduction in the semiconductor unit's work force of 37,000. Earlier layoffs and other cuts had trimmed the division's worldwide staff by 17%.

In a separate move not resulting in layoffs, Motorola consolidated its Motorola/Four-Phase Systems, Inc. superminicomputer operation with its cellular telephone business in a new division, the General Systems Group, based in Schaumburg, Ill. Motorola Chairman Robert W. Galvin said the move was designed to merge computer-based expertise within the two units.

Intel pay cut

Santa Clara, Calif.-based Intel implemented a 4% to 8% pay cut, effective immediately, for its 14,500 U.S. employees. The company also will close its doors from Dec. 23 to 27 and give employees two unpaid vacation days, Dec. 30 and 31.

A spokeswoman said the measures were intended to avoid further layoffs. Intel laid off about 950 workers in June and another 900 last February.

MPI said it will close its Santa Clara plant, which makes disk drives for Sperry Corp., by next July, resulting in the dismissal of 1,100 employees. Sperry is a joint owner of MPI along with managing partners CDC, Honeywell, Inc. and French computer maker Groupe Bull.

MPI President Alvin Netten said Sperry is increasing its use of MPI disk drives made in Minnesota and phasing out the line made in Santa Clara.

National Semi posts $53.5 million loss

SANTA CLARA, Calif. — National Semiconductor Corp. last week reported a loss of $53.5 million, or 59 cent/share, in the first quarter ended Sept. 22.

The loss, which was expected, was by far the worst in the company's history. Sales plummeted more than $100 million from the same quarter last year to $423.4 million. National Semi brought in profits of $35.9 million, or 40 cent/share, in the year-earlier quarter.

National Semi's Systems Division, was profitable during the quarter. National Semi's weakest chip sales were to data processing and related businesses, while sales to military and automotive applications remained strong.

National Semi's revenue in the 16-week quarter showed a small decline from the previous 12-week quarter, when the company posted a modest $2.7 million loss on sales of $428.6 million. But the company said orders improved slightly across the board.

Intel Corp. is also expected to report a quarterly loss this Thursday, with other leading U.S. chip vendors expected to follow suit.

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IBM expanded the storage capacity for its Personal Computer AT/**11**

Comshare announced the Commander Executive Information System mainframe and personal computer software/**12**

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CORRECTIONS

An unlimited-quantity site license for Borland International, Inc.'s Sidekick and Superkey programs costs $75,000 [CW, Sept. 30].

■

The updated version of the DB Vista data base management software from Raima Corp. [CW, June 17] can handle more than 16 million records per file, according to the vendor.

■

The first installment of the Hardware Roundup [CW, Aug. 19] included erroneous information supplied by NCR Corp. concerning its 9300 and 9400 mainframe systems. The correct million instructions per second (Mips) figures are 0.37 Mips and 0.67 Mips, respectively.

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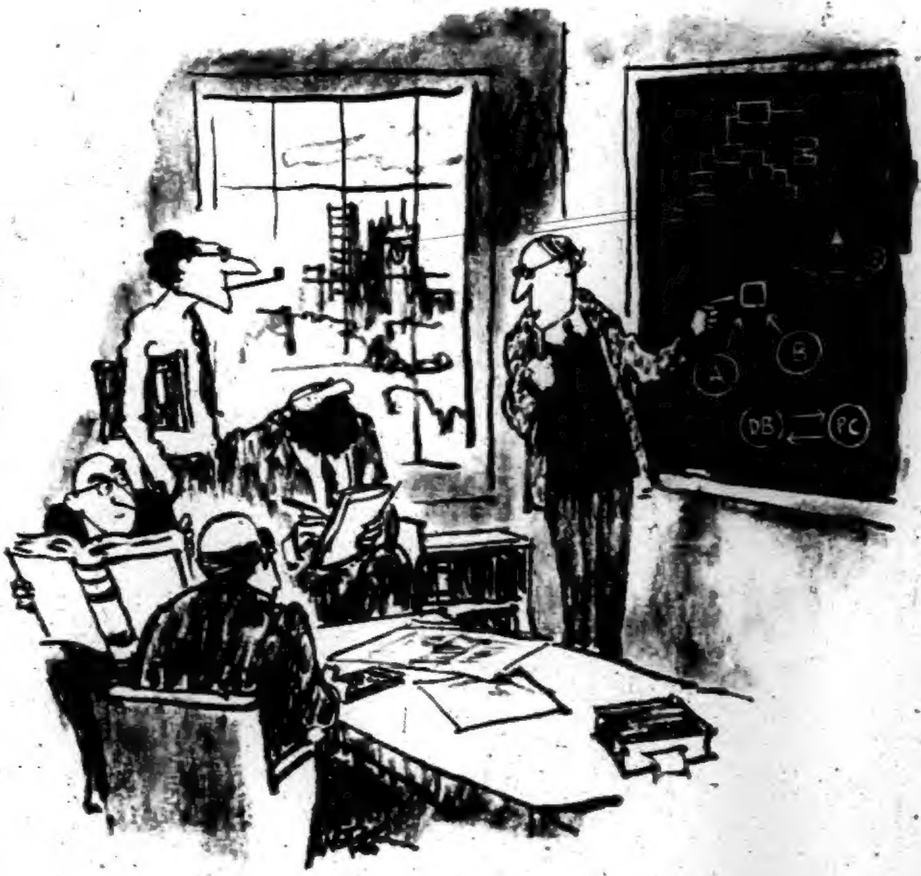

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Profs versions provide link to Disoss network

now all exchange revisable documents via Disoss.

Additionally, IBM products used in offices — 3270 terminals and Personal Computers; System/36 and 38 minicomputers; 5520 departmental processors; 8100 distributed processors; and 4300, 3080 and 3090 series mainframes — can now communicate via Disoss.

Last year, along with announcements of its Personal Services packages [CW, Oct. 29], IBM announced its intention to release Displaywrite/370. The Personal Services packages provide a common menu for electronic mail and calendaring functions.

Displaywrite/370 allows host-based word processing using IBM's Document Content Architecture (DCA). Users on 3270 terminals can create, revise, print and exchange documents with other IBM processors and workstations equipped with Displaywrite.

But the office systems picture may still be incomplete. "Almost every IBM distributed system now has somewhat consistent word processing and other office functions, and nearly all can act as a Disoss node," said analyst Frank Gens of International Data Corp. of Framingham, Mass. IBM needs to expand other office functions, such as graphics.

Profs and Disoss are often confused as competing products, Gens said. Disoss is a network application that controls communication between distributed intelligent office processors, while Profs is a host-based multiple-purpose application package along the lines of Digital Equipment Corp.'s All-In-One.

"IBM had to allow Profs users to participate in a Disoss network," Gens said, providing revisable DCA documents to Profs users, which the company did with the new Profs versions. Prior to the announcement, Profs users could only exchange final-form documents in the Disoss network.

On mainframes, Gens said, IBM had to provide consistency in office automation applications — the same word processing, electronic mail and calendar menus — across the DOS, VM and MVS operating systems.

For user Warren Kress, information center manager at Volkswagen of America, Inc. in Warren, Mich., the IBM Displaywrite/370 announcement presents a temptation. Volkswagen is planning to install 60 departmental computers at a rate of 15 to 20 per year and to provide electronic mail services to its users.

"It's tempting. With Displaywrite/370 on the mainframe, all the dumb terminals can now be used to do word processing and messaging," Kress said. "The temptation is to implement our electronic mail system all at once by putting it on the mainframe. That works, but it's a more expensive way to go."

This may be what IBM has in mind. Peter Lowber, director of information specializing in software and end-user computing issues at the Boston-based Yankee Group, said, "IBM is setting dead aim on 1986 as a good recovery year. The timing and delivery dates of the announcements are extremely aggressive."

For user Martin Ritchie, manager of the network application development support center at Boeing Computer Services Co. in Seattle, Wash., the Profs announcements offer consistency. "As part of our overall integration strategy, IBM is supporting our direction of integrating mail systems," Ritchie said. Boeing is using DIA/DCA protocols as the backbone of its network capability. With the latest IBM announcements, "we can bring Profs users into the fold," Ritchie said.

Profs Version 2, Release 1 is priced at $22,000 for 100 users or fewer and $32,000 for more than 100 users. Displaywrite/370 is priced at $14,000 for the MVS and VM versions and $6,000 for the DOS version. A Document Management/VSE Productivity Facility, which provides text editing, library services and document distribution to IBM 4300 DOS users, is priced at $2,850.

Displaywrite/370, a full-screen text editor for MVS, VM and DOS users, joins the Personal Services and Displaywrite products in the IBM Office Systems family. Displaywrite/370 also features spelling verification and correction, automatic hyphenation and an English synonym aid.

IBM also announced the Document Management/VSE application package, consisting of Displaywrite/370 and the Document Management/VSE Productivity Facility, to provide IBM Personal Computer and 3270 terminal users access to a 4300 processor to store and share documents.

Displaywrite/370 is scheduled to be available in February 1986; Profs Version 2, Release 1 in November; Profs Version 2, Release 2 in the third quarter of 1986; and Document Management/VSE in March 1986.

From page 1

Vector processor takes aim at mid-range mart

el 400 quadratic processor, from mid-1987 to the fourth quarter of 1986.

- Vector processing software and supporting enhancements to the 3090's operating system software, MVS/XA and VM/SP HPO.
- Main memory capacities boosted from 12M bytes to 16M bytes on the 4361 Group 4 and Group 5 systems, available in February for $242,000 and $279,000, respectively.

IBM declined to provide a Flops rating but said the facility can result in speeds of 1½ to three times faster than a 3090 without the facility.

However, analyst Frank Gens of International Data Corp. in Framingham, Mass., estimated that each vector processor allows a peak performance of 108M Flops and an average performance of 10M to 20M Flops.

The vector processor is field installable through hard-wire connections to the 3090's CPU. IBM said two facilities can be added to the Model 200 and four to the Model 400.

The unit is said to help the CPU process arithmetic and logical operations on rows or columns of up to 128 numbers in a single instruction. It adds 171 instructions for processing vectors.

Individual units have 16 vector registers containing 128 elements, each holding a 32-bit number.

Independent consultant Dale Kutnick of Wayland, Mass., said, "It would be useful to companies that can't afford a Cray or have one Cray and want to add the vector processing capability to their 3090."

Analyst Harry Edelson of Edelson Technology Partners in Saddle Brook, N.J., added, "IBM is going to move this up and down their product line. So you can bet that if they are not competitive with Cray or the Japanese companies in supercomputers now, they will be someday."

Scheduled to be available in February, the vector processing facility costs $370,000 for one and $600,000 for two.

New programs include the following:

- Engineering and Scientific Subroutine Library (ESSL), a library of 95 mathematical and scientific subroutines.
- IBM Fortran Language Conversion Program (LCP), to convert most Fortran Level 66 programs to IBM VS Fortran Level 77.
- Vector Processing Subsystem/Vector Facility (VPSS/VF), to run programs written for the discontinued IBM 3838 array processor on the 3090.

The license charge for ESSL is $700 per month. There is a one-time charge of $28,000 for LCP and a one-time charge of $40,000 for VPSS/VF.

IBM also enhanced its IBM VS Fortran with Version 2, which is said to allow users to write assembly language instructions for the 3090 vector facility. Including a compiler, library and debugger, it will have a monthly license charge of $750.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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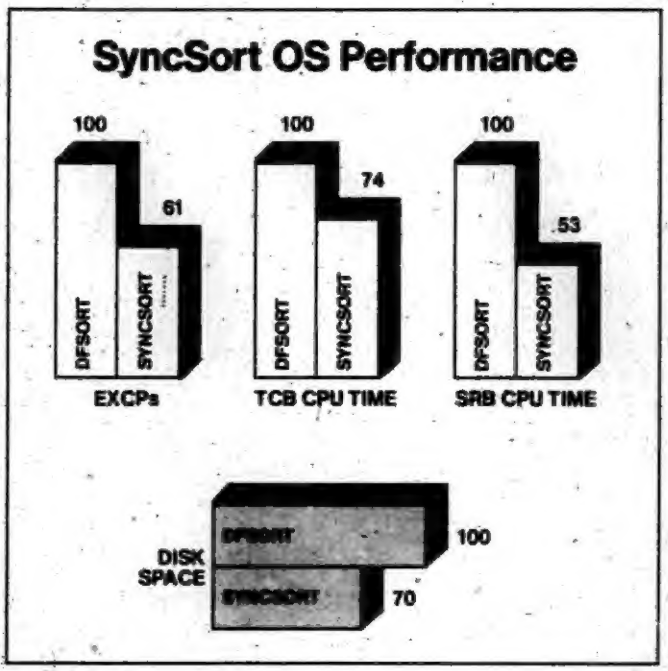

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Masterpiece stars at upbeat Software International meet

Firm commits to bring line to non-IBM users

By John Gallant

WASHINGTON, D.C. — To appreciate the upbeat atmosphere at Software International Corp.'s 1985 users group conference last week, one had only to recall that just four years ago, it was not clear that the company would even be around at the decade's midpoint.

But Software International's darker days seemed all but forgotten last week. Company executives were celebrating user reception of the recently unveiled Masterpiece series IBM mainframe applications. And nonmainframe users seemed pleased with both the company's announcement of a similar application line for the IBM System/38 and with its commitment to migrate that software technology to its other target markets.

As the 1980s began, the vendor of financial and human resource applications was losing money and could not maintain the development pace set by competitors like Management Science America, Inc. (MSA) and McCormack & Dodge Corp. Software International was slipping to the back of the applications pack, and its survival was in doubt, according to Robert Healy, senior vice-president of marketing and planning.

But four years ago this month, the firm welcomed a savior in the form of General Electric Co., which purchased the Andover, Mass.-based company and has since made it a wholly owned subsidiary of GE Software Products Co. With the help of GE's financial and management resources, Software International's development and marketing efforts rebounded sharply.

As a result, Healy was able to stand before more than 700 users and sing the praises of the Masterpiece series of integrated applications — the fruit of a product strategy that rivals in scope the grand designs of industry leaders Cullinet Software, Inc., MSA and M&D. Thanks to GE and a $6 million development push, Software International, Healy claimed, has moved its product line back into the limelight.

But the company still has much to accomplish in the coming months. Software International has promised to deliver by year's end the Masterpiece versions of all its existing IBM mainframe financial applications. It has also slated a first-quarter 1986 delivery date for a new purchase order application and has hinted that it may later deliver a complete purchasing system.

Next year the company will begin a 12- to 18-month project aimed at isolating data base access logic from the applications code. Software International has further committed itself to separating the teleprocessing monitor logic from its systems some time in the future to give applications users more environment independence.

The company has assured its non-IBM mainframe users that it will provide Masterpiece-level functionality and integration in its applications for Wang Laboratories, Inc., Digital Equipment Corp., Hewlett-Packard Co. and Sperry Corp. processors.

Over the longer term, Software International must also decide whether to make commercially available a variety of productivity tools, both acquired and homegrown, which the company relied upon to develop its Masterpiece products.

As a sign of its commitment to its smaller machine users, the company used the conference to unveil Masterpiece/38 (see related story below).

The lag time involved in bringing product enhancements down into the small systems markets had been something of a sore point with users. But Richard Accurso, executive chairman of the Software International users group, praised the company's recent efforts to keep small- and mid-size system users from falling too far behind their mainframe brethren.

The recent computer industry slump has lengthened the software selling cycle, Healy said, and the company experienced lower than expected profits in August and September. But the firm's 1985 earnings have stayed on track, owing in large measure to cost containment steps taken early in the year and to the company's success in the smaller systems markets. Healy said non-IBM mainframe revenue is nearly 30% above target this year because of its success selling to the large installed base of minis.

"We had hoped for better economic conditions at the end of this development cycle," Healy said. "It is scary. But we know we are on the right track, and we just keep trying to look at the market with long-range glasses."

System/38 gets Masterpiece

WASHINGTON, D.C. — Software International Corp. promised IBM System/38 users all the functionality of its evolving mainframe Masterpiece series applications with the introduction of the Masterpiece/38 line last week.

Unveiled at its 1985 Users Group Conference here, Software International's Masterpiece/38 products are said to be built on the same Intelligent Architecture as their mainframe counterparts.

The Intelligent Architecture is designed to integrate the applications through common Help, screen navigation, query, security and micro-to-host link tools.

Included in the announced tools designed to work among the Masterpiece/38 applications are the following:

- Smart Link/38, a micro-host link that allows IBM Personal Computer users to selectively transfer data from and to a System/38. Data is automatically reformatted for popular microcomputer packages such as Lotus Development Corp.'s 1-2-3.
- Masterquery/38, a query and reporting package that allows users to access information across Software Internationl applications.
- Master/Security/38, a security system that provides a single logon to multiple applications.
- Menu and Screen Navigation, a facility that allows users to move from screen to screen among applications.

Pricing for the systems ranges from $25,000 to $35,000, and current System/38 users will receive upgrades at no cost. Masterquery/38 and Smart Link/38 are priced separately at $7,000 and $3,500, respectively.

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Intel supermicro offerings extend 286/310 product line

PHOENIX — Intel Corp. will introduce today two series of supermicrocomputer systems building upon its 80286-based 286/310 product line.

Intel is emphasizing the upward mobility, software compatibility and open architecture of the products.

The 286/310 Advanced Processor (AP) is said to improve performance 80% over the existing 310 by substituting an 8-MHz 80286 processor, with zero wait state for the 6-MHz processor in the 310 to perform more than 1 million instructions per second (Mips).

Intel also announced the 286/310 AP Extension (Apex) series of dual, tri- and quadprocessors, with performance claims ranging from more than 2 Mips to more than 5 Mips.

According to David R. Coffin, product marketing manager for Intel's Integrated Systems Operation, the Apex "multiple-CPU architecture is totally transparent to the application." Apex CPUs can be added to boost the performance of the 286/310 and 286/310 AP.

The products, based on Intel's adaptation of Microsoft Corp.'s Xenix, are compatible with Intel's Opennet local-area network and the firm's Idis data base information and office automation system.

Intel also announced upgrade kits for migration from the 310 to the new systems through board swapping or through installation of additional boards by Intel service representatives.

Coffin said the systems are the first in their price/performance class to use a microprocessor to control each subsystem. Theyuse Intel's 80287 math coprocessor to extend the instruction set of the 80286 in computation-heavy environments.

The 310 AP is available with up to 9M bytes of random-access memory (RAM), an integral 40M- to 140M-byte Winchester disk drive, an integral 320K-byte floppy disk drive and an integral 60M-byte streaming tape backup. It supports up to 16 users, according to Intel.

An entry-level, eight-user AP system with a 40M-byte hard disk is available now and priced at $11,200 in quantities of 50 or more. Upgrade kits for existing 310 users cost $4,995. Larger AP configurations will be available in December at prices ranging from $17,200 to $21,700.

The dual-CPU Apex with a 40M-byte hard disk drive starts at $16,500 in OEM quantities. An Apex upgrade kit lists for $6,995. The Apex-3 and Apex-4 will be available during the first quarter of 1986. A full Apex-4 with 1M byte of RAM and a 140M-byte hard disk drive, floppy disk drive and streaming tape will cost $35,000 in quantities and about $50,000 in single units, according to the company.

DEC loses patent violation suit

By Clinton Wilder

MAYNARD, Mass. — Digital Equipment Corp. suffered a rare defeat in a patent infringement case last week when a federal judge ruled that a C. Itoh Electronics, Inc. subsidiary's terminal does not use proprietary DEC VT220 technology.

Judge Frederick B. Lacey of the U.S. District Court of New Jersey denied DEC's December 1984 request for an injunction to block the sale of the CIE Terminals, Inc. CIT-220+ terminal. Lacey ruled that DEC had not shown sufficient evidence of copyright and trademark infringement by CIE Terminals and that it had not produced sufficient evidence that the sale of the DEC-compatible products unfairly hurt VT220 terminal sales.

While Irvine, Calif.-based CIE Terminals hailed the ruling, a DEC spokesman said the case may be appealed.

DEC suit draws counterclaims

In another unrelated patent infringement case brought by DEC, a Costa Mesa, Calif., vendor of DEC-compatible communications and storage products filed counterclaims charging DEC with antitrust violations, misuse of patents and predatory practices.

Emulex Corp., charged with infringement by DEC earlier this year [CW, July 15], accused DEC of "intending to lessen competition and create a monopoly in the peripheral market." Emulex asked a New Hampshire federal court to throw out DEC's charges and award Emulex treble damages for alleged lost sales as a result of the multimillion-dollar DEC lawsuit.

"We plan an aggressive effort to stop what we view as an illegal attempt by DEC to lessen competition in our marketplace," Emulex Chairman Fred B. Cox said in a statement. "We are most capable and well prepared to defend our right to continue providing competitive alternatives to DEC peripheral products," Cox's statement added.

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English-language interface out for 1-2-3

By Eric Bender

PASADENA, Calif. — An add-on package that permits Lotus Development Corp. 1-2-3 users to give commands and create macros in plain English has been rolled out by GNP Development Corp., a small software firm.

The Human Access Language (HAL) package, scheduled for shipment in December and tentatively priced at $295, lets users carry out standard 1-2-3 functions by typing straightforward English commands, GNP President Bill Gross said. Additionally, the package features an Undo command and creates transcripts that automatically log activity during a work session.

While GNP would not disclose names of any beta test users, one high-level developer at Lotus who looked briefly at HAL gave it high marks for both concept and execution. Applauding its ease of use, he also remarked on the difficulty of the 1-2-3 assembly-level programming required. "No one but a madman would get that deep into the code," he said.

GNP, which has offered 1-2-3 add-ons since last December, began work on HAL after finding that most users tap only a small fraction of the best-selling program's capabilities, Gross said. "There are people out there who think they're great with 1-2-3, have invested all that money in it and use it all day but have not really started with it."

Users may ignore 1-2-3 functions because they take too much work, Gross maintained. "Graphing is something that most people don't do, because there is so much setup required."

Designed for new, casual and experienced 1-2-3 users, HAL can handle words and phrases that people typically employ when working with spreadsheets, Gross said. Additionally, he said, users can add their own synonyms.

According to GNP, users can retrieve a file called "January Sales" by typing "get Jan sales." Rows can be deleted by typing "del this row." The package also responds to commands such as "sort by column X" or "give me a list of salespeople whose pay is > $40,000." Formulas can be entered in normal terms, such as "first quarter is Jan plus Feb plus March," simplifying the construction of financial models, according to the company.

By typing "total all," for example, users can produce a total for all columns in a work sheet much faster than they can by employing the regular 1-2-3 commands. Additionally, users can develop macros in plain English and modify existing 1-2-3 macros with HAL, according to Gross.

From page 1

Honeywell revamps network architecture

Distributed Systems Architecture/6 (DSA6) — which provides DSA for the small system — and Honeywell's SNA6 software. When fully configured, the gateway enables Honeywell terminal users to access IBM hosts, supporting up to 128 IBM host terminal sessions.

A gateway presentation facility is said to provide the necessary conversions between the Honeywell and IBM environments.

DSA/SNA components — which include presentation, facility and IBM 3270 terminal facilities — are priced individually and include initial and annual license fees that range from $95 to $855.

Honeywell has bolstered communications options within its own realm with three new models of its Datanet 8 communications processor, devices that can be configured as front-end processors, node switches, remote concentrators or any combination of the three.

The Datanet 8 supports half- or full-duplex transmission of asynchronous, character synchronous and bit synchronous protocols, including IBM's Binary Synchronous protocol and High-Level Data Link Control (HDLC) used in packet networks.

The entry-level Datanet 8/10 has a maximum of 31 ports, 1M byte of main memory, expandable to 2M bytes, and costs $23,900. The Datanet 8/20 has 8K bytes of cache memory to the 8/10's capacity, supports up to 127 ports and costs $38,000; it can also be expanded with an optional second processor. The high-end 8/30 also has cache memory, an optional second processor and a maximum memory capacity of 4M bytes. It supports up to 255 ports and costs $80,000.

The Distributed Network Software (DNS) for Datanet 8 has been enhanced with this release to provide support of IBM 3780 RJE terminals. The basic DNS 300 operating system software costs $560 per month and will be available with the Datanet 8 products in the second quarter of 1986.

At the low end, Honeywell has enhanced its DSA6 for use with its DPS 6 processors.

Release 3.1 of DSA6 is said to enable DPS 6 to communicate on a peer-to-peer basis with all other DPS family members.

In particular, this release provides a unified file transfer facility, support of a remote batch facility, a network administration facility and an optional network control facility. A bundled version of DSA6, including all facilities, will be available in November for $2,190 and a $1,000 annual license fee.

TOP OF THE NEWS

Continued from page 1

ment of Clipper, an AT&T Unix System V engine featuring three 33-MHz chips on a module. The announcement at the International Conference for Computer Design will claim a Digital Equipment VAX-class peak performance of 33 million instructions per second and a 5-Mips average performance.

■

On-Line Software International will take a dramatic step in marketing micro-to-mainframe software next week, announcing a version of its Omnilink software with the mainframe portion offered for free. On-Line Software will charge only $495 per microcomputer for its new Free-Link product, according to Richard Granger, executive vice-president for marketing at the Fort Lee, N.J., firm, who noted, "It's a little outrageous — we're probably the first mainframe software provider to ever give the mainframe product away." On-Line had earlier priced the equivalent mainframe software at a minimum of $6,000.

■

One sideswipe victim of the shake-up at Apple Computer is likely to be the controversial television commercials for the Macintosh produced by California's high-powered Chiat-Day advertising firm. The commercials, broadcast during the last two years' Super Bowl football games, were championed by now-departed Apple Chairman Steve Jobs and Macintosh Marketing Director Mike Murray — and few others.

■

With IBM's purported Risc-based engineering workstation still in the wings, Digital Equipment was pleased last week to see one of its OEM customers announce marketing arrangements for bundled versions of the Microvax II. The customer is Tektronix, Inc., of Santa Clara, Calif., whose computer-aided engineering division said it will package its DEC VMS-based computer-aided engineering software with the Vaxstation and with the Microvax II. The Microvax II will also be serially interfaced with Tektronix's 4120 series color graphics display terminals.

■

Compaq Computer, which made its mark by deftly emulating (but not copying) IBM's PC-DOS operating system, has moved to prevent anyone from too deftly emulating the enclosure design of its portable computers. The company announced last week that the U.S. Patent & Trademark Office had granted a patent for the enclosure design to Ted Papajohn, manager of Compaq's industrial design department.

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Integration, coexistence stressed at Wang users meet

By Donna Raimondi

BOSTON — Integration and coexistence were the hot words last week at the annual meeting of the International Society of Wang Users. Meanwhile, a few blocks away, an independent Wang users group held its first exposition and national meeting.

Attended by more than 1,700 users, Wang's "Partners in Innovation" show stressed IBM compatibility, networking capabilities and the coexistence of various Wang products, such as the Office Information System (OIS) and VS systems interconnection.

VS users heard about the latest in operating systems; an increase, due in March, in the virtual address space from 2M to 16M bytes; and additional features such as security logging, audit trails and resource sharing.

Wang has committed itself to users of the full spectrum of its equipment, various speakers stressed, including the lower end OIS word processing systems and the vertical market 2200 — primarily sold by value-added resellers.

"Wang is concerned about how well or not well we have done letting the customer decide what he needs," Mark Detering said in his session on OIS/VS coexistence and migration. Users who feel that they are being driven out of their OIS systems into the newer VS line should rest assured that this is not so, he said.

Another reassurance for Wang users is that the company's 2200 system, primarily sold as a vertical market stand-alone system by value-added resellers, will be enhanced, upgraded and fully supported, said Gene Schulz, 2200 product manager and member of a special task force that has been set up by company founder An Wang to improve the product.

The OIS system is being unbundled to allow for more disk space and to allow the system to be configured with a customer's future VS system. The biggest news for OIS users is the company's direction toward interconnecting OIS and VS. VS capabilities can be brought down to the OIS user through a couple of schemes, the vendor said.

The first, based on Wang's Fastlan local-area network product, allows customers to add users or applications to the OIS system. The second scheme, based on the Wang Systems Networking product, allows remote connection of OIS systems to VS systems. For users who want to move up to a VS, a variety of local and remote connection packages allow OIS functions to run on the VS system.

Wang emulation of IBM's Systems Network Architecture (SNA) will be accomplished through software, not through black boxes, according to Bill Donovan, SNA emulation products manager. The emulator packages themselves have been available for two to three years, he said, but services and applications based on the emulations are still being developed or refined.

Down the street from the official company-supported users group meeting, a new organization kicked off its first national meeting. Index '85 was sponsored by Harry J. Berkley, the publisher of *VS News*, an independent magazine for Wang users that is often critical of Wang strategies.

Bob Daniels, a former Wang employee and previously a manager of the official International Society of Wang Users event, organized leaders of local Wang users groups around the country to support the new organization. As Wang gets more heavily into data processing and word processing, it will have to cooperate more with third-party vendors, Daniel said. "Wang hears the music, but it's taking them a little time to get the dance steps."

"We don't want to compete but to provide a channel of communication between users and third-party vendors that is objective and independent," Berkley said.

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IBM expands AT storage with 30M-byte hard disk

Second drive pushes storage to 60M bytes

By Eric Bender

BOCA RATON, Fla. — In a move seen as providing a natural extension of the Personal Computer AT line, IBM's Entry Systems Division last week launched a version of that machine with 30M bytes of hard-disk storage.

Functionally identical — except for the disk drive — to the existing 20M-byte AT enhanced model, the new system is priced $200 higher at $5,995.

Available this month, the new model can be expanded to 60M bytes by adding a second drive internally for $1,995. A 30M-byte drive also can be added to existing ATs for the same price. Built by IBM's Low-End Storage Independent Business Unit, the drive features the same 40-msec average access time as the 20M-byte device.

Response to competition

IBM "is just rounding out the product line," commented Egil Juliussen, chairman of Future Computing, Inc., a market research firm in Dallas.

"It looks like a response to the level of competition that's developing in the AT clone market," said Chris Christiansen of the Yankee Group in Boston.

While the new AT may find some applications as a single-user machine because users often fill up whatever disk storage is available to them, it may be targeted more toward roles as a multiuser system or a local-area network server, other analysts said.

Multiuser system

IBM is positioning the AT as a multiuser system, according to Tom Billadeau of TRB & Associates in Ogunquit, Maine. "Something that doesn't have at least 30M bytes isn't really a viable product."

Billadeau and Christiansen said that IBM will introduce a proprietary operating system for the AT rather than depend on its PC Xenix.

Among the possibilities are a closer derivative of AT&T's Unix System V, a multiuser version of IBM's PC-DOS and a downsized version of IBM mainframe software, the analysts suggested.

IBM also announced a 30M-byte version of the Personal Computer AT/370, available this month from the company's value-added dealers and branch sales offices. A model with 512K bytes of internal memory, a floppy disk drive and the new hard disk drive will cost $9,995.

From page 1

Insurer reaps benefits from DBMS

grading to two 6811s with tightly coupled memory in 1983 and then a Burroughs 7900H dual processor in April of this year. Both the 7900H and its predecessors, the two 6811s, offered the agency the ability to continue operating even if one CPU failed, Szymkiewicz said.

To implement Burroughs' DMS 2 data base management system, Szymkiewicz needed a core of experienced Burroughs programmers. Burroughs agreed to provide half of what he needed for the first year, so the agency added 12, all of them from Burroughs' Indian subsidiary, Burroughs Tata. The group took lower salaries than comparable American programmers, worked 60-hour weeks through the conversion period, including holidays, and all were fluent in English, Szymkiewicz said.

The group included Ramakrishna Eleswarapu, who would become the agency's director of systems and programming and would lead the design of its data base systems.

Eleswarapu designed three data bases, each containing data for a major operations area. One included data on 400,000 workmen's compensation policies, including premium billing; one included 1.5 million claims records; and the third contained data that had to be reported to the State Insurance Board for experience ratings.

"The design has to be such that it ensures future access to the information you need," Eleswarapu said. The task occupied most of a year for him and his three assistants.

Approximately 60 daily operations programs had to be converted to run against the data bases every day, with another 150 programs being used on a monthly, quarterly or yearly basis. During the last two years, the agency has been adding applications that improve operations instead of duplicating what the agency did with its 7070, Szymkiewicz said.

One such application allows a claims search based on the claimant's Social Security number rather than his name, which is often misspelled. "Since mid-February, we've been able to hit 75% of our claimants by Social Security number," Szymkiewicz said, which means a clerk can call up a claims file in 2 seconds.

Correcting names, which are frequently misspelled by doctors' offices and hospitals submitting insurance forms, used to be a batch process, leading to days of delay before a file could even be found. Now a claims examiner can correct a mistake as soon as it is discovered from an on-line terminal, Szymkiewicz said.

Until recently, an agency clerk examining a payroll audit had to make up a list of changes and hand it to a keypunch operator. With 120,000 audits a year, each requiring clerical adjustments, another tedious process was built into the system.

With another application under development, the agency will be able to process an invoice in one day instead of eight. Each day's delay stalls the cash flow to the agency.

The agency has seen the number of claims almost double since 1980 to 170,000, but its payroll has stayed the same at 2,100, thanks in part to the labor-saving methods of entering claims and reviewing them on-line.

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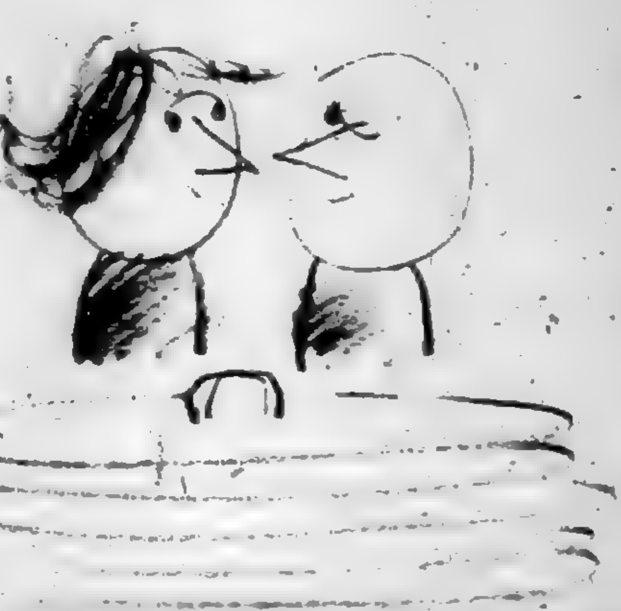

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Execs gain chart, report access tools for CPUs, micros

By John Desmond

NEW YORK — Comshare, Inc. last week introduced a package of mainframe and personal computer software aimed at providing corporate executives a simple method of accessing reports and charts stored in mainframe data bases and applications.

The Commander Executive Information System (EIS), unveiled by the Ann Arbor, Mich.-based software and remote computing services vendor, runs in IBM VM and MVS mainframe environments and on the IBM Personal Computer XT and AT.

The Commander EIS package incorporates several existing modules of Comshare's System W mainframe decision support system (DSS) and two new products designed to ease access to reports and charts for the executive end user.

The new modules are W/Information Gateway, personal computer software that simplifies the end user's requests to the mainframe for reports, and its companion on the mainframe, W/Information Library, which stores reports to be accessed by Information Gateway. A third System W module, Communications, is needed to complete the Commander EIS package. The end user executes all Commander EIS functions from the personal computer.

Information Library can accept reports in final form from applications packages and fourth-generation language products, such as Information Builders, Inc.'s Focus, that can send reports to IBM VM/CMS files. At a later date, Information Library will be equipped to accept reports from IBM MVS/TSO files, a spokesman said. For reports from packages incompatible with those IBM operating systems, data can be extracted and sent to Information Library by MIS professionals, a spokesman said.

Information Gateway can be instructed to provide the most recent version of a report stored on a mainframe or for faster response, the most recent local version stored on the Personal Computer hard disk. Each copy of Information Gateway is priced at $450, and Information Library is priced at $22,500.

Features of Commander EIS include the ability to customize individual user menus on the personal computer, to access information by keyboard or mouse menu selection and to update automatically reports from multiple mainframes and data sources. Information Gateway features automated logon and the ability to incorporate popular microcomputer software packages.

For the DP professional, the EIS development system includes a full screen menu-building facility, graphics capability to chart mainframe and micro data and a range of communications protocols including asynchronous, bisynchronous and IBM's Systems Network Architecture/Synchronous Data Link Control for communication between the micro workstation and the mainframe. EIS offers multiple security levels to support distributed users and a facility for storing frequently used reports and charts on the workstation for fast display response.

Explaining the difference between Commander EIS and System W, Comshare President Richard L. Crandall said, "We're offering the executive access to whatever information he wants, and we're delivering it in a way that requires no documentation or training."

The price for Commander EIS on VM/CMS, available now, ranges from $89,500 to $198,000 for complete DSS configuration.

Existing System/W modules — ranging from $5,000 to $37,500 each — in Commander EIS include System/W Communications, providing for terminal emulation and file transfer through a number of different protocols; W/File Power data importer, which allows extract files to be produced from non-Comshare applications; W/Datman data manager, which puts data in a format necessary for producing reports to be distributed from Information Library; and W/Graphics for producing business charts and graphs.

Comshare, which reported $62 million in revenue at the end of its fiscal year, earns approximately 65% of its revenue from its remote computing service business.

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MSA estimates $10 million loss

ATLANTA — Management Science America, Inc. (MSA) recently said it anticipates a third-quarter net loss of $10 million or more and fiscal year profits significantly less than projected.

Yearly revenue is expected to be $28 million — $30 million including the quarter ended Sept. 30 — compared with $28.5 million a year earlier. Third-quarter expenses are expected to rise to $40 million, hence the expected loss, the firm said.

Third-quarter revenue was below forecast due mainly to customers delaying major purchases in economically uncertain times, the company said. Third-quarter expenses were driven up by an increase in marketing and advertising costs.

Gloria vs. DP centers: Hurricane wins in a TKO

By Charles Babcock

NEW YORK — Hurricane Gloria packed a muted punch but still closed many corporate computer centers in her path. Some that did not close voluntarily were knocked out, MIS managers on Long Island and in Connecticut said last week.

With winds of 130 mph while out at sea, Gloria could possibly have been one of the worst hurricanes of the century, but low tides and abating winds combined to reduce the feared tidal swells.

"We're right on Long Island Sound, and our parking lot is 6 feet above the high-tide mark. If the predicted 12-foot tidal surge had developed, part of our building would have been underwater," said Jack Welsh Jr., manager of management information systems at Bridgeport, Conn.-based Remington Products Corp., the electric shaver manufacturer.

No way to move mainframe

Remington operates a Sperry Corp. System 80 Model 8 mainframe on its ground floor and had no way to move it to a higher location before the storm hit. When Gloria struck, 30% of the trees in the city's Seaside Park next door were overturned, but Remington escaped unscathed.

In case he lost the computer, Welsh made arrangements to run his backup tapes at one of three nearby System 80 sites using the same operating system. In the event of a worse storm, Welsh said, he had plans to transport his data to a Sperry site in Hartford, Conn.

Conco Medical Co. in Bridgeport resorted to figuring its payroll by hand and planned to write out paychecks manually after the storm downed Conco's computer service bureau, Telecomp, Inc., in Milford, Conn., a spokeswoman said.

The service agency went down during the Sept. 27 storm and still had no lights, telephones or operational systems three days later. Telecomp officials could not be reached for comment.

Robert L. Klautzer, director of electronic data processing for U.S. Electrical Motors, a division of Emerson Electric Co. in Milford, had purchased new batteries for the firm's diesel generator prior to the storm. After power was lost during the storm, the generator powered computer operations, supporting three plants and five sales offices around the country.

The Dime Savings Bank computer center in Valley Stream, N.Y., on Long Island, lost its power supply early in the storm and had to turn to emergency generators to stay open. The bank closed its 26 branches on Long Island but wanted to keep its branches in the Albany, N.Y., region open, according to John J. Monaghan, executive vice-president.

The storm occurred at the beginning of Dime's end-of-the-month processing schedule, when interest and dividend computations have to be made on all accounts. "We were quite concerned we would not have a data center Friday," Monaghan said. Emergency backup tapes were stored off site, and the phone lines to Disaster Control, Inc., a disaster control firm in Ivytown, Pa., were tested prior to the storm.

Dime's branches in Valley Stream and Coney Island, N.Y., went off-line when they suffered water damage, but the bank's data center rode out the storm intact, Monaghan said.

At Computer Associates International, Inc., in Jericho, N.Y., the threat of a disk drive head collapsing onto a disk during a power outage was enough to prompt the firm's data center, with 100 Dasd units, to close before the storm struck, said R. Michael Williams, computer operations manager.

Walker cuts sales force

SAN FRANCISCO — Walker Interactive Products, Inc.'s recent consolidation of its sales force was its second major work force reduction this year. The company, which has been the subject of acquisition rumors during the past few months, is now left with 52 employees in its San Francisco headquarters, sources said.

Late last month Walker closed branch offices in Atlanta, New York, Chicago and Boston. In February, Walker trimmed its force almost in half, from 268 to 160.

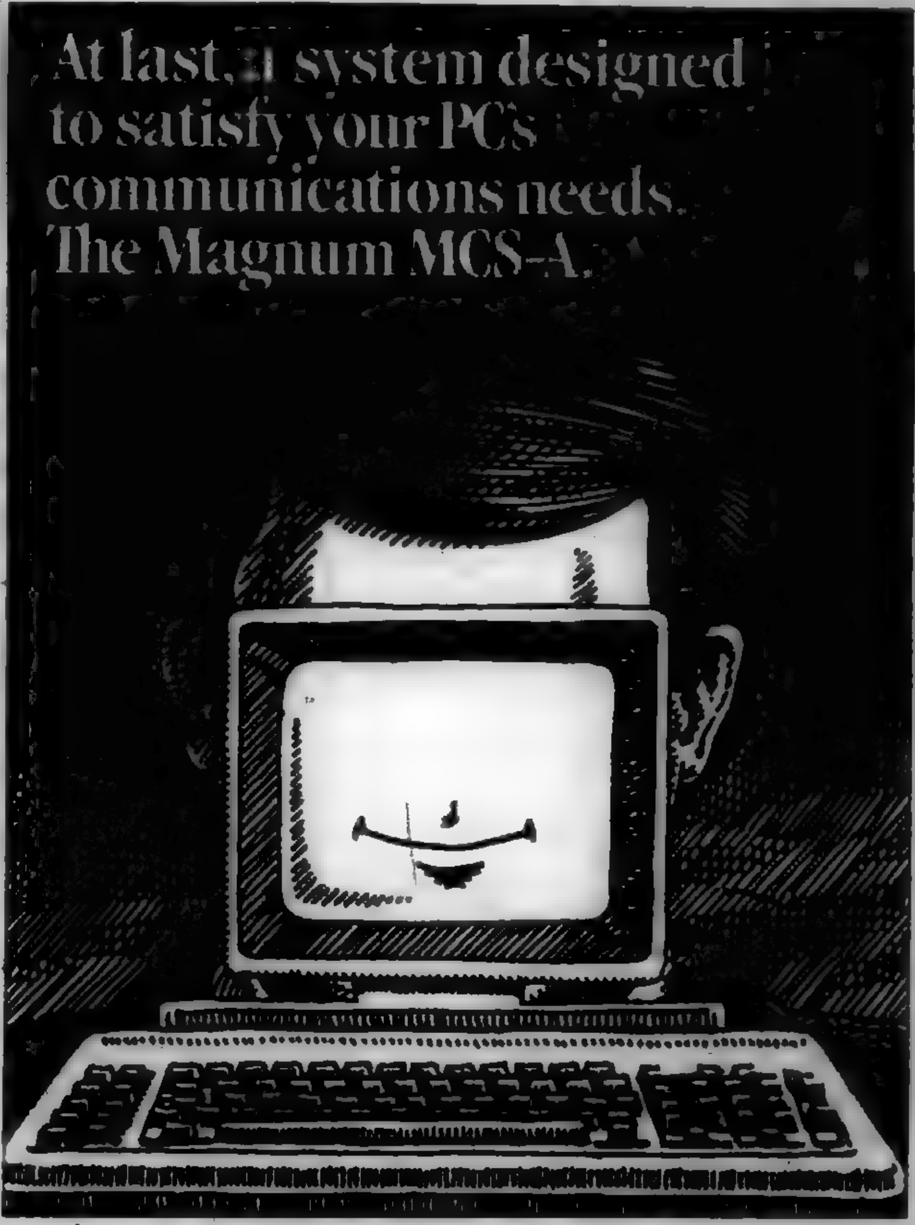
According to Walker President Bruce Coleman, the move is expected to save the company approximately $500,000 a month, making October one of the firm's first profitable months in some time.

Walker is now going through "the last part of a cycle" that began three months ago when Coleman took the reins at the financial applications software company.

"We're in a position now where we don't have to get financing or be acquired," Coleman told *Computerworld*.

"By cutting back, we're trying to get as viable as possible."

However, Coleman added, "If there is an interest in a sale, we'll look at it."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IRS: Large firms to file on magnetic media

By Mitch Betts

WASHINGTON, D.C. — The Internal Revenue Service is stepping up its campaign to get large businesses to file their tax forms, such as the W-2 form on wages and salaries, on magnetic media.

The IRS recently proposed a regulation requiring employers that file 500 or more W-2 forms to use magnetic media, instead of paper forms, in 1987. Before the proposal becomes a final regulation, written comments will be reviewed by the IRS until Nov. 18.

Many of the businesses that will be covered by the regulation already file on magnetic media under a voluntary program, the IRS noted. The move to a mandatory program is required by tax legislation passed by the U.S. Congress in 1982 and 1983.

Smaller employers phased in

Gradually, smaller employers would be phased into the program as well. Beginning in 1988, employers filing 250 or more forms would have to use either magnetic media or machine-readable paper forms.

Although the proposed regulation applies only to returns filed after Dec. 31, 1986, the IRS announcement said filers are encouraged to begin using magnetic media as soon as possible.

The IRS said filing on magnetic media should be cost-effective for firms that have high-volume filings and computerized financial operations or access to a service bureau. Recognizing that magnetic media filing is not cost-effective for all firms, the IRS said hardship waivers will be approved for those "lacking both the necessary data processing facilities and access at a reasonable cost to computer service bureaus."

Unless a waiver is granted, failure to file a return on magnetic media would be dealt the same penalty as failure to file the return at all, the IRS said.

Before sending magnetic media, filers must first get government approval of the type and format of the media, the IRS said.

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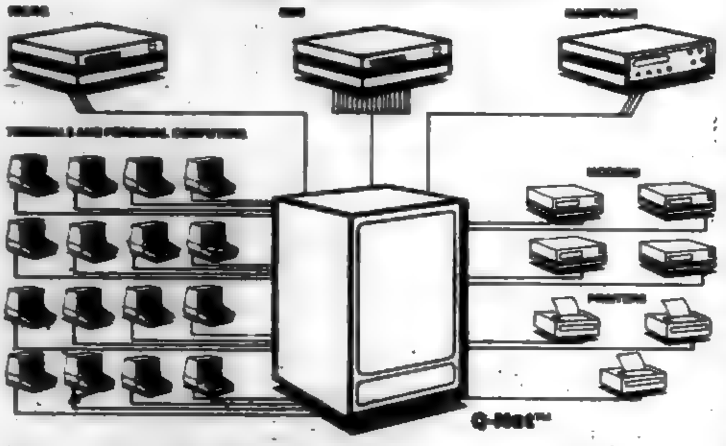

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WASHINGTON UPDATE
Bryan Wilkins
Mitch Betts

GSA speeds DP delivery

WASHINGTON, D.C. — Terence C. Golden, administrator of the General Services Administration (GSA), recently announced a new program — dubbed "Go for 12" — to speed up the acquisition of DP equipment for U.S. agencies.

GSA's Office of Information Resources Management will help other agencies get DP equipment delivered 12 months after budget approval, rather than waiting two to three years as is typical now.

The new approach is needed, Golden added, "to pull the federal government into the new century in handling its work load efficiently and economically."

Golden noted that private industry tends to use its data processing equipment for only 80 months, compared with the government's average of 121 months.

Carriers get rate cuts

WASHINGTON, D.C. — The Federal Communications Commission last week ordered local telephone companies to reduce by 8% their charges to long-distance carriers for connections.

At the same time, it approved an increase in a special category of access charges affecting private-line use, which will mean as much as a 15% increase in costs to users in some cases.

The cuts are not expected to result in lower rates for users, according to FCC officials, who said the carriers earlier this year absorbed increased connection costs but did not pass them on to users.

The FCC said the cuts will result in savings of $536 million to the carriers. At the same time, the FCC said it will maintain the authorized 12.75% allowed rate of return earned by long-distance and local-exchange carriers.

The biggest reason for the cost increases is the local telephone companies' decision to withdraw from the National Exchange Carriers Association (Neca) where access charges were averaged.

AT&T Communications told the FCC that its average costs for connecting to local exchanges that have withdrawn from the Neca pool will be 16% higher.

Mumps is spreading

WASHINGTON, D.C. — U.S. Rep. Fortney H. Stark (D-Calif.) considers Mumps an American success story. In this case, Mumps refers to the software language recently selected as a standard by the Veterans Administration for running its hospitals.

Stark praised Mumps software for being user-friendly, efficient and cost-effective.

"The cost of implementing this system, including hardware, through fiscal year 1985 is only $100 million, as compared with the $2 billion to $3 billion cost estimated by commercial firms," Stark said in a written statement.

John Young speaks out on HP's 'risc'

AN INTERVIEW

I think there is some reason to be hopeful about the next period ahead, but I'm not anticipating some rapid turnaround in which we're returning to red-hot, double-digit growth rates.

I found myself making a sales call a few years ago to a Japanese customer and saying, "Well, I'm here with you representing Hewlett-Packard, a local company, right?" And he said, "Well, it's not a real Japanese company."

Hewlett-Packard Co. has one of the computer industry's oldest existing top-of-the-line products in its 12-year-old HP 3000 minicomputer line, but the company has not been a sleeping giant. Under President John A. Young, 53, the Palo Alto, Calif., firm is engaged in a companywide effort to develop products based on Reduced Instruction Set Computing (Risc) technology. The effort, dubbed Spectrum, is effecting fundamental changes in the organizational structure established by legendary founders William Hewlett and David Packard, but Young maintains that the original HP corporate vision remains intact.

In an interview with *Computerworld* Staff Writer Clinton Wilder and Executive Editor Sharon Frederick in New York last month, Young discussed Risc and Spectrum and other issues.

How did the concept of Risc, as a long-term strategy for HP, evolve within the company?

We had a different problem than a lot of people had. In the computer area, we had desktops with one architecture, factory floor terminals with another and the HP 3000 with yet another stack architecture. And the 9000 series terminals emulated the 3000 architecture in some ways but not really completely.

We found we spent about 90% of our time changing things to get the networking to work out. And all those changes propagated down the whole line.

I just decided, when I became president seven years ago, that our architectures were aging, but we needed to do more than just perpetuate these things — we wanted to find some way of bringing a harmony out of this unique business opportunity.

We needed to make a jump, and the conjunction of all those things was the program we call Spectrum. We could have done a lot of things — gone into complex architecture, scaled up [Motorola, Inc.'s chips] — we could have done anything. But the opinion was unanimous — and believe me, that isn't easy at Hewlett-Packard — that we ought to get on and make a commitment to make this thing and get everybody signed up.

Risc really has a very broad meaning in our company. To us, it's a concept we can unify behind, harmonize our entire program, rationalize the network, do relational data bases that everybody can use.

What applications do you see as best for Risc?

I think that's yet to be demonstrated. I think [HP Vice-President for Research and Development Joel Birnbaum, who heads the Risc effort] would probably argue with the premise that Risc may be good for some things and not for others. At least at first, everybody in HP's different divisions thought it was better than anything else they were looking at to solve their set of problems. It's a pretty universal approach to things.

HP has long had a policy of keeping its divisions relatively small in order to foster a sense of entrepreneurship, of individual initiative. How do you retain that sense, as you grow and try to unify the company around the Risc product strategy?

It's a tricky business. You have to put yourself in the position of the division manager. You like to have your own R&D, your own manufacturing capability, to give your product a proprietary character. It's great. But it is not great to have done that and discover that all the things you did didn't make sense because they didn't fit.

Now you can argue that we've taken something away, but I think if you talk to most HP division managers, you'd find they got something back — a very clear view of what they need to do to be successful.

Last month's Vectra announcement would seem to indicate a different thrust for HP. An IBM Personal Computer AT-compatible, by definition, must be lower priced than IBM. HP traditionally has been noted for premium quality at a premium price. Is Vectra a change?

No, that view is not usually accurate. We are premium quality, but not at a premium price. We think about all the features and are a little more rigorous, perhaps, about packaging things that are truly useful — as opposed to hanging out the lowball deal — that maybe we get that reputation. But if you look at the Laser Jet printer and other products, you see products that are very price competitive — with the HP quality. I think this product is very much in that tradition.

What's your view on the computer slump?

If you look at HP's business, the slump is an electronics slump, not just a computer slump. All of our businesses have been about equally affected. Is it at an end? I don't know. I think there is some reason to be hopeful about the next period ahead, but I'm not anticipating some rapid turnaround in which we're returning to red-hot, double-digit growth rates.

Will that type of growth ever happen again?

Of course. People are quick to say the bloom is off, [that] there's no trend-line growth. I am not personally ready to believe that strong growth opportunities for electronics are over. I really think we're seeing here the confluence of a lot of trends, including the impact of a very rapid defense buildup, the [personal computer] overkill and legitimate customer questions [about networking].

You recently completed your work as chairman of the President's Commission on Industrial Competitiveness. What is your opinion of Congress' apparent direction toward placing duties on imports?

Wild stuff. But in the lack of clear leadership policy, it's not surprising that you find people who are frustrated and pressured by their constituents. There are plenty of people in real pain, and I think you tend to get a lot of seat-of-the-pants backlash that's not good for us and not good for the world.

What are the biggest challenges facing the U.S. in world competition?

It's clear that our ability to compete has been demonstrably eroded over the last two decades, not just while the dollar has gone up.

Very simply, we don't think trade is a national priority. Everyone says, well, the rules of the General Agreement on Trade and Tariffs [Gatt] cover these things. But this is an organization that exists solely to deal with tariffs. World trade has grown by a factor of seven since 1970, but the fraction of transactions covered by Gatt has actually gone down while the incidence of nontariff barriers and other issues have gone up at a geometric rate. And we are not organized to manage that process.

For the computer industry, how do you feel about the Microelectronics and Computer Technology Corp. (MCC) research consortium as a way to boost U.S. competitiveness?

We strongly endorse the idea of public/private cooperation, particularly with the research universities, such as the Center for Integrated Systems at Stanford. Now with MCC, you've changed that from a research cooperative to joint product development.

I personally have a lot of reservations about that. It may be good for some companies, but after evaluating it at Hewlett-Packard, we have not elected to be part of that program.

I think you really lose a lot of the competitive differentiation. Our company's hallmark is engineering prowess — the ability to make that different product, advance the state of the art. We wouldn't know how to function if we had the same thing as anyone else.

What has been your experience selling HP products in Japan?

I would say our joint venture company in Japan has worked very well. We have the ability to compete quite effectively, but that doesn't mean we don't incur some biases. I found myself making a sales call a few years ago to a Japanese customer and saying, "Well, I'm here with you representing Hewlett-Packard, a local company, right?" And he said, "Well, it's not a real Japanese company."

We sell very well . . . where we have a demonstrably better product, and we have lots of trouble where we're one of the pack.

Are the recent moves by U.S. semiconductor vendors toward protectionism realistic?

Well, I think they got [Japan's] attention. That's the most you can hope for. Whether the remedies will work out OK, I don't know. The Japanese are not easy negotiators; you get movement out of them when you push them hard. Take the pending [congressional] legislation. I don't know if they'll pass it or not, but it's certainly having a very real effect.

VIEWPOINT

EDITORIAL

New Jersey and us

A million or more New Jersey automobile owners are currently frustrated by a government agency's incompetence in matters of basic automation policies and practices. If the same sort of thing had happened in a private business, resignations would have been demanded, heads would have rolled.

Governments and computers can be a bad mix for several reasons. The New Jersey case represents just one of them.

Here's what happened: Officials at the state's Department of Motor Vehicles thought they were getting a sophisticated system for tracking license and registration renewals; they thought their high-powered consulting firm, Price Waterhouse, would be able to design it; they thought Price Waterhouse was correct in using a fourth-generation language and a relational data base manager from Applied Data Research of Princeton.

They thought wrong. The system simply could not handle its daily work load. As a result, untold numbers of New Jersey drivers have been unable to register their cars or were incorrectly listed as operating unregistered vehicles and were being cited for the offense. The state hoped the system would cut $3 million per year from its operating costs; instead, it now is paying $160,000 per month in overtime to cope with a backlog of 1.4 million registration records. Price Waterhouse has agreed to pay for reprogramming, at a estimated cost of $2 million.

Now, to this point the New Jersey Department of Motor Vehicles experience is not uncommon in the private sector. System designs frequently do not work out. Happens every day. But it doesn't happen every day that such flawed systems are accepted and implemented by the client without appropriate testing, without backup systems in place and without soliciting — in this case — competitive bids from several suppliers.

Earlier this year, the U.S. Internal Revenue Service attempted a dual hardware and software conversion. It worked, after a fashion and after delaying tax refunds considerably. Now we have the New Jersey case. In both instances, the decision was made to implement a new system seemingly without regard for the effect failure or shortcoming might have on the public.

Private sector firms that endanger the delivery of their product or jeopardize their relationship with the customer base are likely to see customers seeking out alternative sources of products and services. Not so with government agencies. Here, we are all like today's motorists in New Jersey: nowhere else to go for services, no way to hold a government agency accountable for its unconscionable treatment of the citizenry.

An investigation is under way, hearings have been scheduled, fingers will be pointed and formal public blame assessed. But none of that excuses the set of circumstances that created the situation.

Managers of government data processing operations must recognize that their systems require even more rigor in design and implementation, even more rigid adherence to professional standards than those of private firms.

With government DP operations, it is not enough that solutions be elegant, cost-effective or on the cutting edge of technology. Above all, they have to work.

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LETTERS TO THE EDITOR

Million instructions per second rating claimed to be inaccurate

In the article, "Hardware Roundup" [CW, Aug. 19], the IBM 8150A and 8150B systems are both rated at 0.86 million instructions per second (Mips), the 8150B has two 0.86 Mips processors and a system rating of 1.37 Mips.

I find this error particularly interesting because the statement "It was the year of parallel processing — that is, using multiple CPUs operating concurrently to equal the performance of larger mainframe processors" is highlighted in the article.

R. Mark Ulrich
Dallas

Consultant trade organization offers credentials, lower fees

In the Update, "Choosing and using consultants" [CW, Sept. 2], you failed to mention the Association of Management Consultants, which is a consultant trade organization more than 25 years old that consists of small consultant firms.

By using the services of such consultants, many of whom specialize in the problems and solutions of the data processing profession, it affords the client the benefits of a company's continuity, generally at lesser fees than those of the larger, Big Eight consultancies.

In addition, clients generally do better when they look for credentials, especially certifications. Although by no means infallible, it does help narrow down the field of choice.

Marsha D. Lewin
Los Angeles

Senior business managers in U.S. criticized for neglecting security

The greatest unkept secret in U.S. business today is how poorly secured organizational assets are, particularly information assets. U.S. management is plainly and simply derelict in its responsibilities in that regard.

Why has management been so derelict? It is because information seems so cheap and so freely available. Computers spew millions of lines of information in a matter of seconds. Anything that can be produced so quickly and with so few errors must, therefore, be cheap, or so says the executive mind.

Look at the number of major corporations and governmental organizations that don't have documented and tested disaster recovery plans, computer access controls and proprietary information protection plans. The Data Processing Management Association conducted a recent survey of large systems user organizations that indicated less than half of the responding organizations had full- or part-time data security officers.

What to do? The only thing that has caused a mild stirring among senior managers is the recent hacker intrusion problem. Their reaction to the hackers borders on paranoia because information burglary is still mainly an insider problem. But if the hackers persist in their penetration efforts, we may finally wake management up. And none too soon, I might add.

G. J. Bologna
Adrian, Mich.

Job-hoppers' resumes may merit closer look from potential employers

In many of your past issues are references to the short-term employee, or job-hopper, whom employment agencies and personnel departments say they automatically write off. This could be a grave error. The type of person most needed by many companies in today's ever-changing environment, especially in the management and upper level staff positions, is probably in that group.

Just about every company today needs people who have experience in many different functions within data processing, who can get into a situation quickly, analyze it, produce solutions and get them implemented. Because of the tremendous changes that have occurred in the last few years in this business, it is unlikely that those people who have been with the same company for the last 10, five or even three years have the knowledge or experience in these functions.

The next time you are looking at resumes and come across a job-hopper, take a closer look at what that person has accomplished. That is the real key.

Jeff D. Vowell Jr.
Middletown, N.J.

VIEWPOINT

Artificial intelligence: myth vs. reality

WOHL STREET MINIJOURNAL
Amy Wohl

Five years ago, the buzzword for end users was "office automation." It would write a letter, find a lost file, replace and fire an incompetent secretary and brew really good coffee. Three years ago, it was Lotus Development Corp.'s 1-2-3, a spreadsheet so good it would not only figure out your business plan, but it would also guarantee that plan's success.

Today, the new buzzword is "artificial intelligence." Computers equipped with artificially intelligent features are expected to — pick one or more of the following — eliminate tedious office chores, outthink all but the brightest and most creative workers, do your work and brew really good coffee.

Common sense says this is unlikely. Computers are big, very fast adding machines. If you can find a way to express or represent something in numerical symbols, computers can process such information very rapidly. Computers are very good at handling information that can be processed sequentially and not so good at processing information that requires lots of simultaneous intuitive comparisons.

To the extent that the office processes data and needs to add it up, categorize it, sort it or find it, computers are helpful. Particularly in the area of categorizing and finding information, computers can often behave in eerie, near-human ways — such as knowing that you are interested in a particular subject and collecting information on that subject for you from strange and wonderful places — but that is simply a computer obeying your command and not human intelligence being replicated.

To the extent that the office is a special kind of social tribe, organized for the purpose of carrying out a particular goal, it is more difficult for computers to be genuinely helpful. Much of the work that goes on in offices requires social interaction and highly complex, single-time decisions — a combination of discussion, disagreement, research and its aggregation and comparison, further discussion and finally decision making and consensus. Computers can be very helpful in supporting such transactions, but they are limited in their ability to become the transactor.

It is even less likely that an expert system could browse through the memos, pick the best idea and gain a consensus for this idea from the relevant corporate decision making groups. In fact, this process sounds futuristic at best, silly or impossible at worst.

Expectations raised too soon, too high

In the future, however, such investigation and decision support systems could occur. In fact, understanding what's going on in commercially offered artificial intelligence software today is largely a problem of controlling expectations that may have been raised too soon and too high.

Note well the term *commercially offered*; there are lots of very interesting things going on in the research laboratories of universities, large computer companies and small start-up firms — but they are probably far away from delivery as stable, commercially packaged and distributed products.

Most software packages labeled "artificially intelligent" aren't. That should be a simple enough statement, but it seems to need some further details. A package that has information about how you prefer to do something and where you would like the result isn't artificially intelligent, it's just nicely programmed. In an office context, we might expect an artificially intelligent software package to do some or all of the following:

- Be an expert — draw conclusions about a new situation described to it in terms of the expert's stored knowledge, drawing on a set of rules.
- Learn — react to new situations based on learning new behavior. Rules for this new behavior would be based on a combination of stored knowledge, stored rules and modifications of these rules based on observation and inference. Such systems are called heuristic.
- Understand natural language — decipher the meaning of natural (unstructured) and colloquial language and interpret the precise meaning to a computer.

Very few software packages for end users do these things; if they do, their scope of operation is deliberately limited to permit them to function within the confines of relatively small, slow machines. Also, another element enters the picture: Many of the current packages are decision support systems that require the input of significant quantities of information and the assignment of weights or values; when that information is available, the system can help the user "see" the relative value of different decisions via graphics. However, most of us don't make, or want to make, business decisions that way.

More intuitive, less structured programs

To be responsive to user expectations, artificially intelligent programs will need to be more intuitive and less structured in their approach, and it is that intuitiveness that is so hard to capture.

It is these user expectations that make the near-term market for artificially intelligent software so turbulent. It is unlikely that any package could live up to current expectations. And to rise above the noise level, software vendors are using louder and louder — and less and less accurate — words to describe their new offerings.

However, artificial intelligence is slowly being embodied in all kinds of computer software. Eventually it will not only allow users to share the scarce and valuable expertise of specialists but also help create systems that are very simple to use and highly custom-tailored to individual needs.

In the meantime, common sense is still a valuable commodity. Artificial intelligence is no more a panacea than office automation was. Both are useful tools. It is foolish to expect a $695 software package and a $3,000 computer to replace the work experience of a thinking human being. But they surely can help that person do a better and bigger job.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of the "The Wohl Report on End-User Computing" newsletter.

Developing new corporate muscle

MANAGEMENT MATRIX
Walter F. Cuirle

Let's suppose that you are with a manufacturing firm that is about to begin development on a new product or with a financial concern about to venture into a new market. First, top management must make policy — that is, set some sort of direction for the company.

Next, department managers have to come up with some way to get the job done. In other words, they have to define a set of procedures. If policies define what and why, then procedures define how and by whom.

Just as exercising a muscle starts growth, new corporate policies are a deliberate attempt to build strength in a new area, and the exercise spawns new procedures. One difference is that the growth of corporate muscle isn't always as well controlled as you might like it to be. One similarity is that both processes hurt.

Controlling growth and the network that supports it is something that corporations do not accomplish as well as muscles. The natural growth of procedures seems to be linear: When a new situation arises, a new step is tacked on to an existing procedure. As growth continues, what used to be a comprehensible and straightforward process becomes a burden.

One huge procedure, intended to handle any eventually, might address many corporate actions but it fits only the largest well. In most applications, it will move slowly and carry a lot of waste. It can inhibit growth rather than nourish it. Is there any way to slow down or prevent the process?

'One size fits none'

Instead of allowing a "one size fits none" behemoth of a procedure to develop, set up a variety of procedures in a branching structure. These simplified methods are tailored to a particular class of activity or type of problem.

Each is a branch off the larger concept, but none is any larger than it has to be to get the job done. Now suppose that a user wants a truly simple modification to a report, something like the transposition of two lines or the substitution of one figure for another when both are on file. Should this user have to go through your entire procedure? Certainly not. The user could probably handle it all in one meeting and a short one at that.

The advantage of having branched procedures is clear: Everybody gets what they want with a minimum of wasted time and paperwork. Users are happy because the groundwork seems to be both reasonable and no more than necessary. Your staff is happy because it is spending less time in meetings and more time on the job. You are happy because the result is lower overhead and quicker turnaround.

The disadvantages are the necessary complexity of such a system. Single-procedure methods are honored more in the breach than in the observance and are — let's face it — most useful in shifting blame and papering over mistakes than in getting a job done. Branched procedures are simple in application but complex in structure and require careful advance planning.

Obvious political disadvantages

There are some obvious political disadvantages too. If some users get their requests processed more quickly than others, even though the difference is on strictly technical grounds, they will want to know why.

It won't be possible to pass the buck to an anonymous book on the shelf anymore and say, "We're doing it this way because the book says that's the way it's done." Somebody is going to have to explain to the user what procedure to use and why and to make it stick. That somebody is you or a designated project leader from your group.

On second thought, maybe these aren't disadvantages after all. They are just the side effects of going from a sluggish pipeline to an intelligent network.

Cuirle is a senior associate with Nicholas DeMaio Associates in Bryn Mawr, Pa.

Five-phase upgrade untangles bank's spaghetti code

By Donna Raimondi

JACKSONVILLE, Fla. — A vintage 1960 credit card software package that had deteriorated into dead and scrambled code has had new life breathed into it at Florida's seventh largest bank. What's more, the rejuvenation has allowed the bank, with $3.8 billion in assets, to adopt products and services that it could not previously support.

The 88-program, 150,000-line banking package had become so difficult to use that only senior programmers could touch it, even to make minor changes. "We were always able to put [in] what the user wanted," said Frank Hobby, vice-president in charge of systems development at Atlantic National Bank of Florida. "It took a lot of hard coding and special codes and programs to get the stuff [the users] wanted done."

The bank had two ways to go if it wanted to be able to modernize its operations and provide its users with continued services. It could either buy a package, which would cost at least $300,000, or it could rewrite from scratch, which would take at least three years. It made the decision to rewrite and had just started that task when Hobby heard about restructuring spaghetti code.

Peat, Marwick, Mitchell & Co. of New York ran tests on the credit card software that showed it to have dead code and runaway logic. Dead code is code that is useless but was never removed from the system because nobody had time to do it. Runaway logic would have "blown off" the system had anyone gotten into it, Hobby said.

Programmers and users were frustrated at the length of time it took to get anything new from the system, Hobby said. Users would come to MIS and say they needed something right away, and the programmers could not produce it in the required time because of the complexity involved in making any kind of change. "Our run documentation book was about two feet thick trying to figure where everything went," he added.

After Peat Marwick determined what the problems were, it performed a five-phase upgrade, Hobby said. The total cost to the bank was $160,000.

The company first did a structured retrofit process that turned the bank's spaghetti code into structured Cobol. The second phase of the rejuvenation process was to analyze data information and come up with a master library so that each program would no longer have to maintain its own library.

A validation run after the first two steps matched the renovated system's output with a parallel run to turn up any discrepancies. "After the retrofit, everything was fine. There were no discrepancies at all," Hobby said.

The fourth step was to document the system as it stood after the retrofit. "We are still not to the ultimate goal," Hobby explained. The structured format will now allow the bank's staff to change the credit card system to match the user's needs and to expand in the future.

Preparing a design statement

The last phase of the project that involved Peat Marwick was to prepare a design statement for the evolving system. The company met with the bank's MIS department to help them change the old sequential processing method into Vsam files. They also met with users to determine what types of reports would help them improve productivity.

The bank is now involved in changing the whole system again, Hobby said. What Peat Marwick did was give the bank a starting point, he added. "We can now use probably 70% of the existing [system of] programs because it is structured and it is in a nice hierarchy so we know where everything is. . . . Before, the way it was so fragmented, we would almost have to rewrite everything."

Benefits to the bank include the ability to offer new or better products to its customers, Hobby said. A customer who changes branches, for instance, does not have to wait for a new card to be issued. Customer histories can be moved to new services automatically. If a customer is late with a payment, his history now shows whether he has been with the bank for one month or 10 years, a fact that has bearing on how the bank reacts to late payments.

The bank will now be able to go out to a branch that does not have a credit card system and start processing for the branch — a practice called correspondent banking. Bank users will be able to get more on-line reports and faster changes to the kind of reports they request.

Accounts that are tied to the prime rate can have their variable interest rates changed quickly, Hobby said. A bank control file is being created to allow users to change quickly interest rates or account due dates.

"After we make these changes to the system, it will be another five to 10 years before we have to look at it again," Hobby said. The 24 programmers in his National Advanced Systems Corp. 9050 shop worked with Peat Marwick throughout the process so that they need no retraining. Senior programmers are now able to concentrate on development work, leaving the coding to the junior staff.

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Financial firms making move to packet-switching nets

Cite better control, increased savings

By Paul Korzeniowski

Financial service companies are trading in private leased-line networks for packet-switching offerings in an effort to monitor costs and save money.

Packet-switching networks, often called value-added networks, run on lines a vendor leases from telephone companies. The networks supply users with management and control functions such as protocol conversion, error detection and high reliability.

During the past few years, Dun & Bradstreet Corp., located in New York, has acquired a number of businesses so that it now consists of 30 different companies. With the additions came a growing number of networks. Dun & Bradstreet was left with a hodgepodge of incompatible private asynchronous, bisynchronous and Systems Network Architecture networks, according to Allan Conner, vice-president and general manager of Dunsnet, a division of the company.

Rather than supporting the different networks, the company decided to search for a central network. "Dun & Bradstreet is in the information business," Conner noted. "We wanted one network that could support all our services."

Critical selection factors

Critical to the selection of a network was its ability to support asynchronous and synchronous protocols simultaneously. Another consideration was that network management functions be provided by the vendor. When the evaluations were completed, the company chose to install a packet-switching network from GTE Telenet Communications Corp. in Vienna, Va.

Thus far, Dun & Bradstreet has moved half of its old networks onto the packet backbone. Packet-switching services are provided between 156 private nodes throughout the U.S., and the company plans to expand service to 250 nodes by next year, according to Conner.

Because installing the network was a new experience for the company, there have been a few hitches. "Network management is a tough business, and our concept of how it worked was quickly shot out of the water," Conner noted. Initial projections of the time needed to test and debug a network turned out to be inaccurate; deadlines approached, and Conner experienced some anxious moments.

> ”
>
> *'Network management is a tough business, and our concept of how it worked was quickly shot out of the water.'*
>
> — **Allan Conner**
> **Dunsnet**

Conner estimated that the $25 million packet network currently costs a little more to operate than the multiple old networks. "We expect to start saving money when all our business has been transferred to the packet network," the vice-president noted.

A second company attempting to save money by switching to a packet backbone network is MCorp., based in Dallas. The company, which processes data for banks, has been using a private-line network to connect 8,000 users. A proposed packet-switching backbone network will provide financial information to 900 banks and their branches, drive up to 1,000 automatic teller machines and support up to 10,000 point-of-sale terminals, according to Paul Bell, a consultant who is managing implementation of the network.

When the corporation looked to upgrade its network, Bell claimed that only a packet-switching network met the firm's communications needs. The company evaluated a private-line network but found it unacceptable because it would work well only with IBM equipment, according to Bell, who works for New York-based 23K Group, Inc. Since MCorp. required support for other equipment, a packet-switching network was chosen.

Rather than having a vendor manage the network, the company plans to handle that task itself and is installing equipment from Amnet, Inc., based in Watertown, Mass.

When completed, the network will have 18 nodes located in southwestern parts of the U.S. such as Texas, New Mexico and Oklahoma. The first two nodes were installed in July, and nodes will be added at a rate of two a month until they are all installed. Bell estimated that the network, which will cost between $3 million and $5 million, will pay for itself in two and a half years.

Microcomputer use forced Irving Trust Co. in New York to supplement its private-line networks with a packet offering. "Two years ago, the company had no microcomputers; today there are 190 in use," noted Ken Soldwedel, vice-president of the treasury services department at Irving.

One reason for the increase in microcomputer use was that Irving Trust's customers began working with microcomputers. Those customers wanted to call the company and obtain financial data but often were unable to do so. Irving's leased-line networks supported a bisynchronous protocol but did not work with the asynchronous protocol used by most microcomputer communications packages. A packet network helped to overcome this problem, according to Soldwedel.

Another reason for the selection was that the company's foreign customers could work with a packet-switching network but would be unable to use a leased-line network.

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Automated ID system crucial in finding 'Night Stalker'

Pressed into service, Cal-ID matched prints

By Jeffry Beeler

SACRAMENTO, Calif. — State law enforcement authorities never expected their first automated fingerprint identification system to go into operation until mid-October at the very earliest. But after receiving an emergency request to assist in the notorious "Night Stalker" murder investigation, the officials briefly halted the system's installation and gave Cal-ID an unexpectedly early workout that demonstrated its fitness under realistic conditions.

The system was still in its early implementation stages when state Attorney General John Van De Kamp asked whether it was sufficiently functional to identify a latent fingerprint thought to belong to the sought-after Night Stalker.

Van De Kamp's Aug. 29 inquiry prompted Cal-ID's supplier — Boxboro, Mass.-based NEC Information Systems, Inc. — to interrupt its ongoing installation and load the system with its operating software two months ahead of schedule.

After testing the software to ensure its soundness, operators used an optical laser scanner to compare the fingerprints with the 750,000 other prints already in the system.

Within just three minutes, the system responded with 10 possible matches, which it listed in their order of probability. Heading the suspect list was an identification number corresponding to 25-year-old Richard Ramirez, a petty offender with no previous record of violent crime. Late last month, Ramirez was formally indicted on several charges relating to the murders and assaults.

On Aug. 30, forensic experts confirmed Cal-ID's identification and paved the way for law enforcement authorities to make public Ramirez's name and photograph. Two days later in East Los Angeles, police arrested Ramirez as the chief suspect in a string of brutal slayings that began last February and claimed at least 14 lives. The killer earned his "Night Stalker" nickname from his habit of entering his victims' homes after dark and shooting, stabbing or clubbing them to death as they slept.

If law enforcement authorities had lacked access to Cal-ID, the state would have had to compare its own fingerprint records to Ramirez's suspected print by hand. At best, such a procedure would have taken a year and probably would have proven impossible, according to Tony Doonan, a California Department of Justice manager who is overseeing the automated system's installation.

But even with all the state's vaunted new technology, Ramirez would probably still be at large had NEC Information Systems and law enforcement officials not gone to unusual lengths to press the fingerprint identification system into premature service. Since March, the state has been converting the data in its existing fingerprint files and entering the material into the system's hardware.

To expedite the process, installers intentionally delayed the loading of the system's operating software, which permits fingerprints to be electronically compared and matched. "The presence of that software would have greatly slowed down the data entry process," according to Elton Johnson, a NEC Information Systems regional manager.

So when Van De Kamp appealed to the system's caretakers for help in identifying the suspected Night Stalker's print, they suddenly had to scramble to get the operating software up and running, Doonan said.

A stroke of good fortune

Ramirez's capture was also due in large measure to a stroke of good fortune. Because of his date of birth, the suspect's fingerprint records happened to be included in the first batch of existing files that the state chose to be converted to its new automated identification system.

Until earlier this year, California maintained its fingerprint records entirely on cards and identified unknown prints by comparing them manually against the data in its five-million-item catalog. Because of the collection's sheer volume, the state plans to transfer its paper records to the automated system in four stages, the first of which is already complete.

The initial phase involved some 750,000 fingerprint records and covered only those California lawbreakers who were born during or after 1960. The second group of cards, which correspond to offenders born between 1950 and 1959, will be completely converted to the automated system by the end of next month, Johnson said.

If Ramirez, who was born in February 1960, had been born only two months earlier, he would likely still be a free man because his fingerprint files would have yet to find their way into the new system.

As the number of fingerprints in the state's automated data base swells, the system's hardware configuration will do the same. From its current cluster of four specially designed NEC Information Systems processors, the system will expand to 18 CPUs by early 1987, Johnson said.

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Coke cans employee planning to wed Pepsi accountant

By John Desmond

NORTHAMPTON, Mass. — The battle between Coca-Cola Bottling Co. and Pepsi Cola, Inc. for the loyalty of the nation's soft drinkers has bubbled down to the world of ones and zeros. The DP manager for a Coca-Cola Bottling franchise was allegedly fired because her fiance works for archrival Pepsi.

Amanda Blake, 28, filed suit against her former employer July 15 in Hampshire Superior Court charging that her dismissal was an invasion of privacy and a wrongful termination. Blake contended in a recent interview that the same week Coke announced its original change in formula, Coke's management gave her an ultimatum: either break her engagement or have her fiance quit Pepsi.

The two decided there is more pleasure in loving than in being loved by Coke's management. Blake's fiance, Pepsi accountant David Cronin of the Pepsi Cola Bottling Co. of Windsor, Conn., declined to leave Pepsi, and the two refused to break their engagement. Blake was fired by Coke, effective April 26. Cronin said his employer had no problem with his future wife working for Coke.

'They didn't trust me'

In seven years at Coke, Blake held positions as a keypuncher, operator, programmer, programmer/analyst, assistant DP manager and finally, DP manager of a seven-person IBM System/38 shop. "It made me sad they didn't trust me," she said of her superiors. She is seeking $600,000 in damages.

Attorney Neil Jacobs of Boston's Hale and Dorr said Coke offered Blake a less sensitive job, but she refused.

Blake now works as a computer programmer at Mount Holyoke College in South Hadley, Mass. The two plan to be married soon. Neither would divulge their true preference in soft drinks, but Cronin said he usually prefers a Budweiser.

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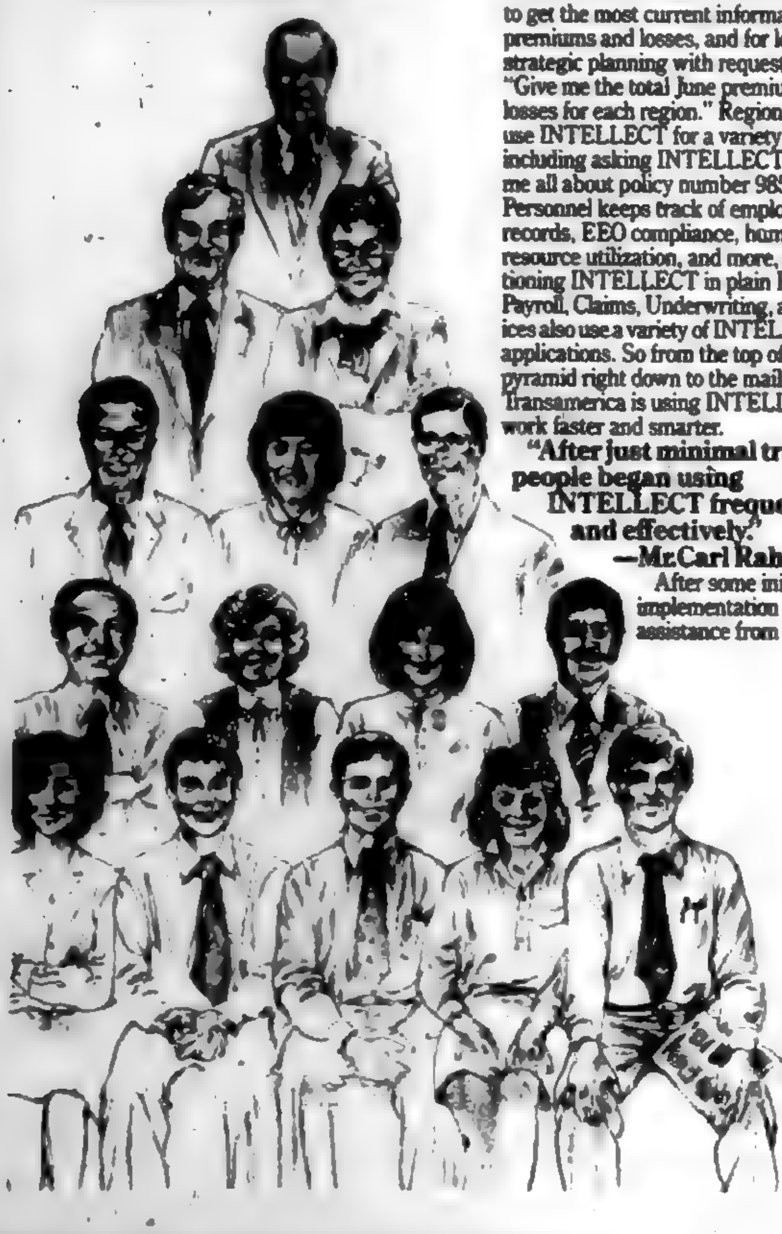

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IEEE irked at DOD data restriction

By Bryan Wilkins

WASHINGTON, D.C. — The Institute of Electrical and Electronics Engineers, Inc. (IEEE) recently fired off a sharp letter to U.S. Department of Defense Secretary Caspar Weinberger complaining about the department's efforts to restrict the flow of unclassified information.

The IEEE said it will not sponsor nor be responsible for closed or restricted-access technical sessions at meetings held under their auspices, asserting that such responsibility lies with the government. The DOD has recently embarked on a drive to deny easy access by Soviet and Eastern bloc countries to high-technology research contained in papers, seminars and other forums.

"The open exchange of information ensures that critical peer review is applied to new advances, provides valuable cross-fertilization of ideas and helps avoid duplication of effort," the IEEE's letter said. It said DOD efforts "have resulted in the disruption of technical conferences . . . and have forced the introduction of a new category of technical session, one that is unclassified but with limited access."

The IEEE said that a broad range of technical information is being affected by the DOD policies, which it charged will have "counterproductive consequences" and be "detrimental to the national security interests of the nation."

IEEE President Charles Eldon asked Weinberger to intervene personally in the institute's dispute with lower level defense officials to minimize the amount of unclassified information that the DOD wants to put under restricted access.

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Cocaine crippling growing numbers of DP/MIS pros

Abuse costing firms in lost productivity

By John Desmond and Kathleen Sullivan

Getting up from his terminal, a 36-year-old Cobol systems analyst walked to the men's room. After locking the door of the stall, he reached into his shirt pocket and pulled out a small envelope. Inserting a short straw into the fine white powder inside, he inhaled, drawing cocaine into each nostril. Then he returned to work.

The Cobol analyst, who did not want his name published, works for a New York-based DP consulting firm that numbers among its clients many Fortune 500 companies. He began snorting cocaine on the job three years ago, when his firm sent him on a consulting assignment for a textile manufacturing firm in South America. His cocaine consumption increased after he returned to the U.S. "I began using more and more cocaine, spending more and more money," he recalled. "I began worrying that I was risking my job, because I had called in sick many times. There's only so much cocaine you can do before it has consequences."

While public attention has been focused on the popularity of cocaine among professional athletes and entertainers, use of the white powder derived from South American coca leaves has extended to the executive offices of U.S. business — and to the DP shop.

Medical specialists interviewed by *Computerworld* said they have treated a number of DP and high-technology professionals for cocaine abuse. "We've seen a significant number of people who have cocaine and other substance abuse problems who work in some aspect of data processing," said Dr. Arnold Washton, director of addiction research and treatment at Regent Hospital in New York and cofounder of the national Cocaine Hotline.

Drug counselors and medical specialists say cocaine abuse may be costing U.S. business billions of dollars a year, but the drug's impact is difficult to measure. "We've seen people make bad business decisions in the DP industry, including people who've been working on complex and elaborate systems," Washton said. "The industry has attracted many so-called baby boomers looking to be upwardly mobile. And you have a lot of young, hard-driving, aggressive business executives making significant incomes. That is the profile of the typical cocaine abuser" (see story page 29).

A systems analyst at an East Coast financial firm who headed up the company's hardware migration project was becoming a cocaine addict. As a result, the project was grinding to a halt. His managers estimated the company lost $200,000 for every week the project was delayed. After the analyst admitted to management that he had a cocaine problem, he entered a treatment program and eventually turned his performance around.

Dr. Kathleen O'Connell, a psychiatrist based in Capitola, Calif., has treated nearly 500 high-tech workers for cocaine abuse; 15% of them were executives from Silicon Valley, and 25% worked in some aspect of quality control. The pressure of deadlines and long workweeks can make cocaine use attractive for many high-tech workers, she said. "Cocaine gives them the illusion they're being more productive and sharper," she said. "Maybe in the beginning they are, but very soon productivity decreases, and they still think they're doing OK."

MITCHELL J. HAYES

Cocaine use is increasing in the industry, in O'Connell's view. "The supply and purity of cocaine is increasing, and the price is going down. We haven't hit the crest of the wave," she said.

The Cocaine Hotline receives up to 1,200 calls a day and has had 1.2 million calls since opening up May 2, 1983, Washton said.

A cocaine addict who was part owner of a micro software firm in the Silicon Valley told *Computerworld* that getting cocaine was no problem. In his company, 20% to 30% of all employees were using cocaine, and he estimated that the norm among Silicon Valley firms is more like 40%.

In the year before he sought help, a 31-year-old DP consultant in New York was smoking, snorting and shooting cocaine. He was spending hundreds a day on his habit. "When I first started using cocaine, I thought I was doing well," he said. "But to do programming you need to pay attention to detail. You have to be meticulous. Cocaine jumbles your thoughts. It juxtaposes different thoughts in your mind really quickly."

While cocaine abuse has the potential to become a major problem in the

DP shop, managers may not know how to recognize abusers. Most managers are surprised when they learn an employee has a problem with cocaine, according to several cocaine users interviewed.

DP managers called at random by *Computerworld* were surprised to get inquiries about cocaine use by their staffs. A DP manager at a Philadelphia insurance company reported that "alcohol and coffee abuse are the main problems" he sees, not cocaine abuse. He added, "I don't know how I would know. It's not the kind of thing they send you to class on."

Cocaine use increased dramatically from 1972 to 1982, according to the Washington, D.C.-based National Institute on Drug and Alcohol Abuse, which conducts a detailed alcohol and drug use survey every 10 years.

The survey showed that the use of cocaine by 18 to 25 year olds tripled in that 10-year period, with 28.3% of the age group reporting in 1982 they used the drug within 12 months. Cocaine use by those age 26 and above more than quintupled during that period, according to the survey. The institute estimates that 22 million people in the U.S. have tried cocaine, and 5 million to 10 million use it once a month.

> ”
>
> *A DP manager reported that alcohol and coffee abuse are the main problems he sees, not cocaine abuse.*

An occasional cocaine user who works in computer operations at a mid-size eastern firm has been using cocaine recreationally an average of once a week for eight years. "I don't do it a lot because it's expensive," the user said. While he is usually not high at work, when he is, the user said, he gets his job done a little faster. "If you can control use, you can use it. If you can't control it, don't use it," he advised.

Further evidence of the spread of cocaine abuse in the high-technology sector is provided by the implementation last year of a pre-employment drug screening by the biggest high-tech firm of them all — IBM. The company instituted the testing policy domestically in the fourth quarter last year, as part of what a spokesman called IBM's effort to ensure the health and safety of its employees. Applicants for all positions are tested by an independent laboratory for a range of illegal or controlled substances.

While most users take cocaine on a casual, or recreational, basis, some professionals deny there can be a casual use. "Occasional cocaine use is nothing short of playing Russian roulette," Washton said. "The majority of coke users use it in a way that has not yet caused them severe medical or psychiatric problems. That's not the same as saying that occasional cocaine use is harmless. After a long period of associating taking cocaine with feeling better, a person is likely to resort to escalating use of cocaine to get stress relief. It can escalate to a pattern of destructive dependency."

Cocaine use is resulting in a loss of productivity, O'Connell said. "People who work 80 hours per week only produce about 25 hours worth of work," she said. "They're snorting cocaine and thinking they're doing great when they are doing terribly. Cocaine affects their perception and judgment."

He overslept, was useless at work and was high most of his waking hours. It was a typical day for the cocaine-addicted vice-president and part owner of a micro software company in the Silicon Valley. At the height of his habit, he was using $1,000 worth of cocaine in a week. "I was doing it at work, everywhere. My life revolved around cocaine," he said. After his company was sold and he was facing charges for distribution of cocaine, the executive finally bottomed out. "Cocaine really psychologically dominates. You quit caring about little basic things like food and sex."

■

Warning signals of cocaine abuse

If you're a manager, you may have an employee with a cocaine problem and not realize it.

Identifying a cocaine user by sight is not easy, which is one reason the drug is so attractive, said Ronald K. Siegel, psychopharmacologist with the University of California at Los Angeles School of Medicine. "The effects are subtle. It's not always possible to tell. The fact they have coke in their system won't read out in gross behavior patterns," he said.

Angela Browne, research and education director of Cokenders, a Berkeley, Calif.-based treatment center, said, "The problem is really hard to spot because there is a lot of denial among cocaine users. For the employer, that presents a difficult situation. It's difficult to act on a suspicion without a full knowledge of what is going on. There is an aura

Continued on page 32

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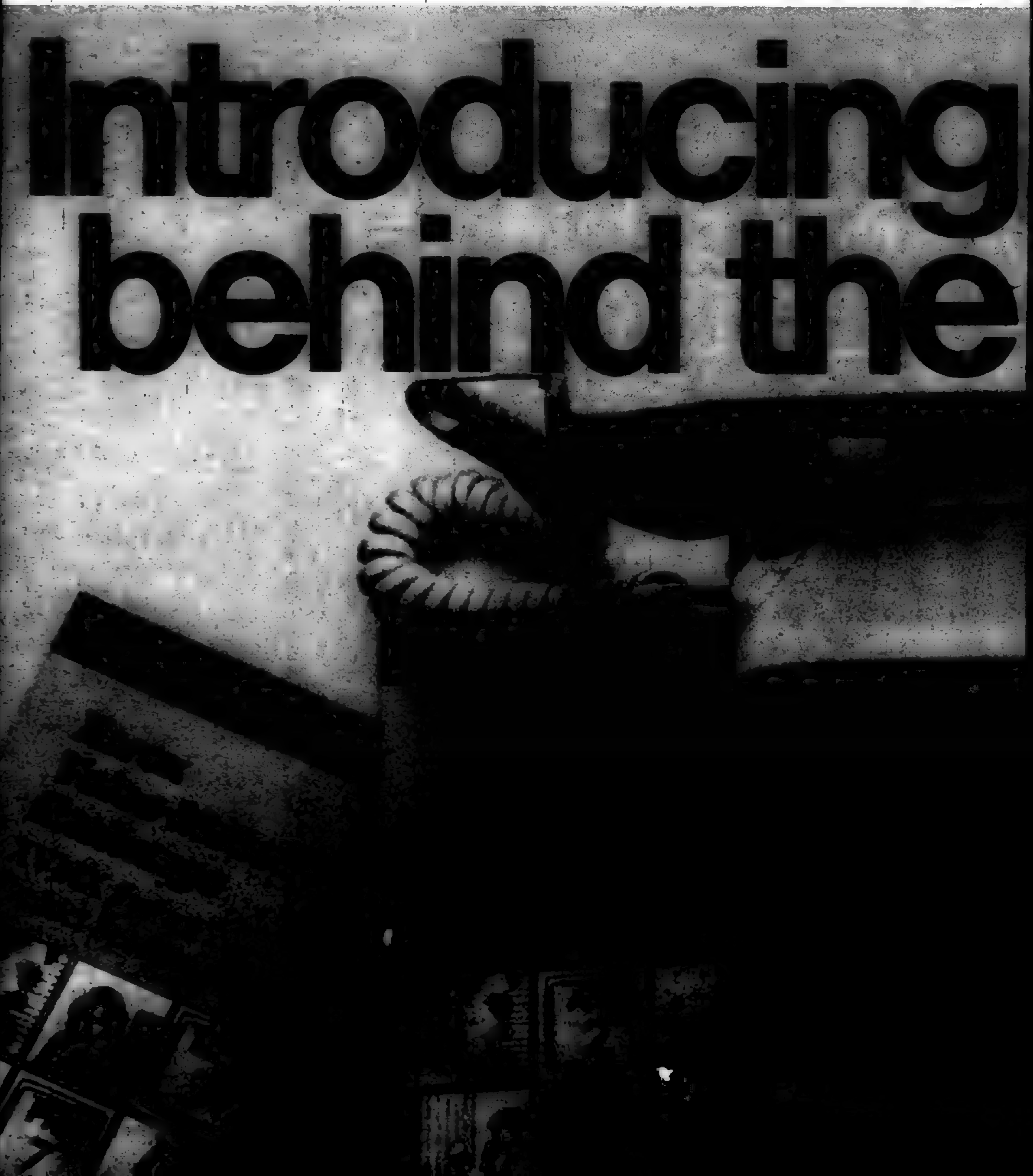

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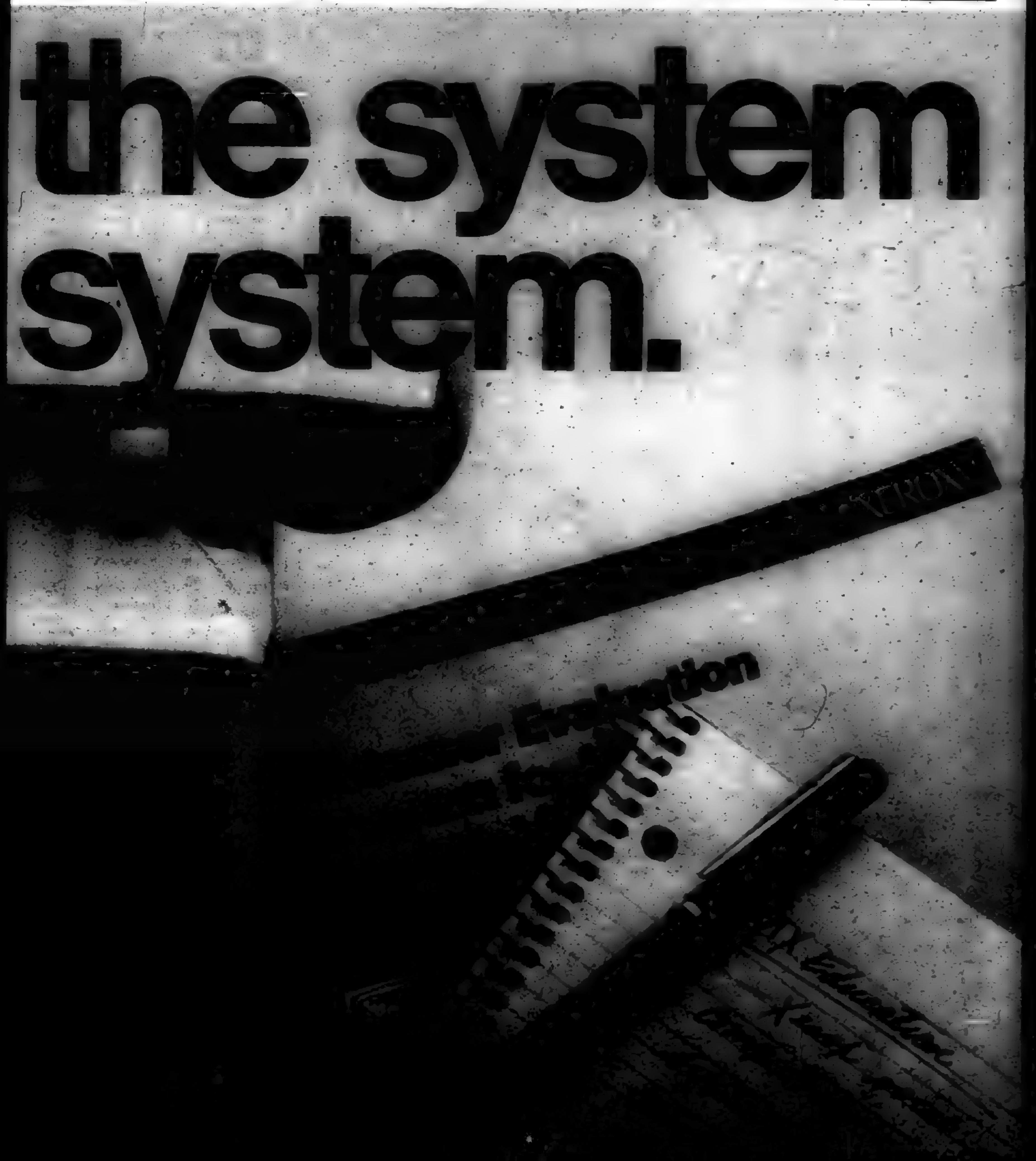

NEWS

WORLD DIGEST
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TOKYO — Hitachi Ltd. announced that it would start taking orders in late September for a new, low-priced supercomputer, the Hitac S-810 Model 5, which it claims has a vector calculation speed of 160 million times per second. Delivery will start in the first quarter of 1986.

The machine apparently was intended to catch the eye of user firms that had avoided two previous S-810 supercomputers for price reasons. The Model 5's standard rental cost is $167,000. The supercomputer has a memory of up to 128M bytes and is said to be the first to offer 31-bit addressing. The vendor, which so far had clinched six orders for the earlier 810 models, said it expects to sell approximately 50 Model 5's in the first five years.

MILAN, Italy — Altos Computer Systems, Inc. of San Jose, Calif., announced the launching of its affiliate in Italy during a news conference recently. Luciano Luini was named its Director General. Altos, maker of multiuser micro systems using the Microsoft Corp. Xenix and AT&T Unix operating systems, has products available in 55 countries with more than 70,000 installed systems worldwide. According to the U.S. marketing research company Dataquest, Inc., sales of multiuser micro systems costing between $6,000 and $25,000 will reach 510,000 during 1985 with nearly one fifth of those sales coming from Europe.

BEIJING, China — A breakthrough in Chinese language processing research has been made by Beijing Teachers University with the introduction of a computerized language information storage system. The system was designed to help check written character frequency, to edit dictionaries and to research the language. The software consists of three sub-data bases of Chinese characters, phrase and language information, a Chinese word index file and enquiry operating code. According to International Data Corp.'s "EDP China Report," the system has been assessed and approved by a team of 60 linguists and computer specialists.

LONDON — Apricot, Inc. shares fell dramatically in September following an announcement that profits for the first half of the year would be considerably lower than expected. Apricot, the former Applied Computer Techniques, is the largest British microcomputer manufacturer but has been hit by the slow start of its new operations in France and Germany. The company's problems have been compounded by late shipments of its new models.

BRASILIA — The Brazilian government has decided to oppose the U.S. government's effort to persuade Brazil to drop its restrictions on the importation of foreign computer equipment and software.

President Reagan recently announced the start of an investigation into Brazil's trade restrictions in preparation for what some say may be a retaliatory response. In reaction, Brazil's Minister of Technology Renato Archer vowed that the trade restriction will not be lifted. "Informatics," he said, "is not a simple industry. It must have tools to protect it, even if we have to pay a high price for it."

Brazil's market generated $1.7 billion last year, half of it shared by 200 Brazilian firms.

THE HAGUE — Although computer vendors sometimes offer personal computers and mainframes free of charge to universities and research institutes, giving away robots with favorable leasing rates is less common. The Dutch subsidiary of Swedish robot giant Asea AB will install robots at 22 high schools for technical education in the Netherlands, officials announced recently. The schools will lease the robots for approximately half the normal leasing rate, according to a company spokesman.

STOCKHOLM — Fewer than 10,000 personal computers are installed in the 1,000 largest companies in Sweden, according to an as-yet-unpublished report by International Data Corp.'s Swedish office. The report added, however, that the largest companies will have more personal computers than terminals within five years.

From page 29

Cocaine abuse warning signals

of deception. The people using cocaine fool themselves and others."

The medical professionals offered the following cocaine abuse warning signs:

✓ Changes in behavior such as tardiness, absenteeism and mood swings.

✓ Changes in personality, such as a tendency to become withdrawn or unusual displays of irresponsibility or dishonesty.

✓ Changes in personal appearance, such as dirty fingernails, weight loss or weight gain.

✓ Physical signs, such as runny nose, sniffing, rubbing sinuses, dilated pupils, more gruffy voice, dazed or overly alert look in the eyes.

A national cocaine abuse hotline, 1-800-COCAINE, provides information and counseling referrals.

— Kathleen Sullivan and John Desmond

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Lotus is offering a 1-2-3 Upgrade program to all registered users. For $150, registered users can purchase a special Upgrade product. Copies of 1-2-3 Release 1A purchased on or after April 24, 1985 can be upgraded for free.

Individual users can register by returning their 1-2-3 Warranty Registration Card to Lotus or by calling 1-800-TRADEUP.* Upgrade instructions will then be forwarded by Lotus.

Companies who want to order more than 100 copies of the upgrade product should contact their local Lotus sales office or call 617-253-9186.

For everyone who upgrades, there's also a $40 rebate offer on Intel's Above™ Board, the first expanded memory board certified by Lotus.

We think you'll find new 1-2-3 the best thing since, well, 1-2-3.

*In Canada call 1-800-447-4700.

Suggested retail price of 1-2-3 Release 2 is $495. 1-2-3 Release 2 requires 256K RAM. Minimum requirement for 1-2-3 Release 1A is 192K.

123

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You get the *performance* you need, because you can select the power, speed and memory capabilities that suit you best; the *software* you need, because it's compatible with the IBM PC/AT; and the *hardware flexibility* you need, because it's designed to access a full range of accessories and peripherals.

The HP Vectra PC is a high performance computer. It's 30% faster than the IBM PC/AT. And with the addition of the optional co-processor, it can run even faster.

And since the Vectra PC is compatible with the IBM PC/AT, it runs PC-DOS 3.1 programs—without alteration. Like Lotus® 1-2-3,® MultiMate,™ and R:BASE™ 5000, plus HP's new AdvanceWrite word processing series, TextCharts presentation graphics, and more.

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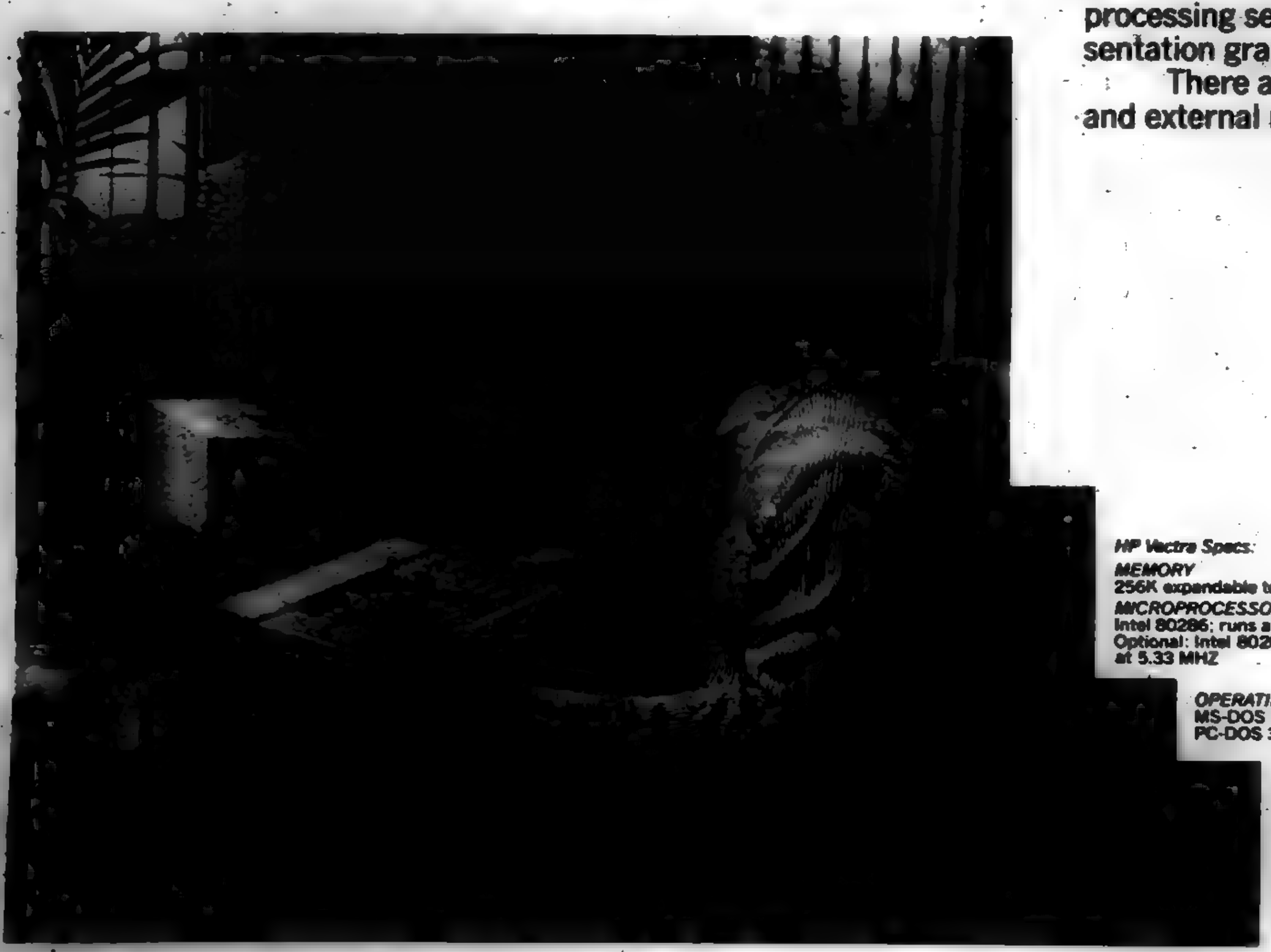

HP Vectra Specs:

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Optional: Intel 80287; co-processor runs at 5.33 MHZ

OPERATING SYSTEM
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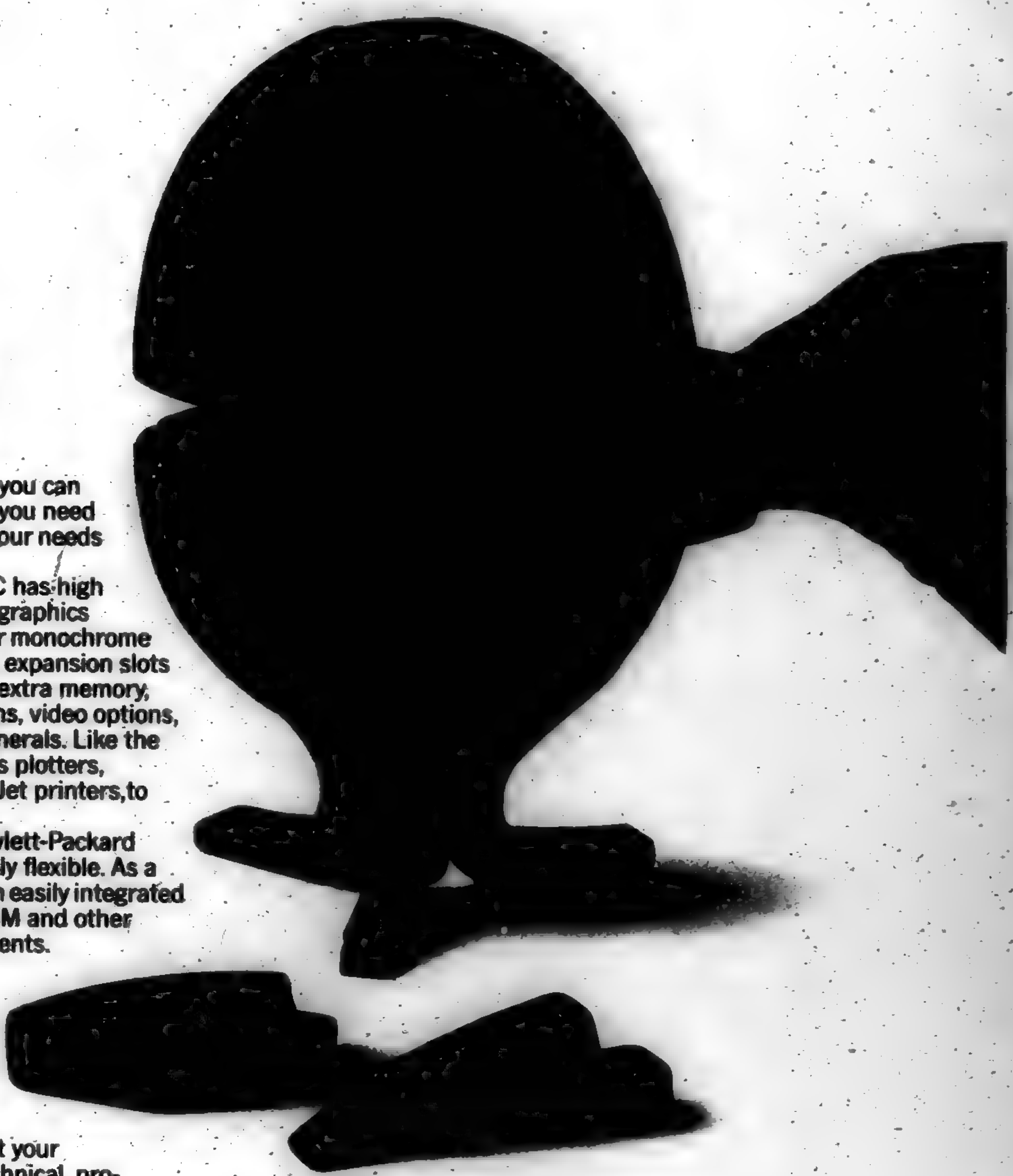
DATA STORAGE
5¼'' internal flexible discs (360K or 1.2MB capacity)
20MB internal hard discs
3½'' stand-alone flexible discs; 20MB stand-alone hard disc.



options, as well. So you can choose the storage you need now. Or expand as your needs change.

The Vectra PC has high resolution text and graphics capabilities. Color or monochrome displays. And seven expansion slots to add accessories, extra memory, data communications, video options, plus a host of peripherals. Like the popular HP graphics plotters, ThinkJet and LaserJet printers, to name a few.

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Business Computing Systems

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COMPUTER ASSOCIATES

SOFTWARE & SERVICES

SOFTLINE
Les Gilliam

DP pros need mixed assets

The employer faced with deciding which is the most important asset in a candidate for a professional position on the computer staff — experience or ability — should remember that native ability is unique to the individual and experience can be gained with time.

A person's potential contribution to the good of the firm depends on ability and its application rather than that person's experience.

The employer should focus on a candidate's specific experience. For example, the requirements for the position might call for five years of experience on IBM's 4300 hardware and DOS/VSE operating system and extensive experience with CICS. Nothing is said about ability, trainability or potential for advancement to management or other contributions to the firm. What about common sense, cooperation, ability to work on a team, dedication, acceptance of responsibility and commitment?

We in the computer industry have been accused of being identified more with the computer vendors and their products than with our own employer's business or industry. What about you? Do you consider yourself a member of the computer industry, or are you a member of the energy, airline, retail, transportation, publishing or whatever business your employer is in? But, are employers also guilty of limiting their search to specific experience?

Continued on page 47

Gilliam is a Ponca City, Okla.-based independent consultant with 28 years of data processing experience. He is a regular contributor to Softline.

Boom times seen for DSS

Strong sales forecast despite undefined role

By John Gallant

FRAMINGHAM, Mass. — Although it may be hard to define exactly what constitutes a decision support system (DSS), the market for DSS products is virtually wide open.

That was the finding of a recent International Data Corp. (IDC) study titled, "IBM Software Environment: Financial Modeling and Planning Systems." According to the Framingham, Mass.-based market research firm, vendors of DSS products have an "enormous" market still to penetrate.

IDC said that last year less than 8% of the 1,240 IBM mainframe sites surveyed had installed a DSS package. But that installed base is likely to grow at an impressive rate through the end of the decade, IDC stated. The survey predicted that the financial modeling and DSS software market will grow at a nearly 40% compound rate through 1988. IDC estimated that the market was valued at $182 million at year-end 1984, a figure that is likely to grow to $679 million by 1988.

IDC labeled DSS products as "some of the most widely discussed, poorly understood and intensively hyped products on the market today." Because DSS products are used by decision makers on an ad hoc basis for what IDC called "semistructured" tasks, their usefulness is difficult if not impossible to determine, the report said.

"Despite the fact that the jury is still out on their utility," IDC said, "decision support systems have received a king's welcome by users clamoring for information in an increasingly intensifying busi-

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- IDMS/R tables managed with a tool from Business Systems Resources/38
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MSA unwraps inventory aids

Management Science America, Inc. (MSA) of Atlanta recently announced two mainframe applications for sales forecasting and distribution resource planning.

The MSA Sales Forecasting System is a decision support tool that aids in the development and monitoring of product sales forecasts. It can be used to produce an integrated inventory plan by producing one companywide sales projection based on previous sales statistics that drives distribution, manufacturing, purchasing and marketing operations. The system will reportedly detect sales trends and seasonal patterns automatically.

The MSA Distribution Resource Planning System allows the user to schedule and balance inventory more accurately and to project future inventory needs. The system alerts the user to potential inventory imbalances and consolidates the distribution network's future inventory re-

Continued on page 40

Notes from the software industry front

Call me. At the recent Software/Expo in Dallas, **Cincom Systems, Inc.**, Cincinnati, announced the opening of its North American Client Support Center in St. Louis. Cincom President Dennis Yablonksy said the St. Louis site will host a 24-hour toll-free user hot line that is expected to provide one-hour resolution for roughly 70% of the support situations it handles.

■

You're in the army now. **Applied Data Research, Inc.** (ADR) of Princeton, N.J., has signed what may ultimately be more than a $23 million contract to provide software for the MIS centers of the **U.S. Army**. ADR said its initial contract with that branch of the armed services was for $6.5 million. If the Army exercises certain options, the contract

Continued on page 45

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Lisp-based financial planning system out

Applied Expert Systems, Inc. of Cambridge, Mass., has announced an expert system for personal financial planning, dubbed Planpower.

Planpower, written in Lisp, is intended to provide expert assistance to professional financial planners. The product runs on Xerox Corp. 1186 AI workstations and is sold in a package including the Xerox AI Workstation Personal Computer Option, which enables it to run software written for the IBM Personal Computer or the IBM Personal Computer XT.

The product includes Applied Expert Systems' Expert Planner software, which emulates the knowledge of planning professionals; Expert Framework, which does the analysis and planning; and Computed Text, which writes the financial plan with observations, recommendations and analysis specific to the client.

The Planpower package also includes data management capabilities, spreadsheet, word processing, English interface and the Xerox 1186. The Expert Planner knowledge base is said to embody 6,000 decision-making rules and the expert knowledge of 125 financial products, including securities and fixed income assets.

With Planpower, financial analysts reduce the time required for analysis and planning for cash and credit and risk management, tax planning, investment management, retirement planning and estate conservation, a spokesman said. A client's financial plan includes recommendations in each area.

Planpower can explain the reasoning behind its recommendations and can test recommendations against any alternative. The system contains intelligent defaults, built-in standard assumptions about financial planning and client data that assigns reasonable values to the facts about the objects in the data base.

The software will drive the Hewlett-Packard Co. Laserjet printer. Shipments are scheduled to begin in January 1986. Powerplan costs approximately $50,000.

Table facility for Cullinet DBMS debuts

Business Systems Resources of Waltham, Mass., has announced the Advance Element File Manager, a table facility for users of Cullinet Software, Inc.'s IDMS/R data base management system running on IBM mainframes.

The Advance Element File Manager gives users screens with which to maintain application reference tables. The product was designed for use with IDMS/R and Cullinet's Integrated Data Dictionary. The Advance Element File Manager is said to enable nontechnical users to build new versions of tables outside of the production system and to update the dictionary and IDMS/R relational tables.

The tables, which contain values and descriptive information for system codes and reference data, are used for editing input and reporting information from the data base. The same tables can be used by an on-line Help facility to indicate to the user the allowable entries in a field. Table member data can be added, modified or deleted independently of the systems that use the tables.

The Advance Element File Manager costs $16,500 and is available immediately.

Interactive Logic updates managing tool

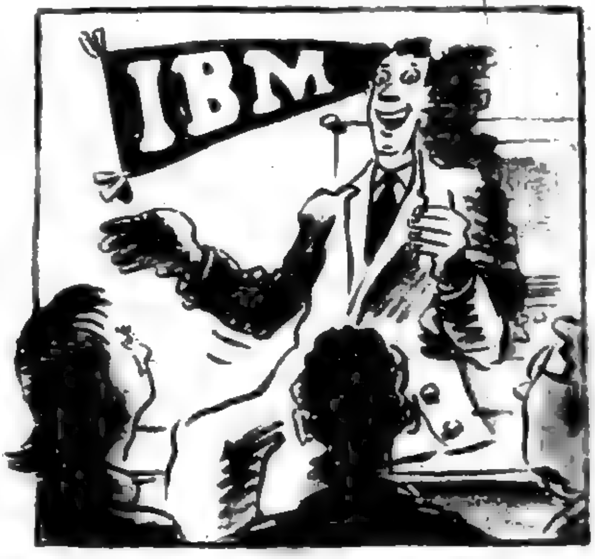
Interactive Logic, Inc. of New York has announced Version 2 of the Scheduling and Resource Management System (SRMS), a project management package for IBM VM/CMS operating environments.

The enhanced release reportedly features intertable and cross-table browsing in full-screen mode based on columns sharing the same domain, additional data base tables to support extended skills inventories and risk and project complexity analysis. Multiple concurrent data base control is established for local as well as remote and distributed data bases, and local private and public data bases can now be configured for multiple access.

A high-performance resource allocation and leveling facility solves the supply-and-demand model using a priority-driven heuristic scheduler. Advancements in the management of adjustable activities and the control of unsplittable activities have also been incorporated.

SRMS was built on a relational data base model and includes an active data dictionary and fourth-generation query logic language patterned after IBM's SQL. The query facility incorporates a structured dialogue manager, macro facility and recursive procedure invocation capability.

SRMS Version 2 costs $73,500, the vendor said.



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Experienced instructors teach the same techniques that IBM itself uses. What's more, classes are conveniently offered in over 20 cities.

To help you find out more about the Institute's curriculum and each specific course, we have recorded complete descriptions on audiotape.

To listen to these tapes, to order a course catalog or to enroll—call the number below.

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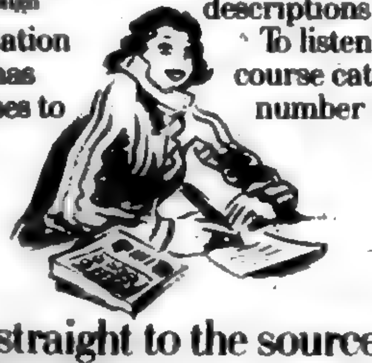

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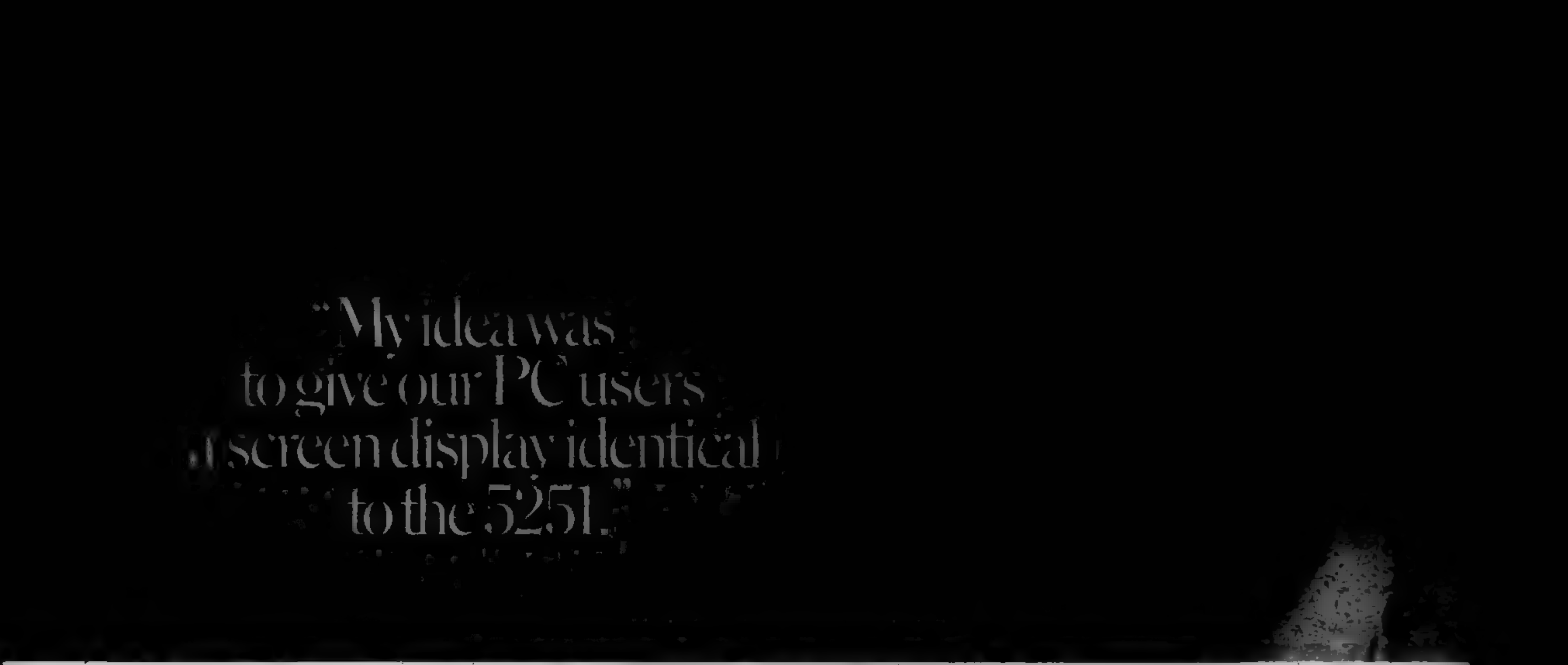
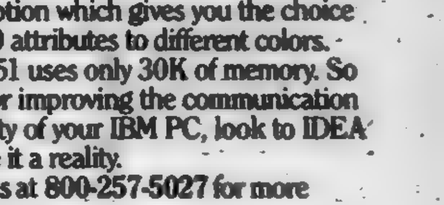


Our IDEAcomm 5251 is the only Twinax Emulator that lets him do it.

For users accustomed to an IBM 5251 terminal, our IDEAcomm 5251 with the D card option doesn't just approximate the 5251 screen display, it duplicates it. The full 32 display attributes of the 5251 are supported. And the D card is an exact replacement for IBM's monochrome display adapter, including a parallel port, so you don't lose an additional PC slot.

Our ideas for IBM System 34/36/38 users shouldn't surprise you. IDEA shipped the first fully functional 5251 twinax emulator last December. And since then we've added several new features you told us you were looking for.

Now, IDEA offers complete support for IBM's FSU and FTF programs on the host. In addition, there are many third party software packages which support IDEAcomm 5251, including DecisionLink and Smart Link, giving you even greater file transfer options.



IDEAcomm 5251 works with the widest range of PC printers including Okidata, Epson, Hewlett-Packard, IBM, NEC and many more. The PC printer can be configured as the IBM 5224, 5225, or 5256—so it's compatible with many work environments.

And our ideas go even further. IDEAcomm 5251 supports four logical units so you can run four tasks simultaneously. Our programmatic interface lets programmers easily customize applications to the board through software. IDEAcomm 5251 can be configured for PC and 5250 keyboard modes and we provide templates for both. And we even have a color mapping option which gives you the choice of remapping any of the 5250 attributes to different colors.

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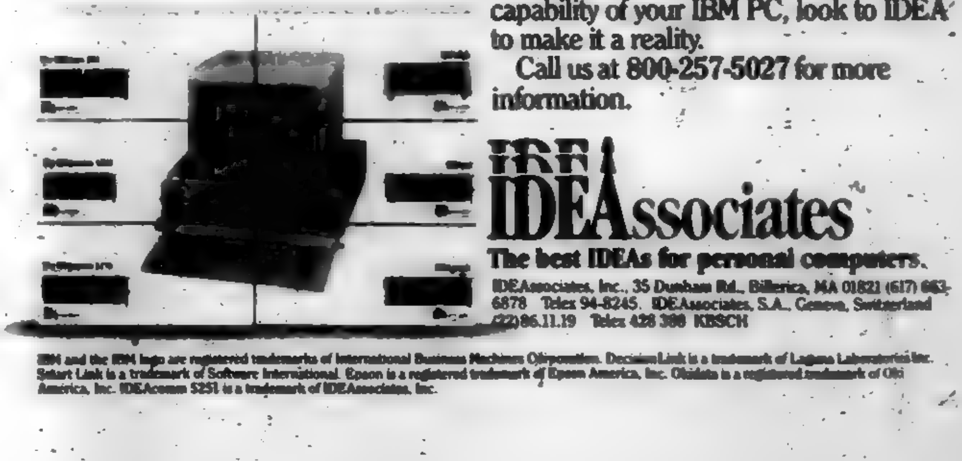

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SYSTEMS SOFTWARE

■ **Software Diversified Services Co. is offering a software product for monitoring IBM DOS/CICS systems.**

Called Online Resource Control Aid (Orca), the software allows users to view IBM Vtam and DL/1 system components, according to a spokesman. Orca provides 50 displays, including queued resources, storage violations, systems console data, Vsam data set statistics and "wait-on-string" conditions.

A permanent license costs $2,600; the monthly license fee is $130.

Software Diversified Services, Suite 308, 6401 University Ave. N.E., Minneapolis, Minn. 55432.

■ **Axios Products, Inc. is offering Version 3 of Fetch, a package designed to improve IBM CICS/VS response time and storage utilization.**

Enhancements in Version 3 include an automatic installation facility; a reduction in program search requirements by putting high-activity programs at the top of the control table; and a shorter optimizer cycle, said to provide faster response to program loading needs.

Version 3 provides hard copy CICS program loading statistics on demand and at shutdown, the vendor noted. In addition, a display shows the status of individual programs processed by Fetch, including the number of times the program was loaded by CICS and the total use count for the program.

Fetch 3 is available for a one-time fee of $12,000.

Axios Products, 1455 Veterans Highway, Hauppauge, N.Y. 11788.

■ **Mindcode Development Corp. is offering Terminal Manager, a character set editor and function key definer for Digital Equipment Corp. VT200 series terminals.**

Designed for any VAX/VMS system, Terminal Manager allows users to define and download custom character sets, define function keys shift-F6 through shift-F20 in terminal memory plus query and display terminal attribute reports.

Terminal Manager, supplied with program-callable interfaces, can be licensed for $500 for the Microvax I to $3,000 for a VAX 8600.

Mindcode Development, 1915 E. 9400 South St., Sandy, Utah 84092.

■ **National Instruments, Inc. has unwrapped real-time software that provides multitasking capabilities for IEEE-488 General-Purpose Interface Bus (GPIB) or Hewlett-Packard Co. interface bus systems.**

The two modules include a handler kernel that is installed in the operating system and a language interface code that the user includes in the application program. An interactive control program is also included to let users experiment with command structures and troubleshoot bus problems, according to a spokesman.

The real-time handlers support C and assembler languages plus Mtos and Versados operating systems. They work in conjunction with National Instruments' VMEbus products, including the GPIB-1014DP that provides two separate GPIB controllers on a full-size VME board.

Single-quantity prices are $200 each for the real-time handlers and $995 for the GPIB-1014DP.

National Instruments, 12109 Technology Blvd., Austin, Texas 78727.

APPLICATION PACKAGES

■ **An integrated sales tracking and planning package for management control and sales forecasting on Wang Laboratories, Inc. Professional Computers and VS systems was unwrapped by Mitchell Manage-**

Uccel unveils tape library manager system

Uccel Corp. of Dallas has announced the Tape Management System (TMS) for managing magnetic tape libraries in Sperry Corp. data centers.

TMS runs on the Sperry 1100/OS operating system. The product monitors tape usage, location and inventory and protects tapes from unauthorized access.

The user mode of TMS allows each user to create internal tapes and list or change catalog entries of the tapes storied in his or her assigned account. The librarian mode allows the TMS librarian to control and maintain all tapes in the data center library.

TMS is available immediately and costs $10,000.

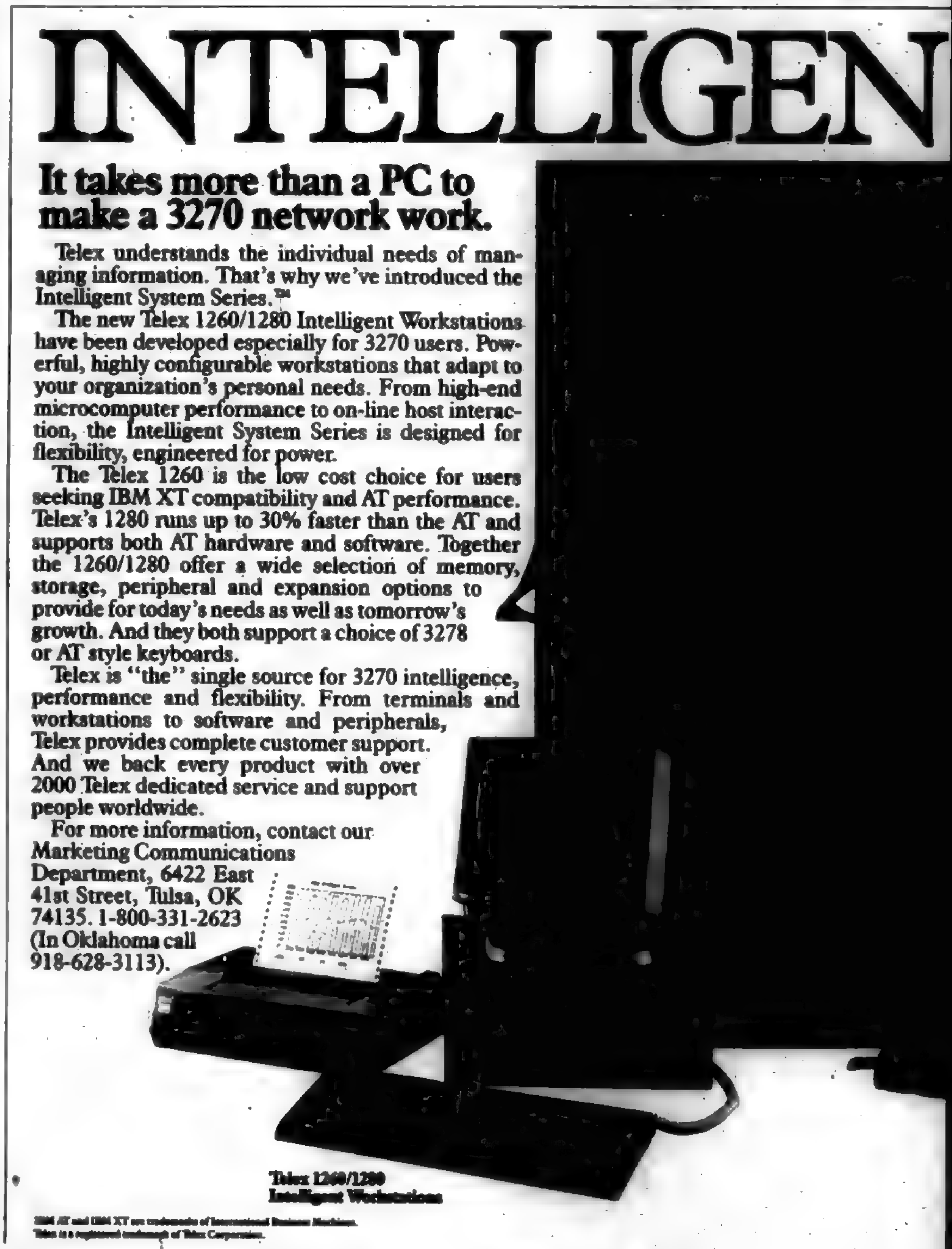
From page 37

MSA announces two mainframe applications

quirements to allow replenishment planning.

Both are on-line, real-time systems for companies with large manufacturing or wholesale distribution operations. With these systems, a distribution manager can ensure that only the necessary inventory is shipped and stored where it is most needed, a spokesman said.

The two systems, available now, may be purchased separately for $8,000 each.



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The Telex 1260 is the low cost choice for users seeking IBM XT compatibility and AT performance. Telex's 1280 runs up to 30% faster than the AT and supports both AT hardware and software. Together the 1260/1280 offer a wide selection of memory, storage, peripheral and expansion options to provide for today's needs as well as tomorrow's growth. And they both support a choice of 3278 or AT style keyboards.

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Intelligent Workstations

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ment Systems, Inc.

Called Sales and Marketing Management (Samm), the software works from an integrated data file and manages the progression of a prospect from first introduction as a lead to eventual close as a customer. Samm organizes sales activity by position in the sales cycle and importance of the prospect. Each prospect is assigned a subjective importance rating and an objective rating based on its location in the sales cycle.

There are four integrated modules: sales, sales management, marketing and telemarketing.

Sales consists of six applications said to help track individual activity. These include call reports, prospect strategies and a prospect hot list and automated telephone messages. Sales management provides a view of sales activity within a specific group, region or territory.

Marketing tracks and forecasts product sales and reports on market penetration, product mix and product sales forecasts.

Telemarketing applications also integrate with the central data base and include an ability to manage a 100,000-name mailing list, the spokesman said.

Samm offers 15 preformatted reports plus a select-and-sort utility that reportedly lets users select and prioritize up to 25 menu variables to create more than 100,000 customized reports.

Priced at $38,000 in single quantities, Samm requires 512K bytes of memory and 10M bytes of available storage.

Mitchell Management Systems, Westboro Office Park, 2000 W. Park Drive, Westboro, Mass. 01581.

■ Control Data Corp. is offering five business and scientific software applications for its Cyber 180 computer systems running under NOS/VE.

The packages are the IMSL Library, developed by IMSL, Inc.; IFPS, a business package from Execucom Systems, Inc.; MGG and Sciconic/VM from Scicon, Ltd.; and CDC's Uniplot graphics and plotting software.

Priced between $250 and $500 per month, the IMSL Library contains more than 540 mathematical and statistical routines for Fortran application programs.

IFPS reportedly performs risk analysis, develops budgeting and planning systems, produces financial reports and analyzes cash flow. The price ranges from $30,000 to $80,000.

MGG is a program generator that is said to produce a Fortran matrix program from a formulation written in a natural mathematical programming language. The software costs between $2,250 and $6,500.

Sciconic/VM, which costs from $4,500 to $12,500, is a mathematical programming system that reportedly can solve standard linear, complex mixed-integer and nonlinear programming problems. Features include interactive or batch access to processing options plus full or partial print solutions.

Uniplot graphically displays output from a batch program by linking it to graphics devices. With this package, users can preview a plot on a display device, delay selection of a plotting device until plot time or run the plot one or more times on selected plotters without rerunning the application. Prices range from $3,500 to $12,000.

CDC, 8100 34th Ave. S., P.O. Box 0, Minneapolis, Minn. 55440.

■ Para Research, Inc. has released Version 2 of its Payroll Financial System for IBM System/34 and 36 computers.

Release 2 reportedly supports shift differentials, tips and up to 15 deductions that can be preset to stop automatically when they reach a preset amount. Paychecks can show vacation and sick days taken and available as well as year-to-date earnings and deductions. The enhanced version also provides two fields for storing deductions from taxable income.

Other upgrades include the ability to issue special checks for reimbursements, bonuses or cash advances; the ability to override deductions at any time; the ability to void and reissue lost checks; the ability to take one-time deductions and feed them into a general ledger account; and the ability to send different check forms to the spool file as separate jobs.

Release 2 comes with current federal, Federal Insurance Contributions Act and state income tax tables, and it includes two sample local tax tables.

At year end, the system automatically makes two copies of the employee master file — one for processing W-2 forms and reports and the other for starting the new year's master file.

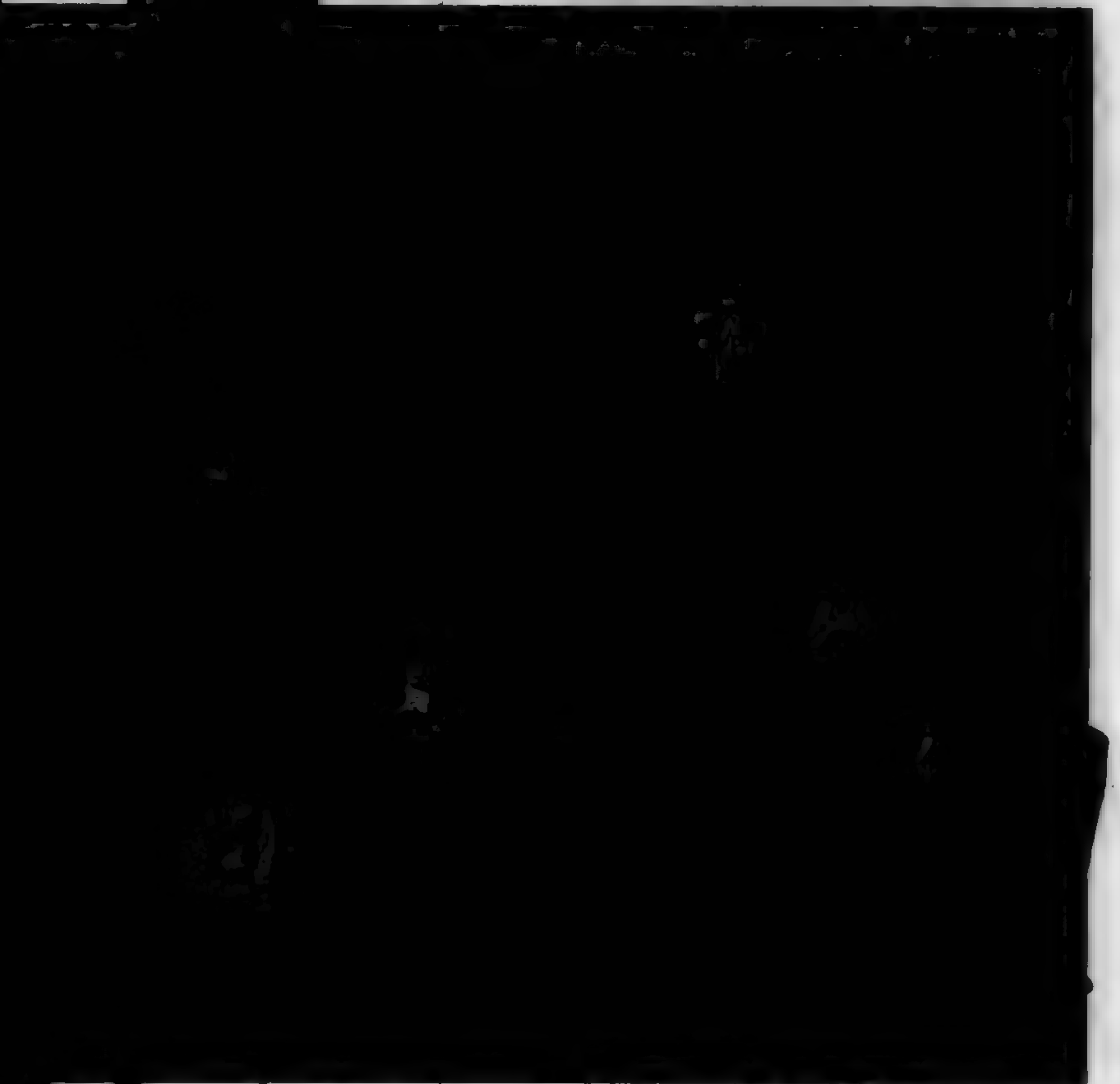
The enhanced version keeps employee records in a personnel file and also provides a separate secured money file to limit access to payroll information. The package interfaces with Para Research's General Ledger Financial System.

Current Payroll Financial System users can upgrade to Release 2 for $500. The enhanced package costs $3,000 for first-time users.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01930.

Continued on page 42

CE AT WORK



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Applications Packages

■ **McDonnell Douglas Computer Systems Co. has announced a Municipal Management System (MMS) that is said to help city managers control governmental resources.**

Developed by Creative Computer Solutions, Inc., MMS operates on McDonnell Douglas' Microdata 4700, 6000 and 9000 business computers.

MMS consists of 16 modules, including financial, which handles budget, cash receipts and fixed assets; inventory; equipment; payroll/personnel; purchasing; utility information system; licensing, which covers business and animal licenses; parks and recreation; and permits.

All municipal services can share current information; no duplicate data entry is required, according to a company spokesman.

The modules range in price from $1,500 to $8,000.

McDonnell Douglas Computer Systems, 17481 Redhill Ave., Irvine, Calif. 92714.

■ **Software International Corp. has enhanced its Accounts Payable system for the Hewlett-Packard Co. HP 3000 computer to support HP's Image data base management system.**

The release is said to use data base unload and reload capabilities offered by the HP 3000 and to allow use of function keys between Software International and HP products.

In addition, enhancements to the Accounts Payable application include the elimination of record numbers, replacement of all sequential batch files with an Image data base of batch files, added menu navigation capabilities to let users change from one function or screen to another and an added main menu job submitter.

Accounts Payable leases for $19,000.

Software International , One Tech Drive, Andover, Mass. 01810.

■ **A menu-driven program that manages equipment or vehicle maintenance is available from Independent Computer Systems, Inc.**

Called the ICS Preventive Maintenance System, the software schedules preventive maintenance tasks, creates work orders for these tasks and posts parts, labor and fuel to the work order.

The package supports five types of work orders, provides unlimited on-line unit history and generates such reports as maintenance schedules, inventory committed, expenses recapitulation, equipment outage and crew scheduling.

The ICS Preventive Maintenance System can run in stand-alone mode or interface to ICS general ledger, inventory, purchase order, order entry or payroll modules.

System requirements include Honeywell, Inc. Level 6/DPS 6 computers running Gcos MOD 400 with Vdam and Sort or Honeywell Level 64/DPS 7 running Gcos 7 with TDS.

A one-time license fee costs $15,000.

Independent Computer Systems, Suite A-201, 10640 N. 28th Drive, Phoenix, Ariz. 85029.

■ **Daly & Wolcott, Inc. has enhanced its Credit and Collection software to allow it to interface with IBM System/36 and 38 machines running the Mapics II Accounts Receivable module.**

The Credit and Collections package consists of three modules: customer credit profile, payment history and credit and collection information. With the enhancement, the package examines paid and open invoices and produces an aged trial balance report on which invoices are aged on the actual date.

A customer credit profile is also provided featuring date of first sale, high credit amount, high credit date and last payment date.

Prices for the upgraded version are $650 for the System/36 and $900 for the System/38.

Daly & Wolcott, 120 Lavan St., Warwick, R.I. 02888.

■ **Integrated Software Systems Corp. has ported its line of graphics software to AT&T Unix-based Sun Microsystems, Inc. workstations.**

The products now available for Sun workstations are Disspla software for scientific and engineering graphics; Tell-A-Graf software for business graphics; and Tellaplan software for project management and reporting.

Pricing involves a first-year investment and annual renewal fees. The first-year investment fee ranges from $1,800 per package in quantities greater than 1,000 to $3,600 for one package. Annual renewal charges range from $288 per package when more than 100 are administered as a unit to $3,600 for a single package.

Integrated Software Systems , 10505 Sorrento Valley Road, San Diego, Calif. 92121.

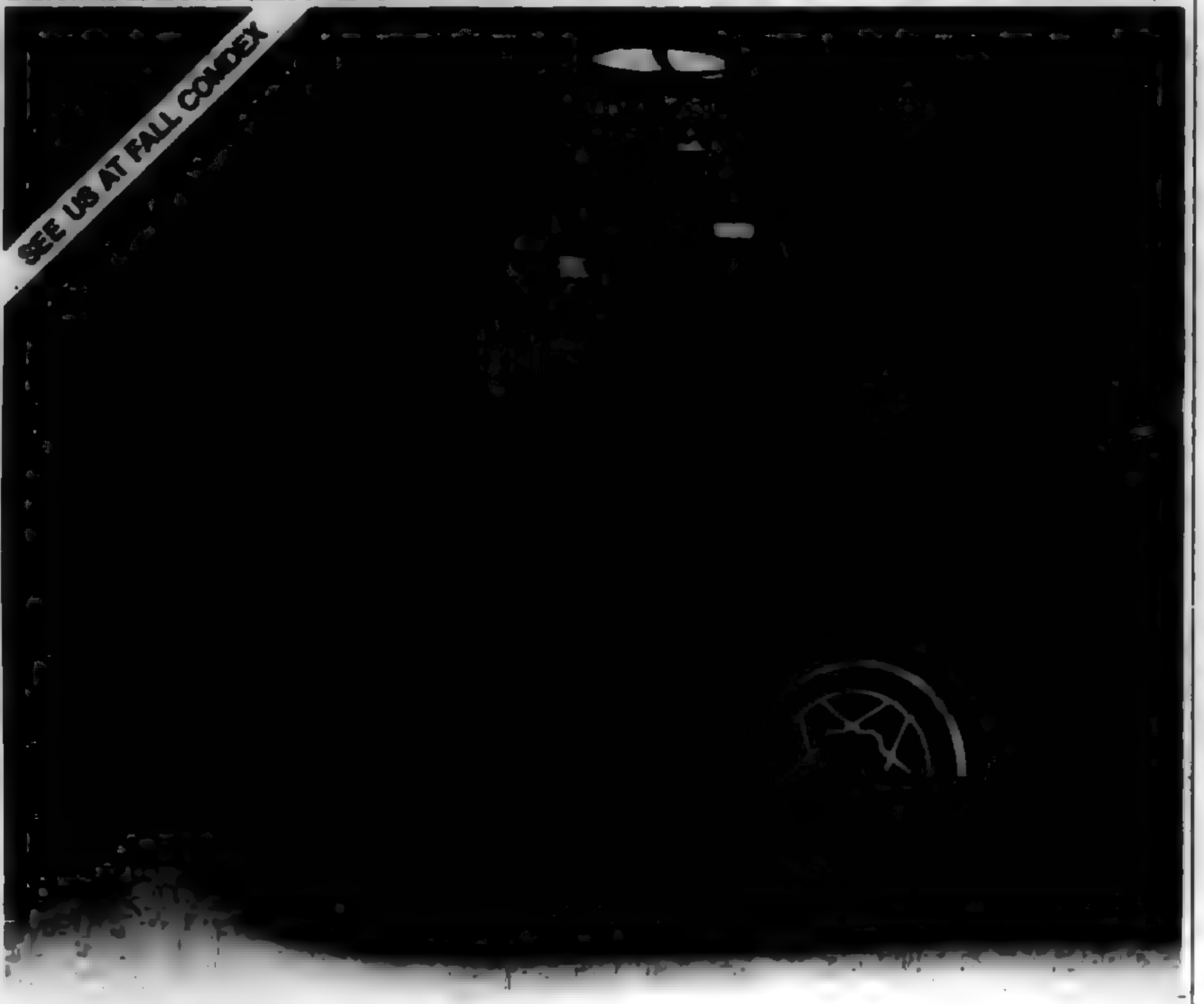
■ **A package for professionals that tracks and bills their time on a project or cost-category basis is available from Software Express, Inc.**

Called Professional Time Reporting, the package is said to provide summary information for each project by budgeted, period-to-date or cumulative hours or amounts.

Other features include reports for projected vs. actual expenditures, manual and automatic billing, project analysis by user-defined categories, and profitability reports on a project-by-project basis.

Professional Time Reporting lists for $2,500.

Software Express, 7th floor, 2925 Briarpark Drive, Houston, Texas 77042.



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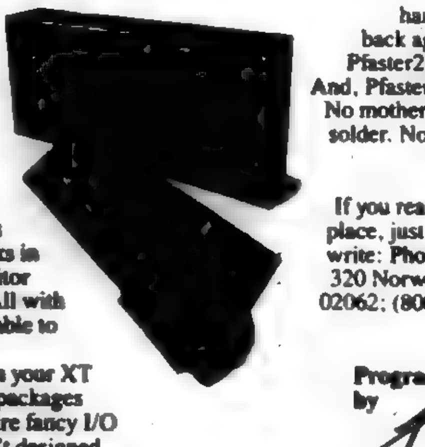

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SAS Institute Inc. Announces

Lattice C Compilers for Your IBM Mainframe

Two years ago...

SAS Institute launched an effort to develop a subset of the SAS® Software System for the IBM Personal Computer. After careful study, we agreed that C was the programming language of choice. And that the Lattice® C compiler offered the quality, speed, and efficiency we needed.

One year ago...

Development had progressed so well that we expanded our efforts to include the entire SAS System on a PC, written in C. And to insure that the language, syntax, and commands would be identical across all operating systems, we decided that all future versions of the SAS System—regardless of hardware—would be derived from the same source code written in C. That meant that we needed a C compiler for IBM 370 mainframes. And it had to be good, since all our software products would depend on it.

So we approached Lattice, Inc. and asked if we could implement a version of the Lattice C compiler for IBM mainframes. With Lattice, Inc.'s agreement, development began and progressed rapidly.

Today...

Our efforts are complete—we have a first-rate IBM 370 C compiler. And we are pleased to offer this development tool to you. Now you can write in a single language that is source-code compatible with your IBM mainframe and your IBM PC. We have faithfully implemented not only the language, but also the supporting library and environment.

Features of the Lattice C compiler for the 370 include:

- **Generation of reentrant object code.** Reentrancy allows many users to share the same code. Reentrancy is not an easy feature to achieve on the 370, especially if you use non-constant external variables, but we did it.
- **Optimization of the generated code.** We know the 370 instruction set and the various 370 operating environments. We have over 100 staff years of assembler language systems experience on our development team.
- **Generated code executable in both 24-bit and 31-bit addressing modes.** You can run compiled programs above the 16 megabyte line in MVS/XA.
- **Generated code identical for OS and CMS operating systems.** You can move modules between MVS and CMS without even recompiling.
- **Complete libraries.** We have implemented all the library routines described by Kernighan and Ritchie (the informal C standard), and all the library routines supported by Lattice (except operating system dependent routines), plus extensions for dealing with 370 operating environments directly. Especially significant is our byte-addressable Unix®-style I/O access method.
- **Built-in functions.** Many of the traditional string handling functions are available as built-in functions, generating in-line machine code rather than function calls. Your call to move a string can result in just one MVC instruction rather than a function call and a loop.

In addition to mainframe software development, you can also use our new cross-compiler to develop PC software on your IBM mainframe. With our cross-compiler, you can compile Lattice C programs on your mainframe and generate object code ready to download to your PC.

With the cross-compiler, we also offer PLINK86™ and PLIB86™ by Phoenix Software Associates Ltd. The Phoenix link-editor and library management facility can bind several compiled programs on the mainframe and download immediately executable modules to your PC.

Tomorrow...

We believe that the C language offers the SAS System the path to true portability and maintainability. And we believe that other companies will make similar strategic decisions about C. Already, C is taught in most college computer science curriculums, and is replacing older languages in many. And almost every computer introduced to the market now has a C compiler.

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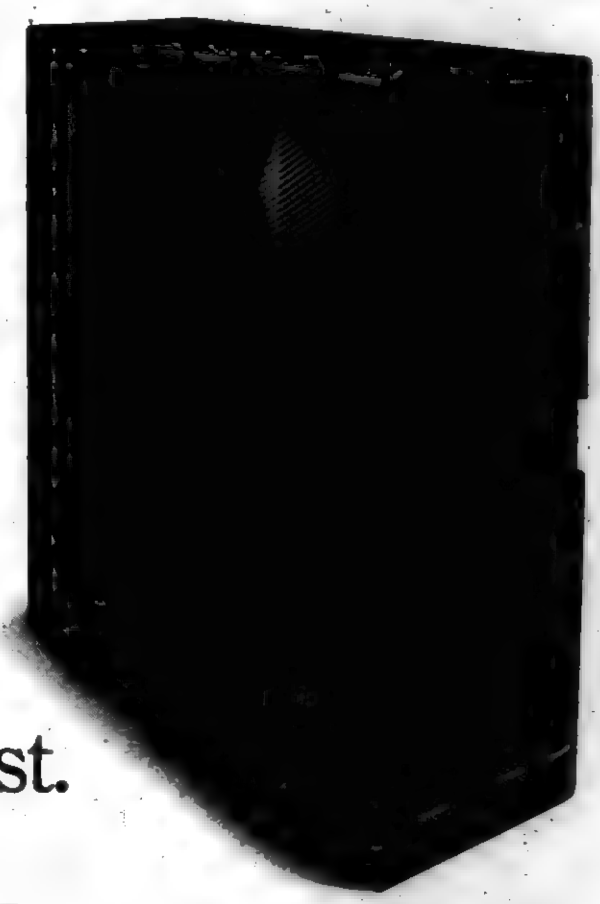
For the last six months Bank of America, Warner-Lambert, Merrill Lynch, McKinsey & Company, United Airlines and General Electric have been testing the first software product likely to replace the spreadsheet.

We're pleased to say it passed the test.



Introducing Javelin.

Javelin

Javelin Software Corporation, One Kendall Square, Building 200, Cambridge, MA 02139
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From page 37

Softscope: Notes from the industry front

will be worth another $17 million. Among the ADR products involved are the Datacom/DB relational data base management system, Datadictionary, Dataquery, ADR/DL, Roscoe and Metacobol.

■

Reach out and sign someone. Palo Alto, Calif.-based **Micro Focus, Inc.** and **AT&T Information Systems** penned an accord that allows AT&T to place its logo on and sell through its direct sales force and value-added resellers Micro Focus' Level II Cobol Enhanced Technology software. Level II Cobol Enhanced Technology is a Cobol development tool for Unix that runs on the 3B2, 3B5 and 3B15 Unix-based computers.

Also, AT&T and **Unify Corp.**, Sacramento, Calif., announced at Unix Expo that the Unify relational data base management system will be co-labeled by AT&T and marketed by more than 4,000 AT&T account executives nationwide. Unify is said to run on more than 100 different computer types.

■

Striking software oil: **Excalibur Computer Systems, Inc.**, based in Denver, and **Michael Smith & Associates, Inc.**, headquartered in Houston, are undertaking a project to integrate Excalibur's financial and accounting software with Michael Smith's production and reserve software. The combined software, which was designed specifically for IBM and Prime Computer, Inc. processors, will be jointly marketed to users in the petroleum industry.

■

Blue moves. **Madic Corp.** of Santa Clara, Calif., and **IBM** inked an agreement that allows Madic to market IBM mainframes with the Madic Software System. Madic will be selling IBM 4300 series processors with the 22 financial and manufacturing modules of its Madic software system primarily to the manufacturing industry.

■

Audity. **Computer Language Research, Inc.**, Carrollton, Texas, and **Financial Audit Systems** of Raleigh, N.C., developed a bridge between their respective CLR/Fast-Tax tax processing and Field Audit System Technology micro-based auditing tools. The two companies will jointly promote the products to certified public accounting firms and corporations.

■

Office talk. **Southwind Software, Inc.** of Wichita, Kan., and Dallas-based **R Systems, Inc.** have integrated their respective IPT Grafsman graphics and R Office office automation systems. The companies will jointly market the integrated products, which operate under Unix.

■

Westboro, Mass.-based **Data General Corp.** will make the **Intersystems Corp.** M package available through DG's Independent Software Vendor program. M combines an American National Standards Institute version of the Mumps programming language with utilities and data management software. M will be available for DG systems in early 1986.

From page 37

Boom times seen for DSS

ness atmosphere."

DSS products, the report continued, are also a symbol of the changing role of MIS professionals in large organizations — and IDC's research clearly indicates that DSS use is heavier at sites with larger mainframes such as the IBM 3080 series.

Where MIS was once simply the keeper of data and computing resources and the supporter of applications, it "now has the capacity to fill a crucial business function as detailed, up-to-date, readily available information becomes a critical decision-making resource."

Although admitting that no one definition encompasses all DSS products, IDC said they generally offer the following capabilities:

- An ad hoc query facility.
- A comprehensive data base of information from a variety of sources, including in-house systems, on-line data base services, data base management system (DBMS) interfaces and the user's own applications.
- Interfaces for retrieving, manipulating, presenting and storing data.
- Mathematical and statistical models and techniques, and tools for risk analysis and simulation.
- Facilities that allow the user to gather data through time and by business unit.
- Support for specific communications requirements such as messaging, local-area networks and document interchange.

Among the products that fit that description, according to IDC, Execucom Systems Corp.'s IFPS is the leader in the DSS market with roughly one-third of the installed base. With approximately half that share, about 16%, Thorn-EMI Computer Software's FCS-EPS system is the No. 2 DSS product. But FCS-EPS registered the biggest growth last year, having increased its market share from slightly more than 10% in 1983.

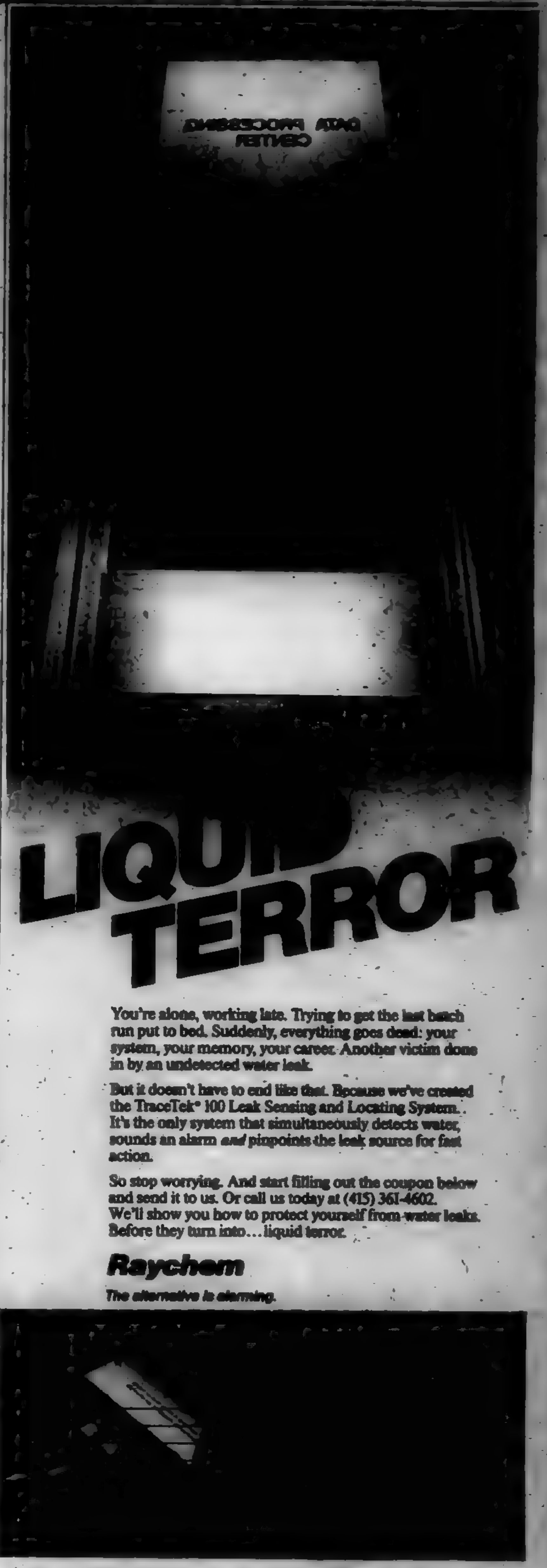
Installed bases that slipped in 1984

Other DSS products whose installed base slipped in 1984 included Computer Associates International, Inc.'s Autotab — 8.7% market share; Comshare, Inc.'s System W — 3.5%; Information Systems of America, Inc.'s Foresight — 3.5%; and Management Decision Systems, Inc.'s Express — 1.7%.

According to IDC, other products such as "lesser" IBM offerings and mainframe-based spreadsheets constitute about one-third of the market. Thus, IDC stated, "The relatively large market share of the lesser lights in the financial planning market indicate that this market has not yet consolidated itself, despite the presence of significant leaders."

IDC's research indicated that almost 20% of all 3080 series mainframe sites had some type of DSS, while only about 5% of IBM 4300 system users had a DSS. Almost 50% of all the installed DSS products were hosted under IBM's MVS or MVS/XA.

Less than 5% ran under IBM's VM alone, and about 14% ran under IBM's DOS/VSE. IBM's DL/1 was the DBMS most widely used in conjunction with a DSS, followed by Software AG's Adabas; Cullinet Software, Inc.'s IDMS/R; and IBM's IMS.



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BASF

SOFTWARE & SERVICES

From page 37

Data processing professionals need a variety of attributes

Let's look at this question first from the perspective of the employee or prospective employee. Do you remember when you were ready to enter the job market? You needed a job. Maybe you were fortunate to have several interviews and even more than one offer. Was your choice of an employer based on the type of computing hardware or software being used? Probably not. If it was a reputable company that offered a good salary, opportunities for advancement and was in an acceptable location, you were glad to get the job.

But now you have become dissatisfied because of limited opportunities, less than competitive wages or specific unacceptable circumstances. Or worse yet, you are committed to a career with your company, but it is in extreme financial difficulties, and a cutback in staff may include you.

When starting to search for other opportunities, you realize that your specific experience is not in great demand on the open job market. Maybe the hardware you have been working on is not widely used. Maybe the software with which you have worked for many years is unique to your company or industry and not used by other employers.

What is the likely result of such a situation, which is happening every day all across the country? I submit to you that more and more computer professionals are beginning to think about how marketable their ability and experience is. Loyalty to your employer is an admirable quality, but the employer cannot guarantee you a lifelong career. When your firm seeks protection under Chapter 11 of the Federal Bankruptcy Act, all the loyalty in the world will not save your job. You are on your own and must try to market whatever skills and knowledge you have to offer to whoever happens to be hiring at the time. Are the odds in your favor? Do you have experience with hardware and software that is in broad use?

> ”
>
> *When your company seeks protection under Chapter 11, all the loyalty in the world will not save your job.*

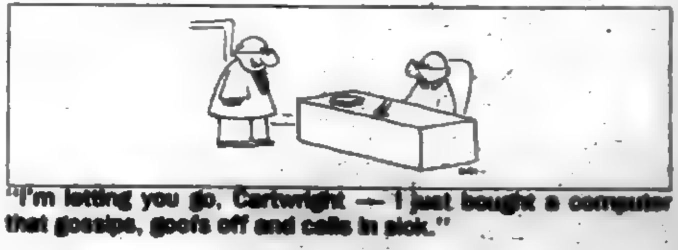
Now, what about the employer? Let's say you are the DP manager and have just lost your chief programmer on the most important application project of your career. The chief executive officer is personally interested in the project being completed on schedule, as the company's ability to compete depends on the automation of this part of the business. Are you going to conduct a thorough search of all possible candidates to find the person with the most native ability, common sense, dedication and commitment, regardless of what type of hardware and software experience he has gained? Of course not.

You will search for the best available candidate with the specific required experience, and the search will be quick. Is there a possibility you are missing an outstanding candidate who could contribute more significantly to the firm in the long run? Yes, but the pressure is on, and the project requires someone who can go to work now — without attending classes or going through a learning curve.

What is the right answer here? Or is there one? Is this situation having an impact on users of specific hardware or software or on the industry as a whole? Does it ever influence the decision as to which vendors' products are installed in the data center? Does it affect a company's recruiting success?

To the employer, I suggest greater consideration be given to ability as opposed to experience. Of course this requires advance planning to provide time for recruiting and training. But you will have a wider choice of candidates, and it will allow you to build a staff that can have a more significant long-range impact on the success of the firm.

To the computer professional, I hope you are gaining a better understanding of the realities of the employment process — that supply and demand are at work in the computer field. I hope you will continue both to enhance your ability and to broaden your experience. I suggest you give attention to the marketability of both your ability and experience. Don't be caught off guard. Assume responsibility for your own career.



"I'm letting you go, Cartwright — I just bought a computer that gossips, goofs off and calls in sick."

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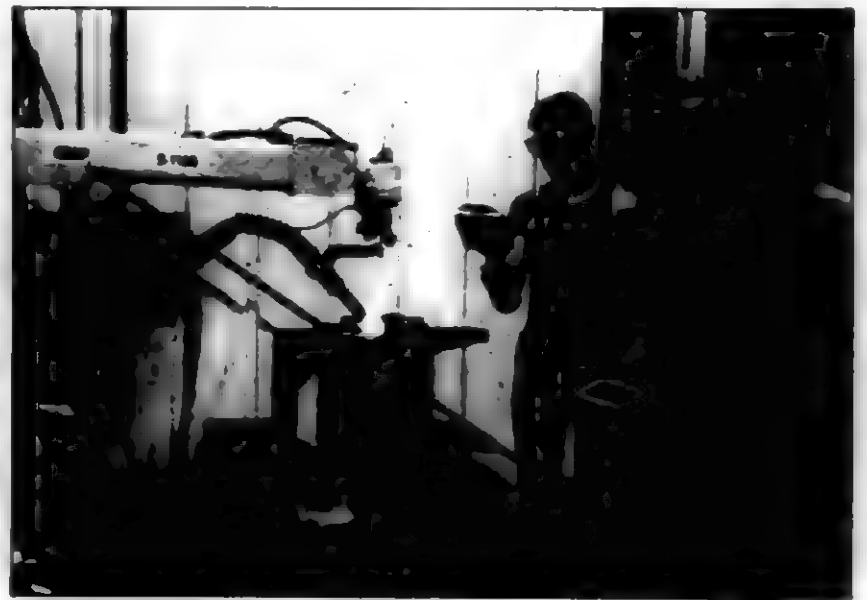
Update

A look at robotics in the U.S.

By Glenn Rifkin
Update Editor

'When [the robot] gets up and starts walking around holding blueprints, then I'll get worried.'

— Bill Bedillion
X-Mark Industries



Welders at X-Mark Industries check progress of the company's robot.

> ***"There was a time when humanity faced the universe alone and without a friend. Now he has creatures to help him; stronger creatures than himself, more faithful, more useful and absolutely devoted to him. Mankind is no longer alone."***
>
> — ***I, Robot*** **by Isaac Asimov (1950)**

In the sloping hillsides of western Pennsylvania, innovation in high technology is the last thing a visitor might expect to see amid the torpor of the steel industry. But at X-Mark Industries in the shopworn village of Washington, the economic outlook is bright, and that is owing, at least in part, to a vigorous commitment to robotics.

When Sam Bruckner, president of the precision metal fabrication shop, installed his new robot six months ago, it raised eyebrows around the local business community. It was unusual, if not downright crazy, for a tiny operation (60 employees, $3.5 million in sales) to be investing in a technology traditionally reserved for huge automotive manufacturers.

Bruckner was undaunted. Though he has no technical background to speak of, he is a pragmatic businessman who is unafraid of experimenting with the latest high-tech wizardry. He has parlayed personal computers, lasers and now robotics into increased revenue. His employees, far from being cowed by the technological influx, love it.

The GMF Robotics, Inc. robot has, contrary to popular belief, created rather than killed jobs at X-Mark. The spot-welding machine has not only taken over the boring and repetitious welding chores that saddled several employees but has proven to be a tireless, far more efficient worker than the people it replaced. Those workers, as well as three new hires, have been moved to other tasks created by the incoming new business that X-Mark has bid for and won.

"We bought the robot to increase our work load, not to lay off people," Bruckner says. "We talked to our welders beforehand and told them that if we wanted to compete in world markets we would need the best technology. They were real enthusiastic. They don't want to let the competition knock our socks off."

With the robot now a prized member of the work force, X-Mark's business is taking off. Revenue doubled in one year, and the company will double its plant size by the end of 1985. Though there are no definite plans, Bruckner has little doubt that he will bring in more robots soon.

The welders themselves are proud of the new machine, and though none has computing expertise, several are learning fixturing (the precise gauging) and programming for the robot. Their friends in the neighborhood bars continue to predict impending job displacement at the mechanical hands of these new machines, but the welders are devoted converts.

Says Bill Bedillion, an X-Mark welder who works closely with the robot, "When it gets up and starts walking around holding blueprints, then I'll get worried."

Though it won't be tomorrow, Bedillion may indeed face that worry someday. Robots are no longer simply products of fertile sci-fi imaginations. These androids with the ability to see, touch and move around already exist in prototype stages. Work continues in both academic and industrial labs around the world to close the gap between real life and literature.

Unfortunately, the field of robotics is a two-headed monster that has, at its heart, divergent goals and conflicting ideals. While some imaginative researchers and scientists pursue the elusive anthropomorphic robot of movies and television, the economically driven field of state-of-the-art industrial robotics seeks to enhance bottom-line profits and increase productivity on the factory floor.

Science fiction has, in fact, cast the field of robotics into confusion and misunderstanding for both workers and managers who fear that R2D2-like creatures will cost fortunes and steal jobs. Robot purists, on the other hand, believe that the mechanical arms swinging to and fro along auto assembly lines have no more claim to the name robot than monkey wrenches and pliers.

It is these robotic arms, however, that make up the current commercial robotics industry. These industrial tools, incorporating vision, sensing and someday mobility, will undoubtedly usher in any futuristic wave of mechanical men. Though Japan has attracted much attention with its extensive use of robotics, this *Computerworld* Update will take a look at the field of robotics in the U.S. and visit several user sites — both large and small — to see these modern marvels at work. Update will also examine the current research that is attempting to improve today's robot performance and push out the frontiers of the robotics of tomorrow.

The state of the industry

For users such as X-Mark, the foray into robotics has been a rewarding experience. That cannot be said for many on the other side of the robot — the manufacturers. Though the industry has grown enviably in the past five years (25% to 35% annually), robotics is a frustrating and costly field for its players. Few companies show a profit.

Despite the hoopla that heralded the robot industry in 1980 and 1981,

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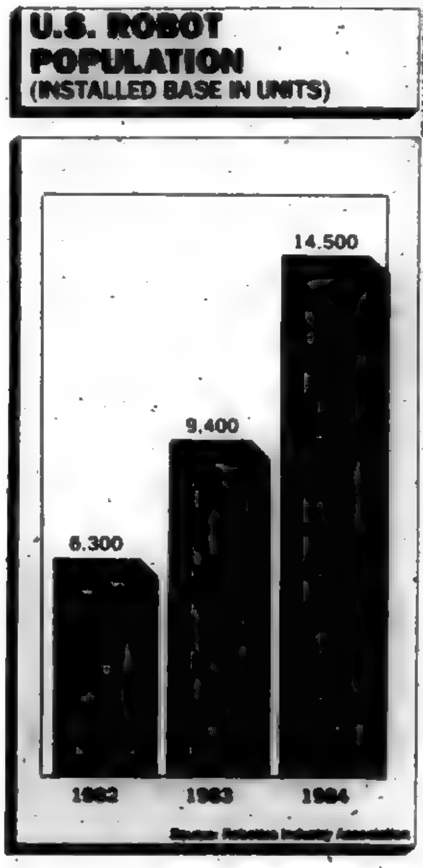
COVER ILLUSTRATION BY KAREN WATSON

the expected wells of plenty have come up far drier than anticipated. There are only an estimated 16,000 robots installed in U.S. factories, compared with 60,000 in Japan, according to the Robotics Industries Association (RIA). Projected sales for 1985, though up 38% over the previous year, total just $545 million. These aren't numbers that make industrialists tingle with excitement.

For industry watchers such as Laura Conigliaro of Prudential-Bache Securities, Inc. in New York, this "profitless prosperity" is frustrating. "It's been so tedious and difficult and frustrating to watch some pretty smart people, whether in a large company or small company, scratching their heads and saying, 'What the heck is a workable strategy for this industry, if in fact there is one?' Ultimately, there might be a cogent and consistent approach you can take, but it certainly is not evident right now," she says.

The problem, she concludes, is that robotics is a "solutions-based industry with heavy engineering content." Gerald Michael, a consultant with Arthur D. Little, Inc. (ADL) in Cambridge, Mass., adds, "The top line has been increasing smartly, but the bottom line hasn't been keeping up. By the time revenues filter down to the bottom line, they have have been taken up by expenses and research and development."



Robotics has attracted a strange and diverse group of companies. Fortune 500 giants, such as Allegheny International, Inc., United Technologies Corp., General Motors Corp., IBM, Westinghouse Electric Corp., General Electric Co. and Textron, Inc., entered the market. Some are still in it, and "some of them wish they weren't," Conigliaro says. In addition, many start-ups with specific expertise in one discipline or another also jumped in. Companies such as Unimation, Inc., Cincinnati Milacron, Inc., GMF Robotics, and Asea Robotics, Inc. dominate sales.

Ironically, IBM, which usually dominates any market it decides to enter, is a somewhat quiet, albeit successful, player in robotics. According to Michael, IBM's projected 1985 sales will total $16 million, which likely wouldn't match a week's worth of Personal Computer sales.

Nonetheless, IBM is committed to selling its small, light-assembly, selective compliance assembly robotics arms (Scara) robots (which they import from Japan) along with the internally designed $100,000 Model 7565, a larger, more flexible assembly unit.

According to John Klein, general manager of manufacturing systems products at IBM, the company began investing in robotics in the early 1970s to facilitate the internal use of the technology. By deciding to sell robots, "we are making a statement about our total commitment to manufacturing," Klein says.

Of the dozens of other companies that joined the fray early on, many have gone belly up or quietly folded their cards, taken their losses and slunk away. "The shakeout is going on, and the number of active players is considerably smaller," Conigliaro says.

She points out that the need for robotics has not disappeared despite the industry's difficulties. Less competition should provide a boost to the remaining vendors. Analysts are confident that profitability will come to more than just a handful in 1986 or 1987.

"It's going to be a left-foot, right-foot, grind-it-out industry where you develop an expertise in a certain application and hope to add a second and third application until you get into a groove," she explains. Ultimately, as the technology improves, the market will open up.

Root of the problem

U.S. firms have had a notoriously tough time adjusting to the realities of modern manufacturing. Productivity growth between 1970 and 1980 was a paltry 28% compared with 102.1% growth in Japan, according to the U.S. Bureau of Labor Statistics. Industrial automation has been slow in coming to this country, and robotics has suffered along with related technologies. Outside of the automotive industry, which employs

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Update

35% of the country's robots, very few industries have embraced robotics in a significant manner. The Japanese, while enjoying no particular technological advantages, committed themselves to robotics in a manner that American robot manufacturers envy (see story Update/11). As early as 10 years ago, the Japanese government initiated incentive programs to aid domestic robot suppliers and encourage the use of robots. These incentives include government-sponsored research and development projects, tax benefits to manufacturers and users as well as depreciation allowances for robot users.

Though industry groups such as RIA have lobbied for similar incentives in the U.S., their voices have been a whisper in a wind of indifference.

"The lack of reindustrialization in the U.S. hamstrings us," says Hal Bloch, vice-president of marketing for Unimation, a subsidiary of Westinghouse and the first robot maker. "While the auto industry is mounting a herculean effort, the trend across the rest of the country is to export manufacturing offshore. That's something we'll regret in 10 or 20 years."

Top management in U.S. companies must be thoroughly convinced of the advantages of robotics before considering a purchase. All decisions, Bloch points out, must clear the return-on-investment hurdle before being approved. This shortsighted approach may save cash in the short run but could affect the very survival of the business in the long term, he adds.

"In Japan, the commitment to automation transcends the simple return-on-investment process," Bloch says.

For John Fife, manufacturing engineer for Snapper Power Tools in Smyrna, Ga., it took two and a half years of "intestinal fortitude" to convince management to spend $110,000 on its first robot. Though the response has been positive to the added benefits the robot delivers, Fife doesn't anticipate an easier time in selling further automation equipment to the powers at the top. "It's always going to be a struggle with management," he says. "They responded well to this, but you just don't win them all."

> **'It's going to be a left-foot, right-foot, grind-it-out industry where you develop expertise in an application and hope to add a second and third application until you get into a groove.'**
>
> ***— Laura Conigliaro***
> ***Prudential-Bache Securities, Inc.***

Better robots, response

The robot industry has added its own handicaps to the battle. The industry, says Allen Gilbert, vice-president of advanced product development for American Robot Corp. in Pittsburgh, has long sold itself on promises — promises that have not been kept. Stability of the products that have gotten out on the factory floor has not been very good from any of the manufacturers, he states.

"Factories are not coddled environments," Gilbert says, "which means that the requirements for stability are much more significant. Short of things like banking and airline reservation systems, the fault-tolerance requirments for most computer systems out there today are not all that high. And when you go into a factory, people tend to take a very dim view of systems that go down and stop the automation line." Because the field is relatively new and untamed, potential buyers have been inundated with confusing and conflicting messages from the overabundance of robot firms. "Customers are sitting there hearing all sorts of claims," says Clare Cox, marketing communications manager of Automatix, Inc., a robot and vision system maker in Billerica, Mass. "They want to know what difference you can make, and if you have nothing to show, that's tough."

The claims are one thing; delivering a usable system is quite another. "The hard part is matching your technology with the job to be done," Cox explains. "It's fine to do something in the lab in Billerica, but to get it to work on a job site can be tough."

Initially, robot makers were turning out general-purpose, out-of-the-box robots almost exclusively targeted to spot-welding or materials handling tasks.

These general-purpose machines needed to be shoehorned into environments that were neither ready nor particularly willing to accept robots. "The vendors were expecting the users to know what to do with them," says Dick Johnson, manager of product and marketing planning for GMF Robotics.

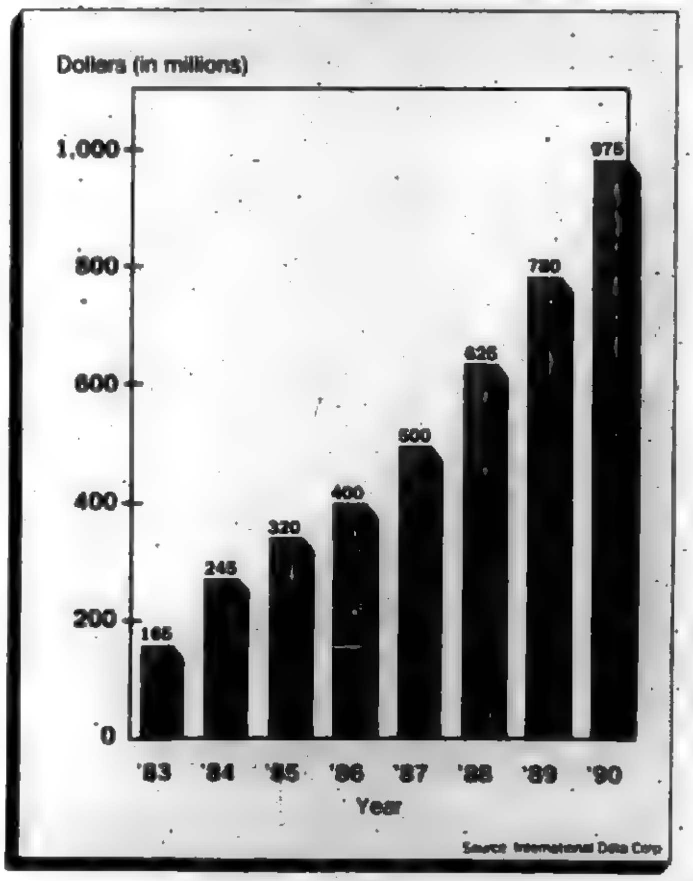
Despite support from the vendors, customers found that the task of integrating a robot into the factory environment was time consuming, costly and riddled with problems. Users were not pleased, for example, to find that the cost of equipment to position and feed the moving parts for the robot on an assembly line could be three times the price of the robot. Also, the complexity of programming for users who rarely possess programming skills causes numerous headaches.

The bulk of applications, according to Gilbert, have

See **ROBOT** UPDATE/6

MITCHELL J. HAYES

U.S. DEMAND FOR ROBOTS BY VALUE, 1983-90



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ROBOT from UPDATE/4

been relatively dumb and imprecise. Users now are looking for more sophisticated, precise functions for their robots, which they want to run at high speeds.

"The applications are getting harder and harder, and you can make fewer and fewer assumptions," Gilbert admits.

Many corporations, initially interested in robots, are simply finding other ways in which to address their needs.

Industry at the crossroads

Since its stumbling start, the robotics industry in the U.S. recently has picked up a perceptible bit of momentum. U.S. robot suppliers recorded a 243% jump in new orders in the first quarter of 1985 over the same period in 1984, according to RIA.

More than 1,800 robots were shipped, compared with 900 a year earlier.

General Motors, the leader in robotics usage in the U.S. from the start, plans to raise its installed base of machines from 5,000 to 8,000 by the end of this year.

Several large automotive manufacturers, such as GM, Ford Motor Co. and BMW of North America, have purchased equity shares in or have otherwise staked some of the small, independent robotics companies to life-giving deals, trading cash for development work on robotic systems.

For the industry, this breathing room provides a welcome chance to examine options.

It is becoming apparent that success in the robotics world will require something more than just a six-axis arm and an aggressive sales force. There are certain frontiers that must be conquered: higher speed and lower cost along with greater flexibility.

General-purpose machines appear to be a dead end.

PHOTO COURTESY OF AUTOMATIX, INC.

Robot at work on automotive assembly line

According to Dr. Tomas Lozano-Perez, associate professor in MIT's artificial intelligence lab, robotics in factories is an economic not technical issue. The Japanese, he points out, are using robots for the same applications as users here, but it is a question of magnitude.

'They've done just an amazing amount of special-purpose engineering in order to get automation," Lozano-Perez says.

Taking that lead, GMF Robotics, a joint venture between GM and Fanuc Ltd. in Japan, embarked on a different strategy from most of its predecessors.

Rather than produce a general-purpose unit, the company concentrated group efforts on specific target applications, such as arc welding, electronic assembly and vision products.

With this strategy (and the not-insignificant backing of GM) GMF Robotics has, in just three years, become the leading robotics vendor in the U.S.

According to Prudential-Bache, GMF Robotics already controls more than 30% of the robotics marketplace with sales three times greater than its nearest competitor. In fact, GMF Robotics, with its high-volume and low-cost approach, has been cited as the reason for the stalled growth of previous marketplace leaders Unimation and Cincinnati Milacron.

GMF Robotics has also pushed toward more sophisticated robot applications, such as vision, off-line programming (see story Update/13) and networking. It recently announced a robotic programming language, which is called Karel (in honor of Czech playwright Karel Capek who coined the term "robot"), that addresses robots and factory automation specifically rather then relying on old languages written for numerically controlled machine tools.

While other segments of the computer industry seek innovation to increase market shares and open up new niches, robotics must push out the frontiers of usefulness, flexibility, cost and ease of use in order to survive.

What users are doing

Though the automotive industry pioneered the use of robotics in this country and continues to be the single largest user, robots are making headway in other markets. As sophistication and flexibility increase, the opportunity for these mechanical marvels to move away from the din of the automotive assembly line into more precise, clean-room activities expands formidably.

Industries such as electronics, aerospace and security services are all tapping the potential of the robot. In addition, with research help from universities such as MIT, Carnegie-Mellon in Pittsburgh and Stanford in Palo Alto, Calif., robotics is being married to various forms of artificial intelligence and expert systems.

In this manner, special-use robots are appearing everywhere from space shuttle missions to the cleanup operation at Three Mile Island in Middletown, Pa. With ever increasing sophistication and functionality, these machines are taking on complex and dangerous missions once reserved for humans.

The military has shown tremendous interest in robotics, and major funding from the U.S. Department of Defense's Defense Advanced Research Projects Agency (Darpa) has fueled several large-scale projects encompassing private industry and academia. Darpa, for example, has invested heavily in walking machine technology and autonomous land vehicles [CW, May 6].

For users with more mundane concerns, the pioneering work accomplished in research labs will translate into better and cheaper machines. For these users, the leading edge today means little more than satisfactorily installing and running the robots in a cost-effective way.

Management is generally unconcerned about "Star Wars" technology, preferring to worry about cost justification and profits.

As robotics moves out toward other industries, the means by which these robots are going to reach the end user has become key, according to Michael of ADL. It is no longer feasible for vendors simply to provide a robot in a crate to users.

"Most vendors are realizing that that is not enough, particularly as you address users who don't have a lot of experience with robots," Michael says.

These untested markets require systems engineering, applications engineering and integration of the robot into the work environment.

Cropping up as middlemen are systems houses that offer integration. The drawback to systems houses, of course, is that they very often do not possess a working knowledge of every brand of robot. Systems houses may be more suited to helping customers create applications rather than with purchase and installation issues.

For the potential user, robots bring the promise of lower costs and higher quality. Though many of these machines fail to live up to that promise, the success rate is growing. As Michael puts it, "Once the robot is programmed to do a job, it will do it repeatedly, consistently and forever."

See **ROBOT** UPDATE/8

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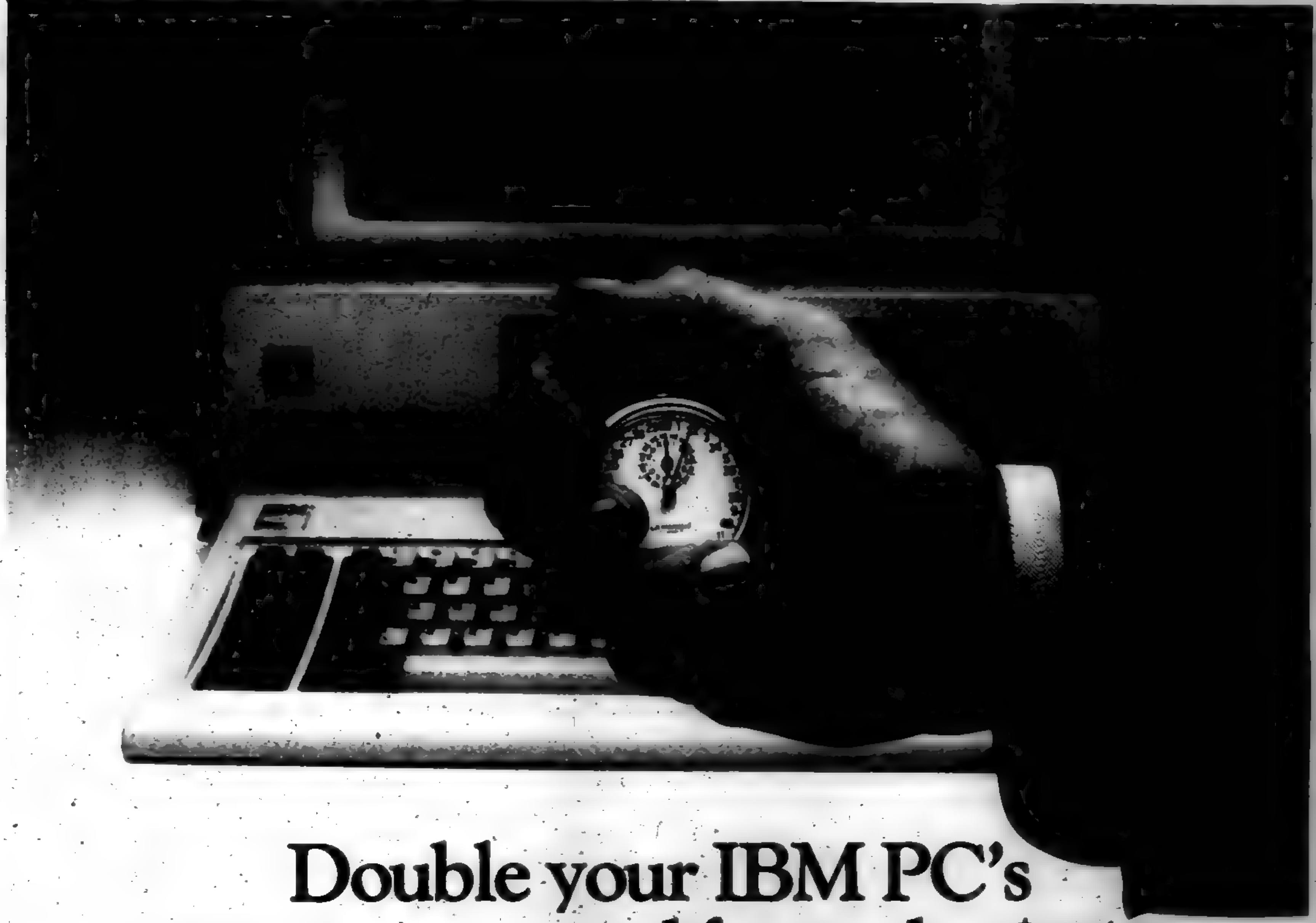

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Update

> **'People were relieved to find that robots were so stupid that they couldn't do anything without human help. They didn't gobble up jobs. They were, in fact, just another piece of equipment.'**
>
> — *Richard Beecher*
> *General Motors Corp.*

ROBOT from UPDATE/6

Three years ago, just 1,500 robots worked in GM plants. By the end of 1985, the number will reach 8,000. The largest single user in world, GM has spearheaded major efforts in computer-integrated manufacturing, encompassing robotics, computer-aided design and manufacturing and other forms of factory automation. GM introduced the Manufacturing Automation Protocol (MAP), a seven-layer protocol based on emerging International Standards Organization and Open Systems Interconnect standards. MAP is thought the likely winner in the race to create a network standard for computer-based factory automation.

According to Richard Beecher, manager of advanced manufacturing engineering at the GM Research Center in Warren, Mich., the company's overriding commitment to automation makes cost justification of robots a minor concern.

Though cost justification is still required, it is done on an application-by-application basis within each individual division, he says.

Some issues, Beecher points out, such as safety, override cost justification. "If a job is real nasty for a human, we put a robot in there without cost justification," Beecher says.

Though GM has a relatively high number of robots installed, the total is miniscule compared with the company's several hundred thousand employees. The robots' presence has done nothing to change corporate culture, Beecher says, though GM workers were concerned when robots were first introduced.

"People were relieved to find that robots were so stupid that they couldn't do anything without human help," Beecher recalls. "They didn't gobble up jobs. They were, in fact, just another piece of equipment." Under union contracts, GM workers cannot be displaced by technology, so while robots took over the boring, repetitious occupations, such as spot welding, materials handling and spray painting, human workers were reassigned or upgraded to other jobs.

Now an integral part of the factory work force at GM, robots have "become old hat" Beecher says. "They've been dramatized way out of proportion. More and more will come in as components of larger, integrated automation systems." GM uses robots from a variety of vendors, including Unimation, Cincinnati Milacron as well as its own spin-off, GMF Robotics.

Using its own research along with innovations from GMF, GM expects major advances in vision, end-effector (robot hands) flexibility and mobile robots.

"Vision is where the action will be in the future," Beecher claims. "Unit by unit, there will be more applications for vision systems than robots."

GM is at work on faster, more complex, mobile robots, and Beecher is optimistic about the coming changes.

"I find the horizon moves toward us faster than we to it. It's moving so rapidly that it's hard to talk about the future. People will think I'm smoking something," he says.

Unlike an industrial giant firmly committed to robotics, small manufacturing operations often find it tougher welcoming such new technol-

See ROBOT UPDATE/10

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The U.S. Department of Defense has given two of its four top money-saving awards to Hughes Aircraft Company for proposals that will cut costs by nearly $275 million. The Contractor Value Engineering Achievement Awards honor defense contractors for helping to trim defense costs during 1984. The Air Force cited Hughes for saving $172.8 million on the Imaging Infrared Maverick air-to-surface missile over the life of the contract. The Navy honored the company for reducing projected costs on the UYQ-21 data display system by $101.5 million. Hughes also contributed to the savings achieved by FMC Corporation, which won the Army award for cost-cutting efforts on the Bradley Fighting Vehicle System. The Value Engineering program was created to cut production costs without affecting performance, reliability, quality, maintainability, and safety standards. Last year the armed forces approved 34 Hughes VE proposals for total cost reduction exceeding $296 million. Since 1964, Hughes military customers have approved 705 changes on 52 programs for total savings of $887 million.

An electronics unit that took six years to complete will operate for 12 seconds when it plunges into the skies of Jupiter this decade. The device, called a pyro control unit, is a key element of the Galileo probe that will be launched in 1986. Armed with seven scientific instruments, the probe will penetrate the atmosphere of Jupiter and, in less than an hour, collect data that will feed scientific thought on planetary evolution for years to come. Tiny explosive bolts in the pyro control unit will fire at three intervals to deploy a small parachute, blow away the probe's aft heat shield (in turn triggering the opening of the probe's main chute), and extend the forward heat shield. The unit also will turn on an instrument for measuring the size and distribution of cloud particles. The circuitry of the unit has been built to withstand forces 10 times the pressure and 350 times the gravitational pull of Earth. Hughes built the Galileo probe under contract to NASA.

A U.S. Army laser device has proven to be extremely reliable in tests. The Ground/Vehicular Laser Locator Designator (G/VLLD), which determines distances to targets and illuminates targets for laser-homing weapons, achieved its goal of operating a mean time of 100 hours between failures. G/VLLD systems have operated for the equivalent of more than 108,000 designation missions and more than 45,000 ranging and location missions for a period exceeding 600 hours. The Hughes device can be mounted on armored vehicles or used with a ground tripod.

Computers help production engineers spot problems before they occur at a facility for making printed circuit boards for advanced missiles. One computer at the Hughes facility in Tucson, Arizona, monitors amperage settings, temperatures, pressures, pH, conveyor speeds, and building utilities. The computer maintains a six-month history on every reading so engineers can study trends in processes and alter parameters before problems arise.

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HUGHES

Update

Robot security guards: R2D2 on the alert

By Glenn Rifkin

The general public, were it confronted with what industrial automators call robots, would undoubtedly be disappointed. These mechanical arms bear no resemblance to the androids and metal marvels created by clever dramatists and science fiction writers.

Perhaps that is why a small start-up company in Woburn, Mass., has gotten so much attention lately. Denning Mobile Robotics, Inc. is on the verge of beta testing a true-to-life mechanical "man" that can move, see, hear and even smell. Best of all, this robot has a practical application and may well serve as the bridge between fantasy and fact.

The Denning robot, which bears a striking resemblance to its movie cousin R2D2, is being developed specifically for the security business: The mobile robot, equipped with ultrasonic sensors, video cameras, gas and fire sensors, an infrared tracking system and a powerful Motorola, Inc. 68000 microprocessor, is designed to patrol and monitor buildings for a long list of environmental and human threats.

According to Benjamin B. Wellington, vice-president of Denning, the robot will sell for between $45,000 and $65,000 and will operate at half the price of a human counterpart. "We've demonstrated that the cost reduces to about $3.50 per hour for cost and maintenance," Wellington says.

The robot is equipped with both a television camera and microphones so that it can constantly transmit a video picture back to a guard stationed in a central control room. Also, it is outfitted with a microwave device that transmits its status every 20 seconds so that if an intruder were to tamper with it, the guard would know immediately.

The company, which struck research agreements with Carnegie-Mellon University, the University of Massachusetts at Amherst and Westinghouse Electric Corp., has incorporated the latest in robotics technology. The robot is equipped with 24 ultrasonic devices for object avoidance. In its computer memory, the robot is programmed with a map of its target area so that it can get a general picture of its course.

Even with careful computer programming, the inventors have run into the problem of dead reckoning. Without a perfect fix as to where it is, the robot can only use speed and direction to determine its location. Inevitably, its course will shift slightly and eventually will throw the unit off completely. To counter that problem, Denning has incorporated an infrared beacon sensor which, as the robot intersects the beacon, periodically lets the robot correct its course.

Denning President John Harding with the company's mobile robot.

According to Wellington, the next generation of the machine will include a sophisticated computer mapping device that will allow the robot's memory to be programmed with a profile of the room, and thereafter, it will know exactly where it is by matching what it sees with the image in memory.

Wellington says he does not foresee complete replacement of human security guards with robots. He insists that most security posts require humans but that approximately 10% of the jobs could be filled by robots.

In fact, Denning is counting on the robot to replace humans in either dangerous positions or those stuck in routine patrol jobs. Although robots as guards conjure up images of battles between humans and androids, the security robots are not geared to fighting off intruders.

Nonetheless, interest in the Denning robot has spread to the prison industry. Wellington explains, "With a robot patrolling an area, it might create a safer environment for inmates who fear prisoner-to-prisoner violence." ■

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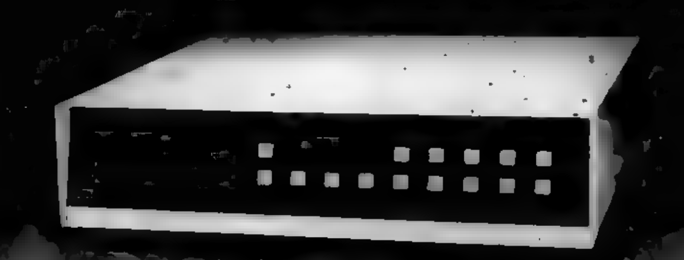

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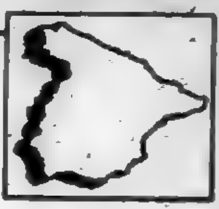

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Update

ROBOT

from UPDATE/8

ogy. Beyond workers' fears about job security, management itself often provides the biggest obstacle. Factory floor managers tend to be partial to the methods they have used successfully for decades, and management is likely to issue the dictum, "If it's not broken, don't fix it."

Robots are also expensive. Individual models range from $25,000 to $150,000 and more. Cost justification can require great foresight on the part of corporate management. For example, Unimation estimates that human labor in the automotive industry averages about $15 per hour, while a Unimation robot, amortized over eight years, would cost approximately $4 to $6 per hour to work on the same assembly line.

Perhaps the greatest stumbling block for introducing robots has been a general lack of advance preparation by most neophyte users. Peter Cohen, an industry analyst with the International Data Corp. (IDC) in Framingham, Mass., points out that robots are simply a small part of the whole picture of industrial automation. Though the robots get most of the attention, a company should be well along its automation plan before attempting to make a major commitment to robotics, Cohen says.

Jeff Lebow, a manufacturing engineer with a major electronics company in Atlanta, agrees. "There are lots of misconceptions about robots," Lebow states. "The typical manufacturing engineer doesn't understand enough about robots to apply them successfully, and top management expects a one- or two-year payback when [robotics] simply has to take more time than that to pay for itself.

"There are simply not enough experienced people out there to apply robotics successfully," he continues. "People must plan for industrial automation. I've seen people ready to spend $8 million on factory automation, but they wouldn't spend $20,000 for up-front planning. This is not so much a technical problem as a people problem." Lebow's firm is just beginning to bring in robotics for a variety of applications. Unlike the situation in automotive plants, there is little need for welding.

Assembly applications, such as inserting components on circuit boards, and material handling applications, such as palletizing, are more common in the electronics industry.

Among the early obstacles Lebow encountered was the lack of robot speed. Currently, a robot moving materials through electronic testing simply cannot keep up with the speed of the testing equipment. The firm recently purchased an Adept Technology, Inc. four-axis robot — reputed to be the fastest in the industry — to address the problem.

Lebow believes senior management in companies must spend time and money to learn about robots and understand that they are just a part of the total system. "Robots tend to be the most reliable piece of equipment in the system," he says. Again, the key to success is designing factory automation before you bring in the equipment, Lebow insists.

By careful design of the work cell, benefits will come now and in the future. Without careful planning, the retrofit costs can be extremely high, and initial benefits will be lost.

Last fall, X-Marks' Bruckner saw a welding demonstration by a GMF robot. Though the demo wasn't particularly good, Bruckner knew immediately the robot could help him. He convinced GMF to install the robot for 60 days and then let his nephew and systems manager, Richard Bruckner, along with his welders, play with the unit. They were unanimous in their praise of the machine. The key to success was the need for precision fixturing. Without that need, the robot couldn't cost-justify itself. With the aid of GMF personnel, Bruckner programmed the robot to an accuracy of 1/5,000th of an inch in spot welding.

> **'I've seen people ready to spend $8 million on factory automation, but they wouldn't spend $20,000 for up-front planning.'**

The welders at X-Mark were ecstatic at being relieved of a boring job, and Bruckner quickly noted that even with time spent on fixturing and programming, the job was still completed in half the time. Side benefits also popped up. A job requiring 21 ½-in. welds usually received 1-in. welds when a human welder performed the task. The increased accuracy of the robot saves on material costs, and welding tips last longer.

With three workstations already in use, Bruckner has plans for further applications. He is taking a close look at vision systems, and as his business increases, so will his venture into high technology.

Despite his success, Bruckner cautions that a company would be wise to bring along these new systems slowly. "You don't want to load down your people before they are comfortable with the machine," he says.

A Brief History of Robots

Pre-1900: A long list of religious and literary figures, such as Mary Shelley's Frankenstein, depict beings created in the image of humans.

1923: Karel Capek, Czech playwrite, coins the term *robot* (which means serf or worker in Czech) in his play *RUR* which stood for Rossum's Universal Robots.

1927: Fritz Lang's film *Metropolis* unveils a futuristic female robot named Maria.

1939: Westinghouse displays Electro, a robot man, and Sparko, a robot dog, at the 1939 World's Fair.

1941: Author Isaac Asimov publishes the first of his *I, Robot* stories, which introduce what becomes the classic popular science fiction robot.

1954: George Devol files with the U.S. patent office for his "programmed article transfer" device, the first pick-and-place industrial robot.

1959: A prototype Unimate robot, built by Consolidated Controls, is installed at General Motors Corp.

1960: Stanford Research Institute develops "Shaky Robot," a mobile, advanced android robot on three wheels, with built-in logic systems, TV camera and range finder.

1962: Unimation, the first industrial robot company, is founded by Joseph F. Engelberger.

1969: The first spot-welding robots are installed at GM plant in Lordstown, Ohio.

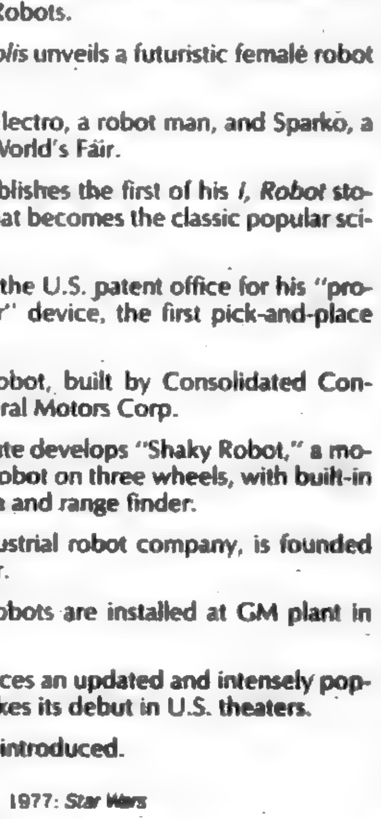
1977: *Star Wars*, which introduces an updated and intensely popular vision of robots, makes its debut in U.S. theaters.

1980: First vision-aided robots introduced.

1927: Fritz Lang's film *Metropolis*

COURTESY OF ACADEMY OF ARTS AND SCIENCES

1977: *Star Wars*



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Partial source: Westinghouse Robotics Handbook

Though management at Snapper Power Tools was far less enthusiastic about its robot expenditures, Fife already has demonstrated that the new robot is worth its cost. Brought in for arc wire welding, the robot works a straight eight-hour day and will be doubling that schedule soon. It is 10% to 15% more efficient in cycle time and at least 50% more efficient in terms of quality.

"Once the parameters are set in the system, it takes away the possibility of operator error," Fife explains. "The robot follows a control path, and there is no wasted motion." His six-axis GMF Robotics machine is a double-ended machine that can hold four parts while another four are being welded. The arm flip-flops 180 degrees and features 360-degree rotation capability for applications.

The machine began to pay for itself immediately. It is being overseen by a former jig loader who has a lower pay classification than the welder he replaced.

Fife points out that as the first robot installed, the new machine presents a "tremendous learning curve in procuring and maintaining the system." Since he has pushed the company to automate in a number of areas, the robot has become just another tool "we must learn how to use."

While he has been frustrated by the difficulty in getting others to understand the potential impact of automation, Fife has been surprised at the enthusiasm with which the workers greet the new technology.

"People were hearing that we were not competitive, and they're happy to have a tool that will let us do our jobs better. This is a small-town company, and people who work here work here for life. They take pride in it."

Programming the robot once it was installed offered the greatest challenge. The contract called for the vendor to write the necessary program control software, but it was up to Fife to set the parameters and functions. He did the final programming himself.

"You learn something new everyday," he says.

At the leading edge

While corporate America decides whether or not to accept robotics, an array of leading-edge research and development continues at robotics laboratories on campuses and in private industrial research centers. Without the pressures and constraints of product development hanging over their heads, robotics researchers have taken the discipline yards closer to the science fiction models that have intrigued the public for decades.

As projects attempting to create robots that can see, feel and even think have gotten under way in diverse locations, a common obstacle has emerged for researchers: the task is tough. The public, weaned on a diet of *Star Wars* and pulp science fiction, assumes that machine vision and tactile sensing are commonplace. Any day now, walking and talking robots will be doing the vacuuming and taking out the garbage.

Unfortunately, both the scientific and economic realities are that those days are still far off. MIT's Lozano-Perez points out that in the area of robot manipulation, for example, research has only shown how far there is to go.

"The problem of creating robot

See **ROBOT** UPDATE/12

Update

Robots in Japan pose another challenge to U.S. industry

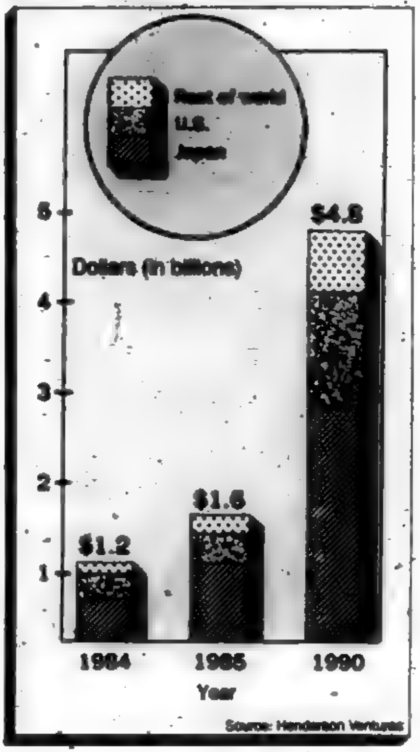
By Earl C. Joseph
Special to CW

In the early days of robotics, Japan trailed the U.S. in installation, application and production of industrial robots — but not for long. The Japanese now lead in all three respects. Why have they taken to robots while Western countries have considered them as an affliction for nearly 20 years?

One likely answer goes back to the late 1960s and the concern of impending labor shortages. The Japanese Ministry of Labor projected half as much growth (0.7% rather than 1.4%) in labor supply for the 1970s than was needed to sustain 9% annual economic growth. By 1977, Japan expected to be more than three million workers short. The theme of a Japanese robotics symposium in 1967 was, "What can the robot do for a society that is short of labor?"

WORLDWIDE PRODUCTION OF ROBOTS BY VALUE

MITCHELL J. HAYES



Source: Henderson Ventures

Japanese policy makers reacted with vigor to the projected labor shortage by encouraging the start-up and growth of small businesses in the robotics field. In 1971, Japan established the Industrial Robot Roundtable, the first of its kind in the world, predating the Robot Institute of America by three years. In 1972, the roundtable was reorganized into the Japan Industrial Robot Association (Jira).

In its second year, Jira was converted to a private association under the Ministry of International Trade and Industry (Miti). Jira's efforts go far beyond those of typical American trade associations, especially in supplying millions of dollars of interest-free loans to robot vendors and users.

The Japanese government has also fostered the production and use of robots. Early in the 1980s, firms installing robots were given a depreciation allowance plus an additional 13%. Below-market interest rate loans were available to purchase robots. Miti in 1980 established the Japan Robot Leasing Co., initially subsidized by 24 robot manufacturers and 10 insurance companies and backed by a loan syndicate that includes the government's Japan Development Bank, the Long-Term Credit Bank and the Industrial Bank of Japan.

By the late 1970s, a dozen Japanese government laboratories were engaged in robot research, some funded under the umbrella of the large-scale research projects group coordinated by Miti's Agency for Industrial Science and Technology. One project's goal was to design by 1980 an unmanned machine production plant. In 1977, another project was aimed at developing a flexible manufacturing system using lasers. In 1983, the agency initiated a project to produce intelligent robots within seven years.

Throughout this period, the American scene was quite different. U.S. economists projected a surplus of labor, not a shortage. Government, union and industrial policymakers encouraged a slow move toward the robotization of American industry. Then the U.S. faced Japanese competition — lower price and higher quality — resulting, in part, from their use of robots. In 1983, more than half of the world's robots were found in the automobile industry, an area where the Japanese lead.

The macro- and microeconomic impact of high technology can be observed in the factory today as it is transformed by robots and computers into the factory of the future. For

See JAPAN UPDATE/16

Joseph is a futurist and president of Anticipatory Sciences, Inc. in Minneapolis.

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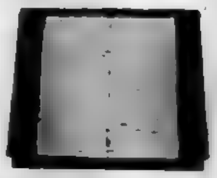
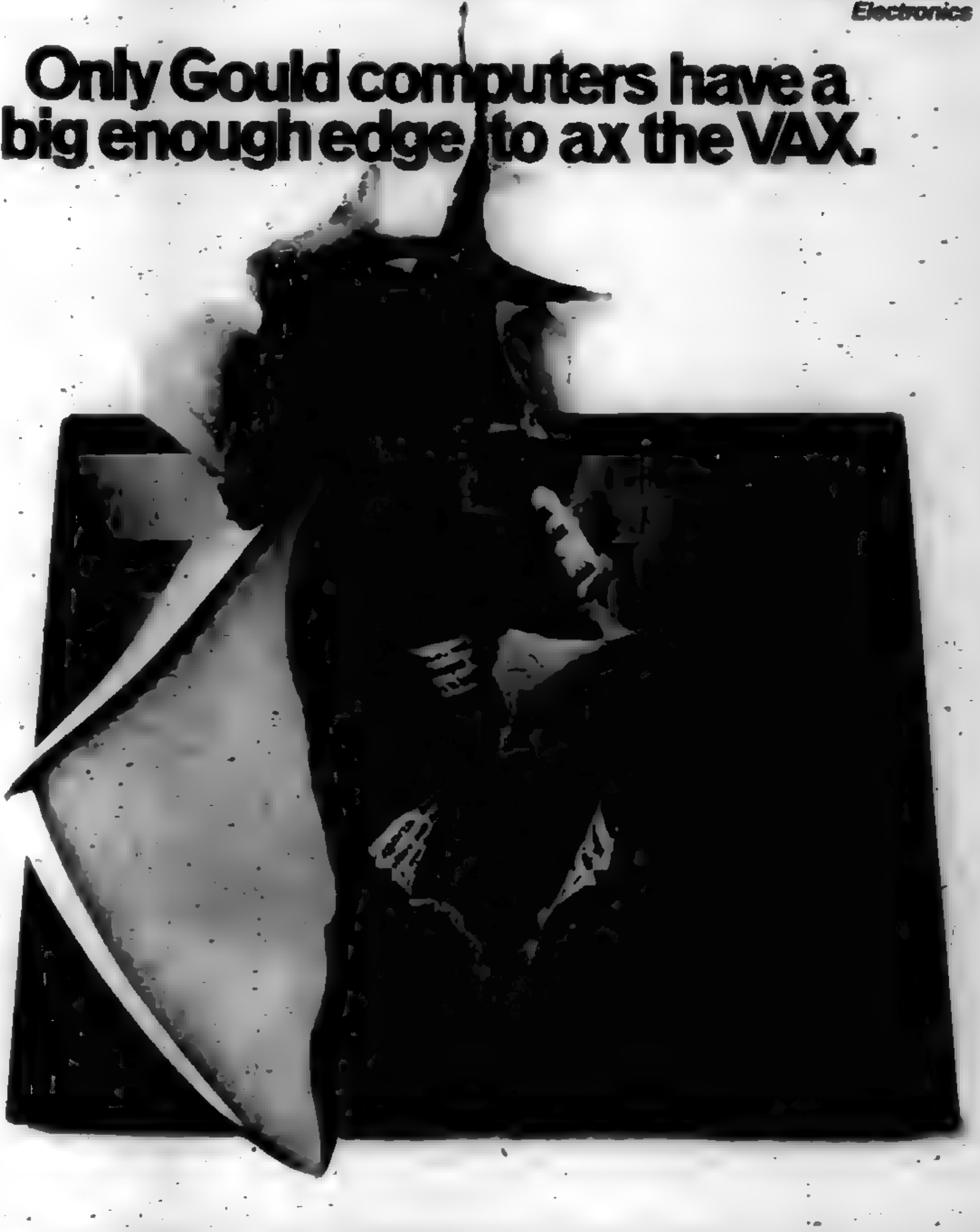




Update

ROBOT

from UPDATE/10

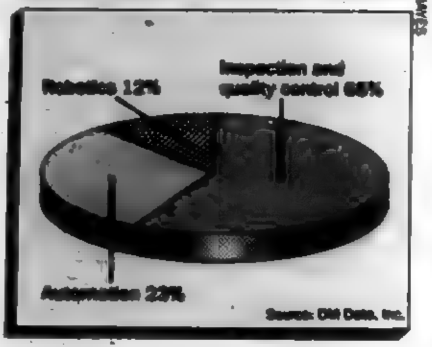
hands is enormous," he says. "We don't know how to do it at all. It's orders of magnitude more complicated than we thought. Most of our brain is devoted to vision and manipulating the hand. The part of the brain devoted to language is minuscule compared with that. You had several billion years of evolution to get very good at seeing and moving your fingers.

Tomas Lozano-Perez, associate professor in MIT's AI lab

"Robot grippers are designed for a single application. We are working on multiple-finger hands, and the basic problem of simply moving things around is amazingly difficult."

Michael of ADL believes that the role of advanced technology in robotics presents some critical questions for the industry. With many areas of development such as vision, sensory perception and feedback moving forward rapidly Michael wonders, "What is the appropriate role for that technology? Is it needed? How much is needed? Is the market willing to pay for it?" For universities, those questions are unimportant. Michael is concerned that without ready markets, all the advanced work might become mere bells and whistles.

MACHINE VISION APPLICATIONS



Source: CM Data, Inc.

MITCHELL J. HAYES

At MIT, the AI lab, under the direction of Professor Patrick Winston, has done breakthrough research in numerous facets of artificial intelligence, expert systems, natural language, learning and robotics.

The major funding for the research comes from Defense grants and national research foundations.

Though there is support from private industry, MIT's work is considered pure research and is unencumbered by corporate expectations.

The robotics research, according to Lozano-Perez, falls into two main categories: vision and manipulation. There is also a single research project in mobile robots.

The vision research is broken into two parts: low-level and high-level vision. In low-level vision research, some of which has been used in commercial vision systems, the goal is to obtain depth representation by knowing how the intensity of light changes across an image.

The vision research also encompasses the use of motion and shading to obtain depth and shape information. "The human system makes use of all these techniques and more," Lozano-Perez says. "What we're trying to do is take the cues from biological vision and use them to obtain depth information. Of course, all this does is transform the amorphous information obtained through a camera into something that is usable. It makes no assumptions about recognition. You still don't know what's out there."

In high-level vision work, the aim is to provide somehow recognition of what is out there using geometric models. Most of this work extends into the sophisticated tracking systems required for military purposes, such as the autonomous land vehicle.

Commercial vision systems in use in robotics today are two-dimensional binary systems that convert images into black and white and then use lasers to scan the outline for object recognition. According to Lozano-Perez, people in industry would like to be able to use these vision systems for inspection, an application that in many cases will require three-dimensional data.

"For sophisticated projects like Darpa's, all the vision systems are based on 3-D," Lozano-Perez says. "Three-dimensional [technology] is perhaps the future. But people argue whether that has a place in factories where you know where things are and what they are."

He points out that most of the argument centers on the "bin-picking" problem. Many factories continue to store materials in large bins, and robots, as of now, cannot distinguish one item from another in those bins.

Todd Simonds of Carnegie-Mellon University

"Bin picking can be done now for simple parts, but for complicated parts, it is a difficult problem, and people wonder whether it is economically viable," he states.

Lozano-Perez cautions that those counting on sophisticated vision systems for robots may wait a long time. "Two-dimensional vision technology took 15 years to develop," he explains. "It is an extremely old technology which became practical with the advent of microprocessors. It's possible that it will be another 15 years or more before we get to the next generation," he maintains.

In the area of manipulation, MIT supports several major projects, including the joint effort with the University of Utah's Center for Biomedical Design known as the Utah/MIT hand. After four years of research, the project teams delivered a prototype hand with four fingers operated by eight tendons. Each finger on the prototype hand is controlled by a Motorola, Inc. micro-

See ROBOT page 14

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Update

Off-line programming: The next big step in robot technology

By Ben Nagler
Special to CW

Substantial reductions in robot programming time, elimination of the need to stop production while programming and the ability to generate more complex, more efficient programs are reasons why the off-line programming of robots is improving the bottom line — now — across a spectrum of industries.

What is off-line programming? What is its significance for computer professionals outside the manufacturing department?

Since the beginning of industrial robotics some 25 years ago, robots have been programmed by the "lead-through-teach" method whereby the operator, using either an attachable teach pendant with a keyboard and function keys or the control console, leads the robot through the intended motions. The motions are recorded on either floppy disks or tape and then played back. The tapes or disks can be replicated for other robots with identical tasks. Typically, robots can store a limited number of programs internally and then switch back and forth between programs to meet production demands. In some cases, programs can be automatically "mirror imaged" for right-handed or left-handed tasks, as with car bodies.

Starting from square one is likely to be very expensive. In some industries, computerized off-line programming is not yet feasible or cost-effective.

The principal limitation to this programming technique is that the robot and its associated equipment — usually two to four times the value of the robot itself — are all tied up while the robot is programmed. More often than not, multiple passes are needed to edit out the bugs. Further, many plants — especially in the automotive industry — employ dozens or even hundreds of robots, with no two doing identical tasks. On-line programming is clearly time consuming, and the necessary skilled personnel are in short supply.

When plants started to buy robots for use as emergency spares or for research and development or personnel training, they also began to use these robots for off-line programming when they were identical to those on the production line. Such use of extra robots for off-line programming is still common today and will probably continue for the near term, but it's not the latest technology.

The latest technology is completely computer based. The programmer, sitting at a remote terminal, preprograms the robot's movements just as effectively as with on-line programming.

From the standpoint of computer technology, the programmer creates files, the formats and contents of which closely resemble those created on-line.

Before further discussing current trends, some perspective will be helpful.

Computer-based off-line programming requires a realistic model of the workpiece and manufacturing process and is feasible and cost-effective only if the bulk of the data needed is already captured in a computer-aided design and manufacturing system. The CAD data base operation is, relatively, easier to acquire — from drawings, for example; the process or CAM data that may be needed is generally quite difficult to capture in a suitable form.

In assembling a mechanical device, for example, the transfer and insertion of a subassembly into a larger assembly may have to be constrained so that internal components don't fall out or get damaged in the process. Additionally, the incorporation of vision or touch sensing in a process to identify a part, verify its quality or confirm that two pieces have been mated properly may be desirable. The important point is that starting from square one is likely to be very expensive. In some industries, notably spray finishing, computerized off-line programming is not yet feasible and/or cost-effective.

Technological change occurs only when there is some driving force behind it. The principal force behind all aspects of factory automation has been the automotive industry — especially General Motors Corp. The entire industry has invested heavily

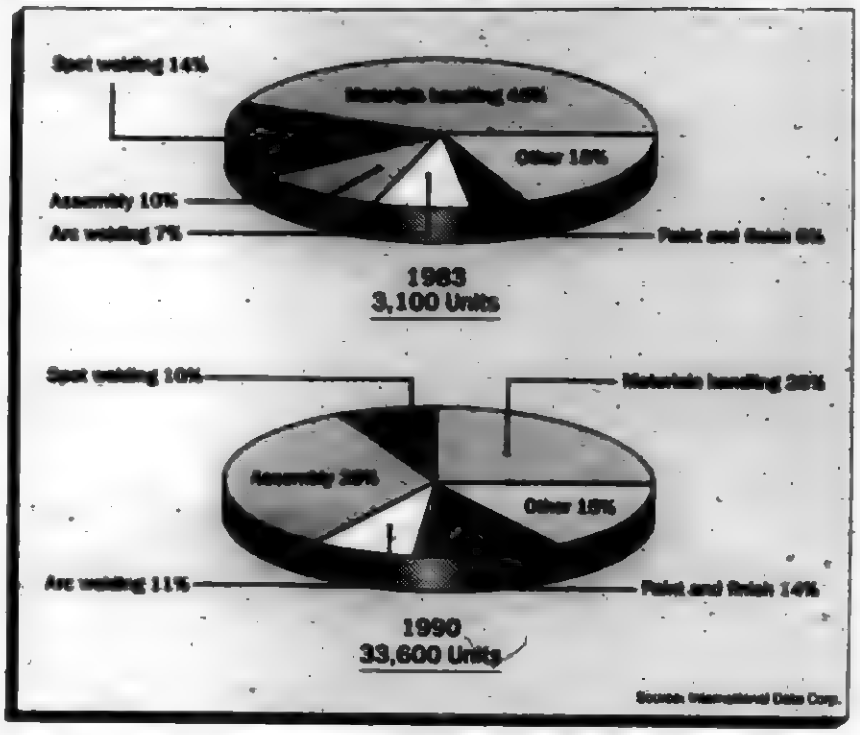
See CAD UPDATE/16

Nagler is a Cleveland-based freelance writer specializing in high-technology topics.

Update

MITCHELL J. HAYES

U.S. ROBOT APPLICATIONS, 1983/1990



Source: International Data Corp.

ROBOT from UPDATE/12

processor, and a Digital Equipment Corp. VAX-11/750 handles high-level planning and control. The hand performs roughly like a human hand.

Other MIT researchers work on the Stanford/JPL/MIT three-fingered hand, a project concerned with the design, control and programming of articulated hands as a means of increasing robot dexterity and adaptibility.

As these devices become more sophisticated, MIT researchers, including Lozano-Perez, are working on incorporating "planning" into them. Currently, every movement and task must be laboriously programmed into the hand. Linking them up with AI, the goal is to get the robot to program itself.

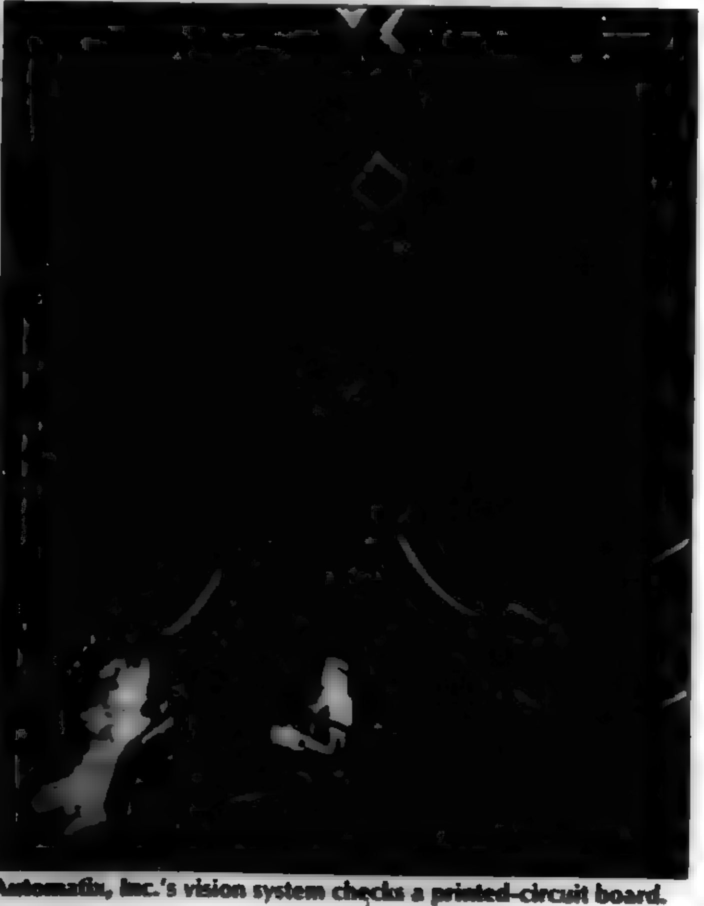
This problem is not easily solved. Lozano-Perez has worked on planning motions for 10 years and only now is making minimal progress. "Something as simple as getting the robot to find the shortest path between two points without hitting a set of obstacles turns out to be provably intractable," he says. "You can't even express the answer completely."

At Carnegie-Mellon, the mandate of the Robotics Institute is far more pragmatic than at MIT. Fully two-thirds of its funding comes from private industry, while the remainder is from government grants. Though not particularly end-product oriented as an industrial research lab might be, the Robotics Institute has focused mainly on bringing robotic technologies to bear on one or another set of manufacturing problems, according to Associate Director J. Todd Simonds.

The institute, with $9 million in funding, is broken into 14 labs concentrating on everything from vision systems to the social impacts of robots. In the manufacturing lab, researchers work on developing robotic- and computer-numerically controlled techniques along with a special language called CML to achieve a truly autonomous manufacturing-cell operation.

Another lab is focusing on improving controls of welding robots using sensors that will enable the robot to follow precisely seams that deviate from the original design.

"Until now, a welding robot has been useful only for long runs in a set place," Simonds says. "But a lot of welding in American manufacturing is short-run or even custom welding. With this research, we expect over the next few years to use welding robots to carry out custom work as well."



Automatix, Inc.'s vision system checks a printed-circuit board.

Toward that end, the institute is also working with expert systems. The goal is to capture the expertise of skilled machinists or welders and program it into robotic systems.

In the vision area, work is being done on visually based adaptive control: showing the robot an image of its hand around an object and instructing it to remember that image and be able to extract other images from it. Currently, when a robot is programmed, it must start with a blank slate. The goal here is to give the robot the ability to teach itself in a way that humans do.

Work is also on-going in civil and construction engineering using AI techniques. Development is under way on an excavator robot for the gas pipeline industry that will excavate around leaking gas lines. "This is extremely hazardous work for a human," Simonds points out. "There is a 10% mortality rate."

Using similar technology, the institute developed a set of robots that are operating at Three Mile Island in the cleanup operation. The robots were designed specifically for this task because it was simply too radioactive down there for a human "to even open the door," Simonds says.

Off campus, at AT&T Bell Laboratories in Holmdel, N.J., John Jarvis leads his robot systems research department in four main categories of research: computer vision, sensors, multiple processor systems for robot control and robot control algorithms.

Though AT&T offers no robot products for sale, Bell Labs' motivation is taken from manufacturing-related problems. Nonetheless, the research is pure, according to Jarvis, and the work is concerned only with the search for concepts.

The biggest success story thus far comes in the area of hand-eye coordination — finding a real-time vision system with real-time robot controllers, Jarvis says. One project developed a vision system that can track objects at a rate of 60 times per second. It can direct the robot to pick up moving objects.

Jarvis is optimistic that in the next five to 10 years, practical tactile sensors will combine reasonable cost and performance along with reliability and computing systems necessary to be integrated into the work cell.

Though he agrees that the cost of implementing these systems is prohibitive, Jarvis believes the biggest obstacles to implementation of advanced systems may be as much administrative and cultural as they are technical.

"It's an educational problem," he points out. "A lot of people in factories need to have a better understanding of these types of systems. Sometimes the amount of programs and understanding of those programs necessary to use them is very high and difficult to use in a factory environment."

The driving force behind any realistic attempt at the ultimate work cell will require increased magnitudes of computer power, Jarvis says. "Since I've been involved with this work, we've had several orders of magnitude increase per dollar in computer power, and we seem to be nowhere nearer to what we need than when we started," he says.

The robot makers

The robot manufacturers, with the exception of GMF Robotics, are having a tough time figuring out how to turn a profit. Trying to remain at the leading edge of the technology is an added worry.

Companies such as IBM or those with access to well-stocked parents such as GM and Westinghouse clearly hold an edge. Westinghouse, for example, provides Unimation with not only a potent working laboratory for its machines, but it supports a great deal of research in the area of robotics. It was among the first and largest supporter of Carnegie Mellon's Robotics Institute, and the company maintains its own R&D center for robotics research.

Westinghouse is working on sensor and vision systems, software architecture and systems, mechanical and servo-drive systems, robot and work-cell control systems using multimicroprocessors, smart vehicle systems and computer-integrated engineering.

Meanwhile, Unimation actively seeks new markets for its robots. According to Bloch, the company is exploring such offbeat opportunities as meat cutting and fish filleting, wedding cake decorating and packing speciality foods.

American Robot has made investment agreements with both Ford and BMW. With their support, the company is working on vision systems for inspection and robot guidance as well as in the area of computer-integrated manufacturing. "It's not just a financial partnership, it's an industry partnership in which they are getting our technology, and we get their understanding of the problems that need to be solved," Gilbert explains.

Like Jarvis at Bell Labs, Gilbert is convinced that more computer power is necessary to create truly outstanding robots. "I could create a system today that would knock your socks off, but I would need a VAX or even a [Cray Research, Inc. system] to do it," he says.

Gilbert also expects to see much accomplished with expert systems. It takes years, he notes, for a master welder to learn his craft. Welders using robots tell him that it takes up to two years to understand just what the system can and cannot do.

At GMF Robotics, applied research focuses on several areas, the most significant of which is off-line programming. According to Cohen of IDC, off-line programming is currently an extremely limited part of the marketplace with only 50 installations in that mode. Most observers agree, however, that off-line programming will be a key feature in years to come.

Update

Robotics researchers agree that robots of the future may find the most technically challenging environments outside of industrial automation. Applications within the space program and in the military will lead to the greatest advancements, calling upon robots with the most humanly evolved characteristics.

According to Johnson, GMF has pioneered off-line programming in robotics. A complex and costly endeavor, GMF is attempting to bring off-line programming down to the personal computer level as well as to 32-bit workstations and computer-aided design and manufacturing systems. "This is an area that will help our users apply their robots more easily," Johnson states. "If you can reduce the time it takes to program the robot to do the job, you have greatly decreased the cost of any system."

Robots and the DP/MIS staff

The move toward fully integrated industrial automation systems with increased off-line programming could significantly affect the data center.

GMF's Johnson says that data processing will certainly be affected as more programmers are needed to write programs for flexible automation tasks. "This area is going to be explosive," he says. "It's a good time to be in DP, especially if you have an industrial background."

IBM's Klein believes that the involvement of DP/MIS personnel with robotics varies from company to company, depending on how complex the industrial automation network has become. "In a company integrating all the manufacturing and communication of data on the plant floor and where local-area networks have created the need to exchange information back to key departments such as engineering systems or material requirement control systems, there is significant involvement of DP," Klein says. "In other companies, the MIS executive has very little to do with manufacturing, and those decisions are generally left to the plant manager."

ADL's Michael sees a significant DP/MIS role in robotics. "It's inevitable that they will get involved," he declares. Michael foresees a computer hierarchy with the lowest level being a programmable controller that is embedded in a robot going up to supervisory cell controller, area controller, plant controller and on up to the corporate computer.

"The greatest detail I've seen of this hierarchy is seven or eight levels, and certainly once you are at the corporate computer, you're at the MIS level," he says.

MIS will almost certainly get involved in the linkups of networks and the creation of data bases that will inevitably include engineering and manufacturing data as well as typical corporate data.

"I don't think MIS people need to be concerned with robots so much as the emerging networking aspects of factory automation such as MAP," Michael says. "When local-area networks extend from the factory floor to the office network, they'll have to be involved."

A look at the future

"The factory," says Lozano-Perez, "is not a very receptive environment for the more advanced functions."

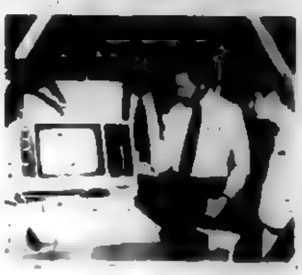
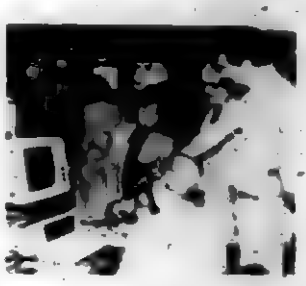
In that light, robotics researchers agree that robots of the future may find the most technically challenging environments outside of industrial automation. Applications within the space program and in the military will lead to the greatest advancements, calling upon robots with the most humanly evolved characteristics.

"Robotics is moving rapidly out of the factory," adds Simonds of Carnegie-Mellon. "Of our $9 million in grants, $3 million is in nonmanufacturing work, such as the autonomous land vehicles. I have every reason to believe that by the end of this decade there will be autonomous vehicles operating — with lots of legal constraints — on the open road. We have them operating on the sidewalks of Carnegie-Mellon right now.

"I expect to see gracefully mobile leg devices that can move up flights of stairs or across rocky terrain. I expect to see robots playing Ping-Pong. In fact, that's already a club-level activity on our campus."

Most industry watchers agree that a single breakthrough is not imminent in robotics. It will be a slow, evolutionary process dictated mostly by the decreasing cost of computer power.

Lozano-Perez sees no fundamental limitations to robots with capabilities once-reserved for science fiction. He does note, however, that the most basic physical advances could be 20 years away; as for intelligence, there is simply no way to predict what will happen. "Lately, what's happened in AI is that people have found applications for very simple things. But there haven't been any break-

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throughs in the fundamental reasoning processes involved. That's still out of reach," he says.

George Devol, considered the founding father of robotics for having patented the first pick-and-place robot in 1954, proposes a most farsighted idea for the future. He is promoting the idea of a completely automated manufacturing facility that would be leased to medium-size businesses in need of robotics and factory automation.

"There's a tremendous need for medium-size manufacturing to take advantage of robots," Devol says. "We already have 85% of the technology available to do this, and the other 15% is strictly programming and networking issues. The biggest stumbling block is that it costs $100 million to get started."

Gilbert, of American Robot, believes that the truly impressive systems for industrial robots will emerge in the mid-1990s. "There will be thousands of robots out there between now and then. But I believe the impressive, flexible systems are going to come later, and that's what most of the players in the marketplace are looking for right now."

As for the more current robotics industry picture, analysts such as Conigliaro feel that brighter days are coming either next year or in 1987. She predicts 25% to 30% growth annually for at least the next three years and profitability coming to more than a handful of companies. In addition, she predicts that the shakeout and consolidation period will come to a close, and those companies with a serious shot at the market will remain, while a host of others will give up in defeat. What she definitely does not expect are any more start-ups in the field.

"Experience is a very important barrier to entry into this industry," she says. "Experience means a lot — there's no substitute for it." ■

JAPAN

from UPDATE/11

example, in 1984 the average age of industrial equipment in the U.S. was younger than the equipment in Japanese industrial plants by about three months.

This leapfrog over the Japanese by the U.S. came to light in a study reported in *Nikon Keizai Shimbun*, a Japanese business journal. For years, U.S. factory equipment was older than that of the Japanese; now the tables are turning.

This leap forward is primarily caused by the expanded capital investments in high-tech factory automation made in the U.S. in 1983, especially in the automotive industry.

The average age of U.S. industrial equipment dropped during this period from about 7¼ years of age in 1983 to less than 5¼ in 1984; Japanese industrial equipment aged by 11%.

General Motors Corp., for example, invested $20 billion in capital improvements of its industrial equipment from 1981 through 1983.

High-tech investments in robots, computers, computer-aided design and manufacturing, flexible manufacturing systems and other automated factory machines and software were key to this turnaround of U.S. industry.

However, this country is still lagging in steel and many other areas. And Japan's high-tech industries are being given massive government doses of rejuvenating capital.

Japan's 150 robot makers are struggling to compete with leaders in the U.S. and Europe. Japanese industry can be expected to give birth to a new generation of robots in hope of becoming the leading nation not only in using robots but also in supplying them to the world.

These third-generation robots are expected to be smarter (more on-board and embedded computers), to incorporate voice and speech recognition and to possess sight and a high degree of sensory and touching capability. In some cases the robots will be more mobile, some with walking capabilities.

Third-generation robots will be aware of their environment and will react to it as they sense it instead of being second-generation "dumb" repeaters of a series of programmed motions.

First-generation robots, the majority of the ones used in Japan, are merely automated mechanical arms with grippers that indefinitely repeat programmed operations.

Second-generation robots are more versatile. Nevertheless, in 1983, Japan had almost 17,000 of the world's 40,000 second-generation robots in use.

The Japanese robot industry differs markedly from its U.S. counterpart. Virtually all U.S. robot production comes from just a few firms like GMF Robotics, Inc. and Unimation, Inc. In Japan, there is considerably more diversity both in number and types of robot manufacturers. Of the 150 Japanese robot manufacturers in 1983, Kawasaki Heavy Industries, Ltd. captured only 8% of the market. The company leads only in spot-welding robots.

U.S. robot manufacturers concentrate on general-purpose robots; the Japanese tend to develop special-purpose robots, often for their own use. These differences have far-ranging implications.

The Japanese challenge is clear: They have geared up to dominate this strategic new industry. This dominance in recent years is feeding the competitive strength of a growing group of other Japanese industries. The main question facing the U.S. robotics industry is whether it can stem the tide. ■

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CAD

from UPDATE/13

in putting all its body and component designs into CAD data bases. In addition to its own significant purchases, the industry is forcing its suppliers to improve manufacturing technology. For manufacturers dependent on the automotive industry, high technology is becoming more a matter of survival in a very tough, competitive environment.

A corollary effort within GM appears also to have had an impact: Electronic Data Services Corp. (EDS) has been assigned the task of getting GM's computers in manufacturing operations to communicate with its financial computers.

Another group in the forefront of applying CAD-based off-line programming is the printed-circuit board industry. To be competitive, the manufacturers must lay out their artwork on a CAD system — which means that the position of every component and hole is known.

With the latest surface-mount technology, standard components are placed on boards with high-speed, dedicated machines, but robots are needed to place outsize or nonstandard components. With the CAD data base, these can easily be preprogrammed off-line.

Off-line trends

A number of trends in technology are apparent, and each broadens the technology's applicability.

■ Software is shifting from "how to do it" to "what to do" statements; software is becoming data driven instead of program driven. This shift has occurred because users want to have more commonality from one installation to another.

Also, vendors fighting high applications software costs want to reduce their costs per installation. In a sense, a data base and its applications characterize a manufacturing process. Thus, this trend underscores the need for and the benefits of well-designed data bases. Without a suitable data base, data-driven software would not be feasible.

■ Programming languages are becoming more general purpose — becoming, on the one hand, more device independent and environment independent (portable) and being applied to controlling processes as well as robot arms.

Robots are not expected to send statistical production and quality reports to a host. At the same time, the capabilities of the host computers are being enhanced by being applied to larger spans of control.

Clearly, these enhanced robot and host capabilites also improve the ability of the plant management to know what's going on and to integrate all operations further — but only to the extent that internodal communications and information storage are also brought up. Robotic cells may now need megabytes of associated memory instead of kilobytes — a requirement that has created some problems:

■ Where should the data be stored — in the robot or at a remote computer?

■ How does one ensure the integrity of the information? How should it be backed up?

Right now, there is no consensus on the solutions. Conceivably, something may come out of GM's Manufacturing Automation Protocol (MAP) program. Again, this relates to the significant role GM is playing in rationalizing all areas of U.S. manufacturing automation technology.

For years, robot and other automation equipment users have been plagued by difficulties in getting different vendors' equipment to communicate with each other.

About two years ago, GM decided to muster the full weight of its economic clout and essentially coerce key automation equipment vendors into adopting a single MAP.

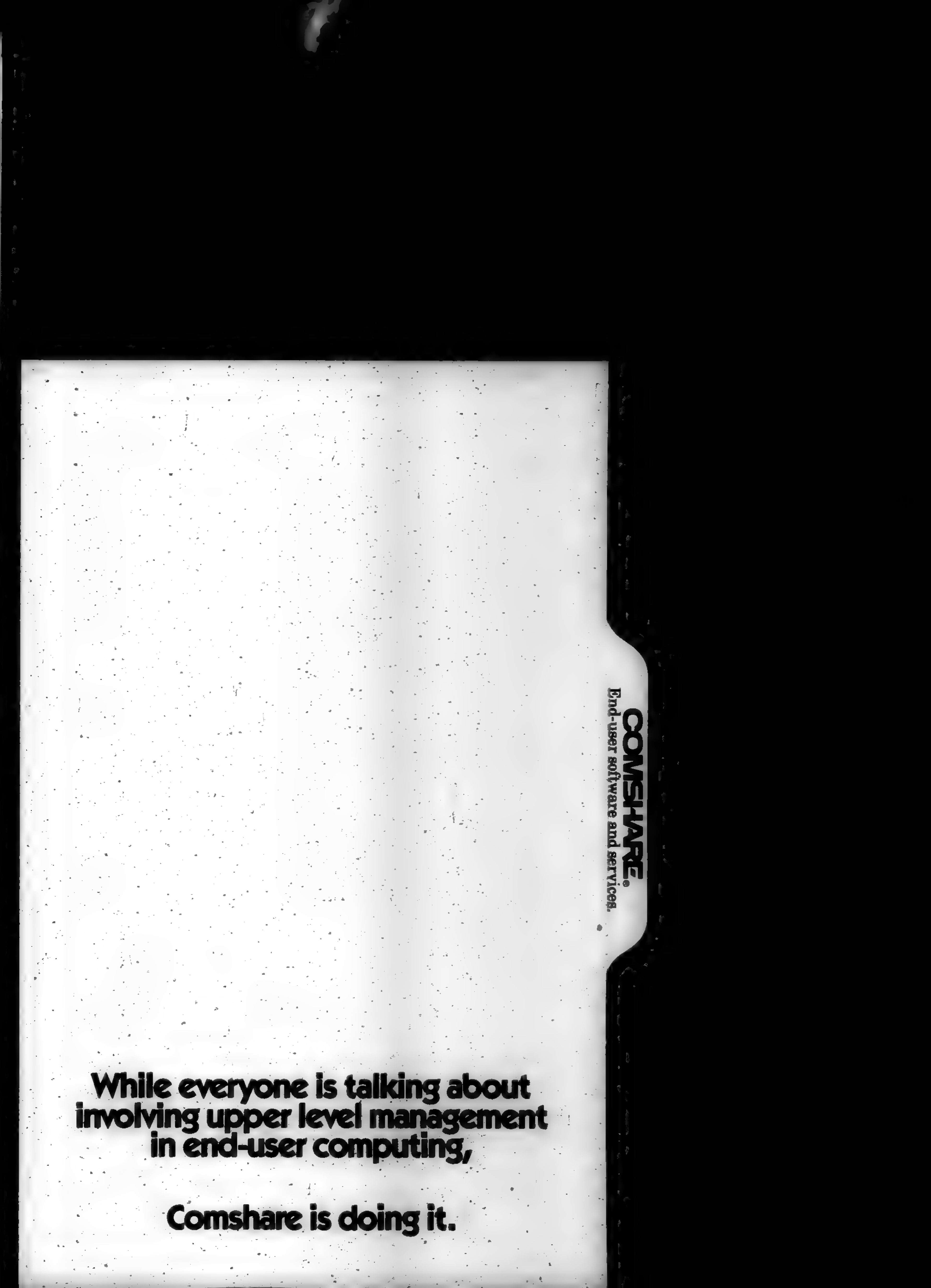
Automation heavyweights like IBM and Allen-Bradley Co. are now engaged in cooperative discussions.

Given the need for the availability of a CAD data base, it is not surprising that complementary software for laying out and simulating cell operations on graphics terminals has also been developed. Indeed, the combination of these capabilities with off-line programming has proved to be a powerful tool.

Finally, a word about "people problems," which have been a major drag on the rate of factory automation. The ultimate goal of a completely computer-integrated manufacturing enterprise can be reached only if all parties concerned talk to and understand each other. (EDS personnel at GM are important participants in factory automation discussions.)

For nonengineering data processing professionals, help in understanding high-technology manufacturing technology is available. The Society of Manufacturing Engineers in Dearborn, Mich., offers courses or seminars geared to the interests of DP personnel.

A shortage of trained personnel to implement all aspects of high-technology manufacturing has been a persistent problem and will probably continue for the near future. ■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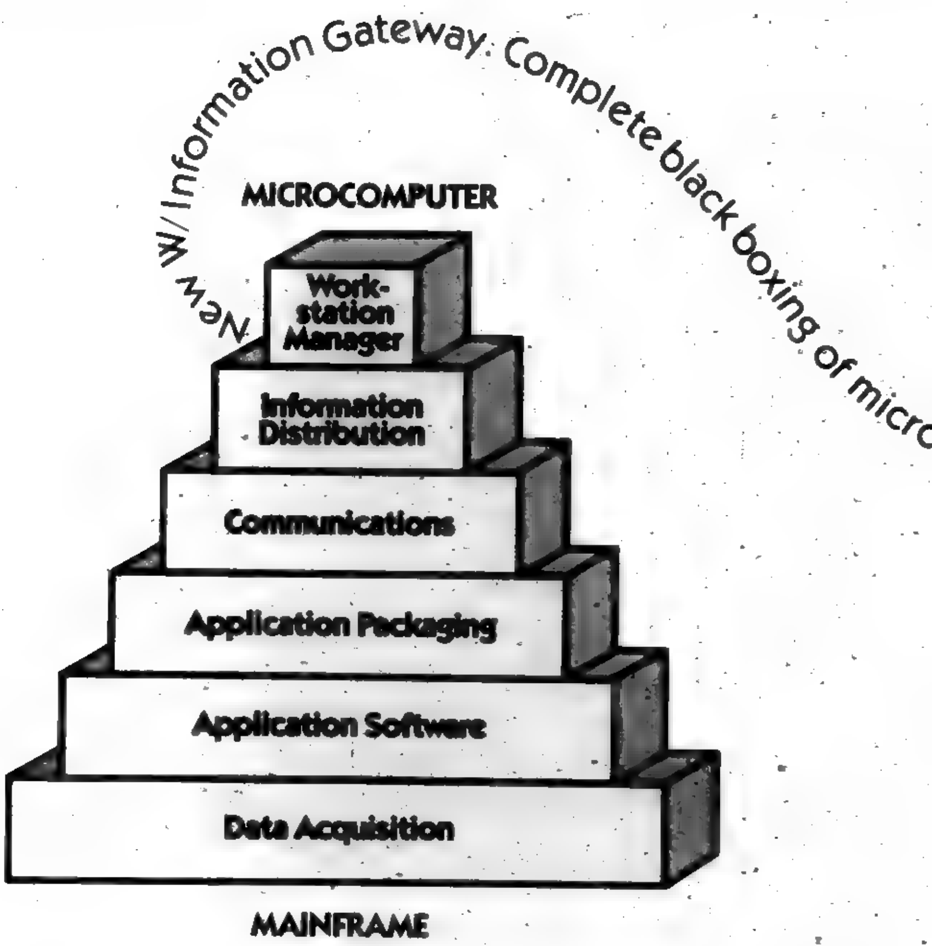

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The back-to-school training blues

By Gary Slaughter and Joanne Fletcher Slaughter

Admitting they need training in fundamental people skills is abhorrent to most DP managers. Shouldn't they already be effective managers after 15 or 20 years of experience?

We should be extremely pessimistic about the chances of any DP department implementing a full and effective management training program. The current state of affairs of the two people who would launch such a program — the top DP manager and the DP trainer — dictate this pessimism.

Traditionally, DP trainers spend most of their time on technical training for DP departments, because organizations value technical prowess. Lately, emphasis has shifted back toward managerial skills. Organizations place greater value on DP professionals' ability to interact successfully with each other and with top management, so the DP trainer's job description has effectively changed.

The trainer's new task may not be an easy one. Management training is the most difficult area of personal skill training for DP managers. Hard to evaluate or quantify, management training may be even harder to sell to DP managers.

Typically, top DP managers are the training have-nots of the DP department. They receive fewer days of training each year than any other DP group except operations and data entry. Whether they admit it or not, DP managers often lack the essential "Three Ps" — people skills, public relations skills and political skills — for successful interaction with top corporate and end-user managers or even with their own staff members.

More often than not, top DP managers are overworked, stressed and burned out. They feel undervalued by their superiors and their peers. In effect, they operate under siege from top and end-user management, from vendors and from their own subordinates. As a result, many are skeptical to the point where suggestions for helping them out of their situation are met with suspicion.

Perhaps most important, to many experienced DP managers, the idea that they need training in fundamental people and management skills is abhorrent. After all, don't their resumes say they possess all those skills? Shouldn't they already be effective managers after 15 or 20 years of management experience?

This "resume resistance" by some top DP managers is so strong that they refuse to attend management development training sessions that they arrange for their subordinate managers. Needless to say, their boycott neither strengthens their skills, improves relations with subordinates nor offers support for the spurned DP trainer.

As a rule, the DP training director still faces an uphill battle to win the commitment and involvement of top DP management. Despite years of struggle to establish the value of DP training programs, on average, according to the 1985 Brandon Systems Institute (BSI) annual survey, DP training budgets make up a shrinking percentage of the overall DP budget.

Despite the odds

One reason is that DP training still suffers from a serious image problem. Other DP professionals tend to view DP trainers as glorified clerks who, because they are not capable of doing anything important or responsible, are put in charge of training. This lack of recognition is demonstrated by the fact that only one-third of DP training directors report directly to the top DP manager. The rest are buried somewhere in the organization, out of sight and out of mind.

There is another reason DP trainers lack the commitment of top management: Trainers are often among the least trained and informed on the subject of management development. Trainers themselves suffer from a lack of the Three P's, which seriously impairs their ability to sell top DP management on the need for management training.

The current state of both top DP management and DP training appears to suggest little hope for a surge of new management training programs. Yet, despite these odds, hundreds of DP organizations

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Gary Slaughter is chairman of Gary Slaughter Corp. in Bethesda, Md. Previously, he was president of Brandon Systems Institute, a systems development training organization in Rockville, Md.

Joanne Fletcher Slaughter is executive vice-president of Gary Slaughter Corp. She has written numerous articles and books on the subject of managing people.

improper reason for optimism, but it is a cold fact that top DP management must change.

Top DP managers who lack the Three Ps needed to excel in today's environment cannot survive. The drive to decentralize computing power outward into the user departments would ordinarily be enough to dictate a need to improve.

However, this force has been joined by a growing awareness by top corporate and end-user management of the ever-increasing costs of DP service. This management recognizes that the increasing cost of DP staff is the most significant factor affecting increased DP cost in general. Hence, the pressure is on top DP managers and their subordinate managers to cultivate and protect the DP department's most valuable resource — its people.

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> *The pressure is on top DP managers and their subordinate managers to cultivate and protect the DP department's most valuable resource — its people.*

Also, a certain unrest within the DP department itself is pushing top DP managers to reevaluate traditional management styles and decision-making processes. Many younger DP professionals as well as their younger supervisors are simply not accepting management methods of the past.

These valuable — and expensive — members of the DP department are demanding a greater say in decisions that affect them and their jobs. They back their arguments by pointing to the recent successes of participative decision-making and team problem-solving methods popularized by the Quality Circle movement, the One-Minute Manager and other similar approaches.

The benefits of democratic management styles and team building are creating a new ethic in the DP profession. The ethic demands that "enlightened" DP managers must set aside old management ways and train themselves to adopt a people-oriented approach.

Ironically, this new ethic is creating a healthy competitive spirit in many top DP managers that motivates them to seek management development training. They want to be the first to have it. Old dyed-in-the-wool autocrats among DP managers are now claiming to have "invented" participative management.

Those of us who have been loudly recommending this change for a number of years say the change is taking place because of fatigue factor — we simply wore them down. Regardless of the reason, the emergence of this changing attitude in top DP managers is seen as a refreshing, encouraging and hopeful sign for the DP profession and for its future longevity.

DP training's future

In a sense, DP trainers have no choice but to change, like their top DP managers. The pressure on them, especially from DP middle management and first-line supervisors, to provide personal and management development grows daily, Fortunately, DP trainers are better equipped now to meet this need than ever before.

First, there is a growing resource base for training and support in the management development subject area. More and more vendors offer management skills training for DP professionals. In many cities, consortium groups pool requirements for DP management training to bring in high-quality training sessions at a reasonable cost to participating companies.

Training and development literature is now filled with good advice on how to design, develop and implement management development programs. In short, an overall awareness of the need for this training has created a larger source of supply for both training and information on training DP managers.

Second, consortium training and other forms of shared management skills training have given DP trainers the flexibility to offer schedule and location choices to top DP managers. Some top managers do not seem to mind "exposing their ignorance" to other top managers, but resist sharing workshop sessions with their own subordinate staff members.

Even though top management misses the opportunity to build trust and rapport with members of their own management teams by scheduling themselves for management training with strangers, they at least receive the training.

From the standpoint of professionalism, according to the latest BSI survey, DP training positions are being filled more and more by full-time, career DP training people. Partly as a result, turnover among DP trainers is significantly lower than it was five years ago. Furthermore, there are strong signs that DP training is coming of age and is shedding its bad image of the past. The recently acquired credibility of some DP trainers can be attributed directly to their taking a leading role in bringing management development training to their organizations.

As a result of their newly gained credibility, some DP trainers are now moving ahead in areas other than training. Their charters are broadening to include all elements of DP

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human resource development. To everyone's relief, signs of cooperation are growing among DP trainers and their counterparts from the corporate training and human resource development staffs.

On balance, there are more reasons to be optimistic than pessimistic about the future of management training programs. DP trainers have been presented with a great opportunity: to shed the image of the past and establish themselves as the true custodians of the human resources in their DP departments.

Moving ahead

Before deciding to move ahead, you should have a clear idea of where you want to go. How do you know when you are doing an optimal job of providing your organization with the personal and management development training it requires? This may not seem like an easy question to answer, but if it's not addressed, neither you nor your superiors will be able to measure your progress and ultimate success.

Ideally, each manager, supervisor and key professional staff member in the DP department will be offered the opportunity to sit through at least one week's training on the subjects of communication, management styles, job contracting, motivation skills and team problem solving and decision making.

In addition, workshop reunions and refresher trainer sessions will be offered to reinforce the skills covered in the workshop sessions. Application of these skills will be recognized as a part of the required performance of all managers and key professional staff members in the organization's performance-appraisal process.

A new ethic

Finally, after the training, a new ethic for the organization will gradually evolve. This ethic will be characterized by a strong reliance on trusting, delegation and mutual respect among all members of the DP staff.

A similar ethic will develop in dealing with top corporate and user management. This new ethic will supplant the traditional, us-vs.-them attitude that has undermined past dealings.

If you can achieve the state described above, it is fair to say that you have arrived. Arriving won't be easy, and staying there requires hard work, too. But a few tips can make it easier.

Remember the "fried egg phenomenon." DP professionals are very particular about those from whom they will allow themselves to learn. Right or wrong, they have been conditioned over the years to expect little new knowledge from non-DP trainers.

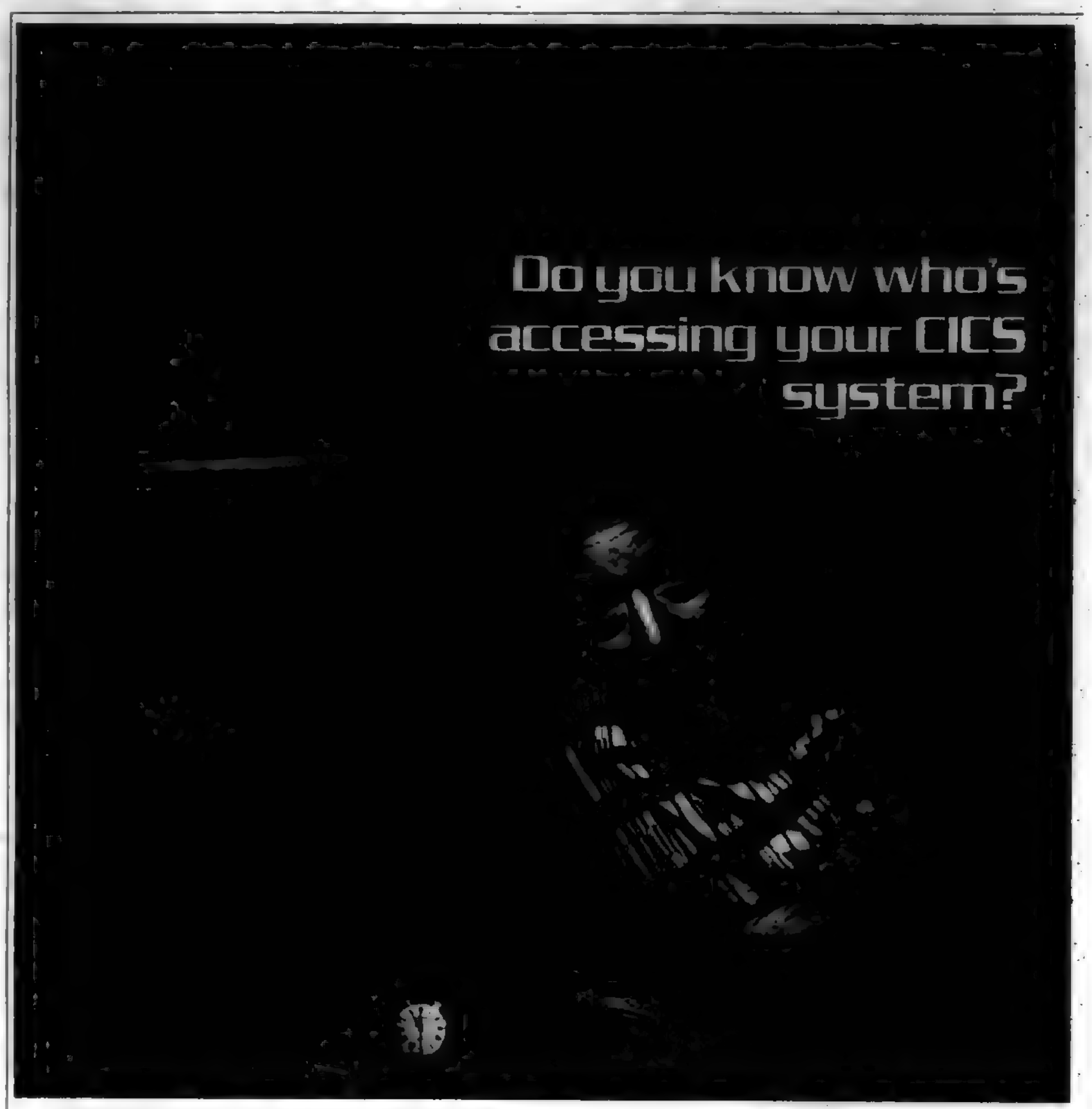
You must ensure that your DP management instructor possesses a solid DP background. Do the training yourself if you are qualified, ask members of the DP management staff to act as instructors or use a vendor whose instructors are bona fide DP professionals. Remember, unless you have a DP background, you can't teach a DP professional how to fry an egg.

Educate yourself first — become the expert. There is a great deal of information available about the effective approaches to managing people, some of it specifically tailored to the DP environment. Educate yourself. Call vendors and ask them to assist you in becoming acquainted with this subject area. Read the current best-sellers in the management area.

The best way to build your credibility is to overcome people's objections intelligently and tactfully. An expert is merely a person who has read, thought and articulated more about a subject than you have. Become that expert.

Offer "safe" training first. In any DP department, one group of people always seems to be willing to risk training before others will. This group may come from a certain level of management or project team or are subordinates of a certain manager. Test your management training on them first. They are your friends and are safer, in case the first offering doesn't go quite as well as you want.

Risk to schedule it. The first rule of management training is that you can never get everyone to agree on what, when, where or how. You can waste a great deal of time attempting to reach consensus; meanwhile, no training is being done. Work closely with your instructor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or with the vendor involved. Tell them that you are scheduling the workshop on a "y'all come" basis.

If you level with the instructors or vendors, they shouldn't be upset if you cannot reach your minimum enrollment. Take the bull by the horns. If the course is any good, the second offering will be standing room only.

Use your vendors wisely. John Rose of PPG Industries, Inc. in Pittsburgh, who started his DP training career in 1967, summarized it best: "Never misuse your DP training vendors. They are a DP trainer's best friend."

Talk to your vendors. Let them know what you are attempting to do. Don't mislead them or promise them business when you are not sure if you can deliver it. Ask them to help you present the need for management training. With reasonable assurance that you will decide to acquire their training, they should be willing to visit your top management to present an overview of the program's benefits.

However, before asking your vendor to visit, be sure you have a commitment from the decision maker to attend the session. Above all, avoid scheduling and then canceling a vendor workshop. This costs the vendor time, money and the opportunity to reschedule instructors and leaves the vendor with a less than positive feeling about helping you next time.

Start from the top down. Assuming you are successful in obtaining a commitment from the top DP manager to support and be involved in management training for the DP department, start by having that individual attend and participate in the very first, fully tested session. You may encounter some resume resistance at first as well as some squirming and excuse making about not being able to afford the time, but press on!

The top DP manager's presence in the first workshop session will give the training the much needed blessing from the top. This will send a strong signal to subordinate managers that the top DP manager supports the workshop content, so they had better get with it and attend.

It also nips in the bud objections from subordinate managers who otherwise might say, while pointing a finger to the ceiling, "This is all well and good, but 'they'll' never buy this." "They" already have!

For the staunch resister at the top, try the old ego tickler: "We all know you don't need this training, but attend the session to share your experience for the benefit of those managers less experienced, effective and successful than you."

> *The top DP manager's presence in the first session will give the training a much needed blessing from the top.*

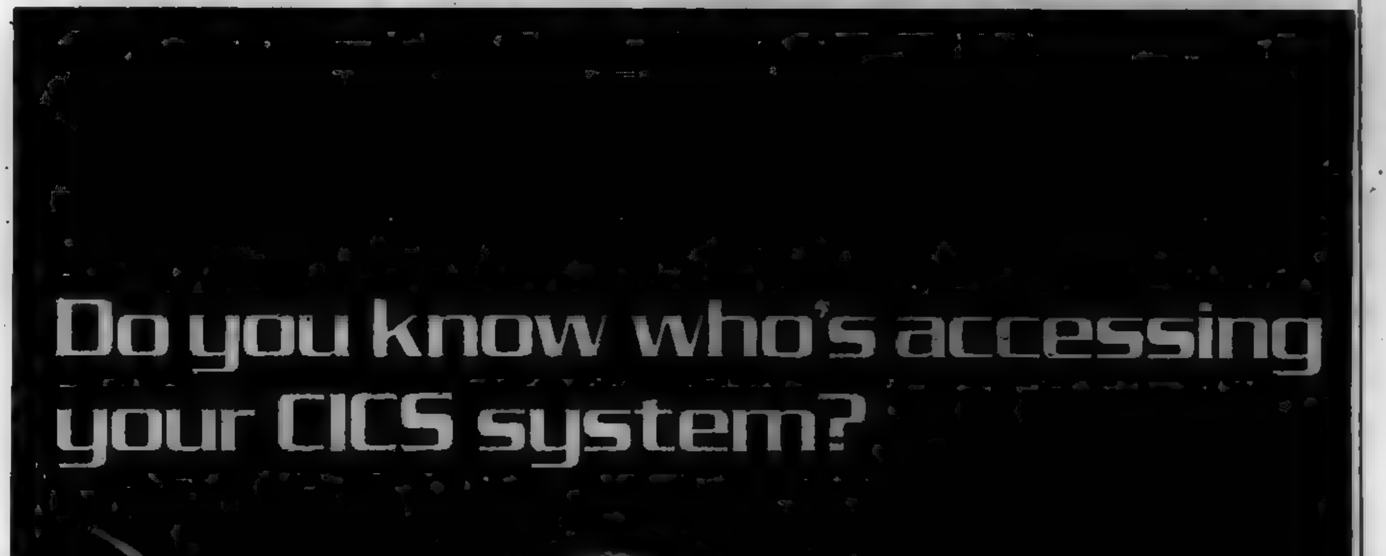
Random-distribution class consistency. Class attendees at personal and management development workshops should be selected without regard to function or level. This method of assignment offers the greatest opportunity for communication barrier removal and trust building during the workshop session itself.

Some high-level managers may feel their presence could stifle lower level managers from freely exchanging ideas about organization problems, management styles and so on. Although there is some validity to this point, the advantages of all levels sharing this learning experience far outweigh the disadvantages.

If the workshop is effectively designed to encourage interaction and make use of experiential learning techniques, real-world roles tend to melt away as the workshop progresses, and the rapport built during the session lasts forever.

Anticipate backsliding. DP professionals tend to be perfectionists, and DP trainers are no exception. Some managers and trainers alike become extremely discouraged when, shortly after the workshop, they observe themselves and others in the organization reverting to the old way of managing people.

Recognize, ahead of time, that this is the rule, not the exception. It is not a question of *if* backsliding occurs; it is a question of *when*.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As a DP trainer, you must recognize this reality and stand ready to offer not only support and encouragement to the backsliders but also a solid program of workshop reunions, refresher training and focus sessions on subjects discussed in the workshops.

Establish support systems — ahead of time. Formalized retraining is a vital part of keeping the management development momentum rolling, and establishing a strong support system gives it the final push to success.

An effective support system includes small group sessions made up of workshop graduates who meet regularly to discuss victories and failures in applying workshop skills and to assist each other in resolving problems with subordinates, peers or superiors.

> ”
>
> *Effective management is built on trust. Trust is built by risking, but not risking costs you, too.*

Support systems might include using an outside resource for individual, boss/subordinate or even team conflict resolution and counseling sessions. DP trainers can use the support system to further enhance their credibility as the custodian of DP human resources.

Prepare for environmental changes. Don't make the mistake of waiting until after the management development workshop to ensure that the work environment will allow people to apply what they have learned. A perfect way to frustrate people is to train them to use a skill and then make it impossible for them to use that skill when they return to their jobs.

Carefully ensure that top DP management is prepared to support every training objective — with their words and actions — after the training. For example, do not teach managers how to enrich their subordinates' jobs if top DP management will not accept that there will be a temporary but necessary reduction in job performance, perhaps organizationwide, as subordinates practice the skills of their newly enriched jobs.

Surprises can be avoided if DP trainers do their homework and communicate upward and outward before the training.

Don't stop with DP management. If you are teaching good management methods to DP managers, remember the people to whom these methods will be applied. Teach the rules for effective communication, cooperation and decision making to both parties in the these transactions.

As an adjunct to your DP management development training, you should plan to conduct workshops for people who must interact with DP managers, including top corporate managers, user managers and key staff members. Team-building workshops are particularly effective for building rapport and trust among these groups and for solving the tough problems they share.

Schedule off-site. Despite the fact that you may have the world's most beautiful training facilities, do anything you can to schedule your management development sessions off-site. Find a good retreat conference center deep in the woods, preferably without telephones and out of beeper range of your home grounds.

Make an agreement with top DP management that these training sessions will be free from daily distractions and interruptions. These sessions are too important to be devalued by people coming and going at random.

Attend each session personally. Even if you are not teaching the session, attend every management session personally. This offers several advantages.

First, from a purely practical standpoint, you can relieve the instructor of having to attend to logistical details; perhaps you can facilitate a part of the session yourself. Second, your presence sends to all who attend a strong signal that you value their training.

Finally, you can assist the instructor by adding continuity from session to session, especially when the time comes to confirm those values to which top DP management is committed.

Put your best foot forward. Here is your opportunity to change your past image and to shine. Don't blow it! You may never have another chance.

Take care of every logistical detail. Work closely with the instructor or vendor. Anticipate snags and last-minute changes. Try to eliminate any element of the physical arrangements that might detract from the effectiveness of the workshop. If you have to be absent, send someone to stand in for you.

Remember, poor physical arrangements or logistical coordination can turn an 'excellent' workshop into an 'average' workshop in the eyes of the attendee. Don't be sandbagged by a petty detail.

Today's finest management development workshop teaches DP managers that effective management is built on trust. Trust is built by risking, but not risking costs you, too. Which price have you personally chosen to pay when it comes to your involvement in the need for management training for your DP department?

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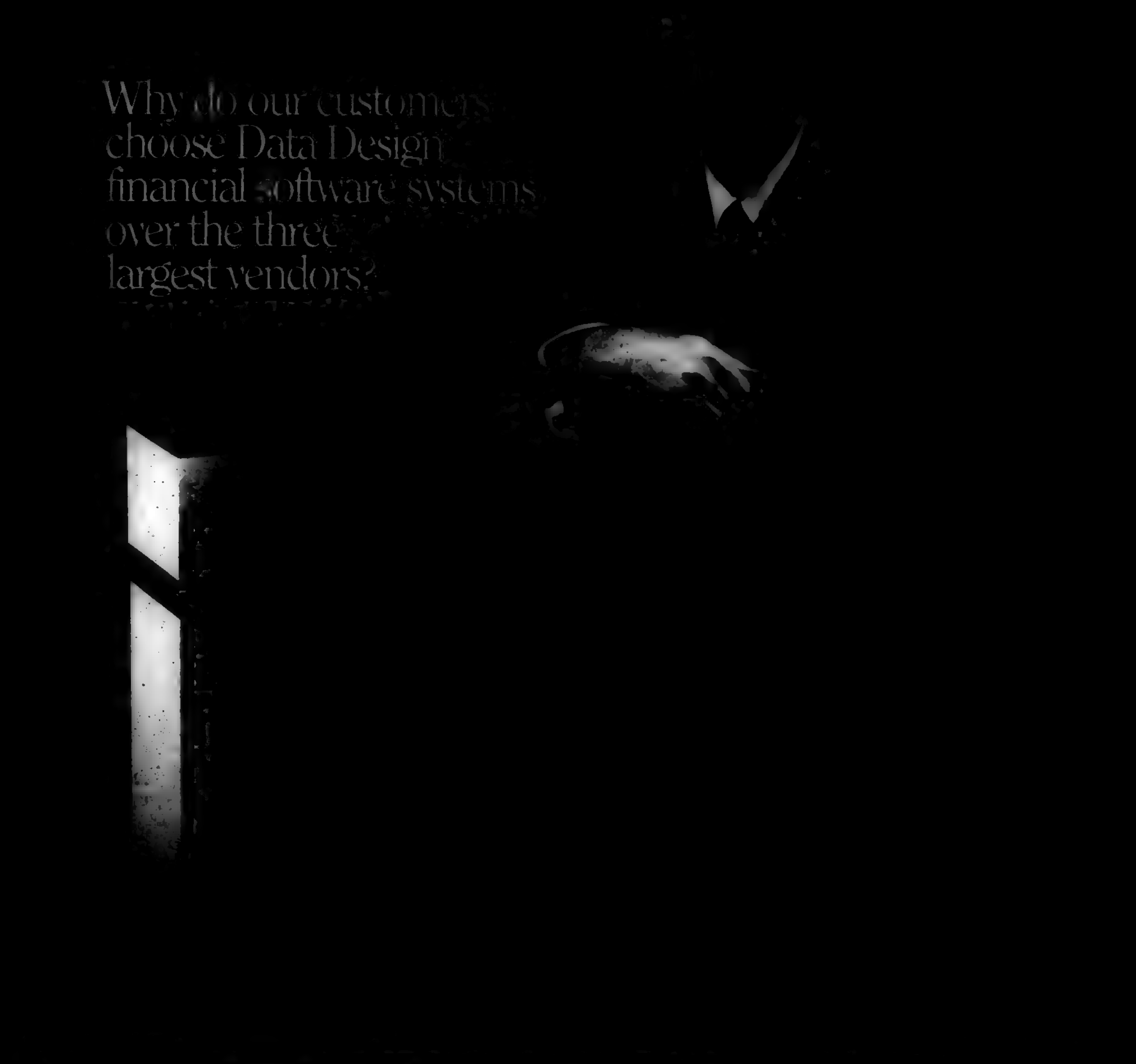
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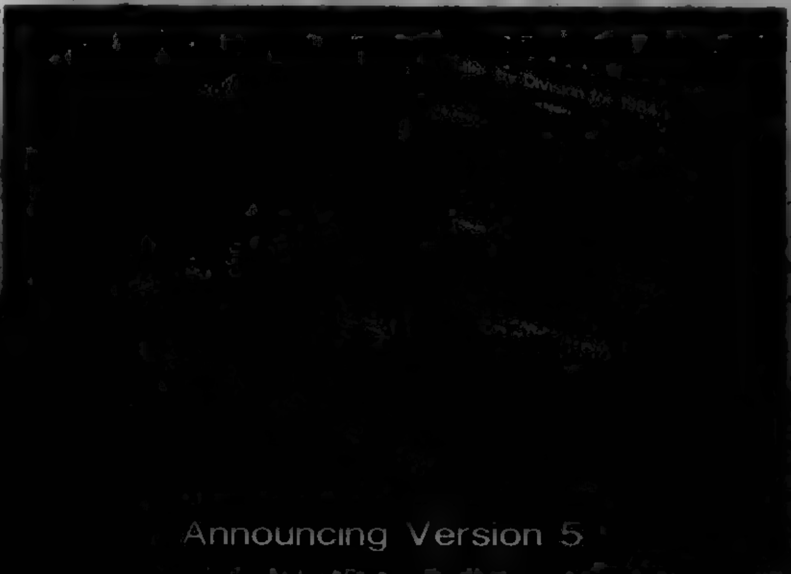

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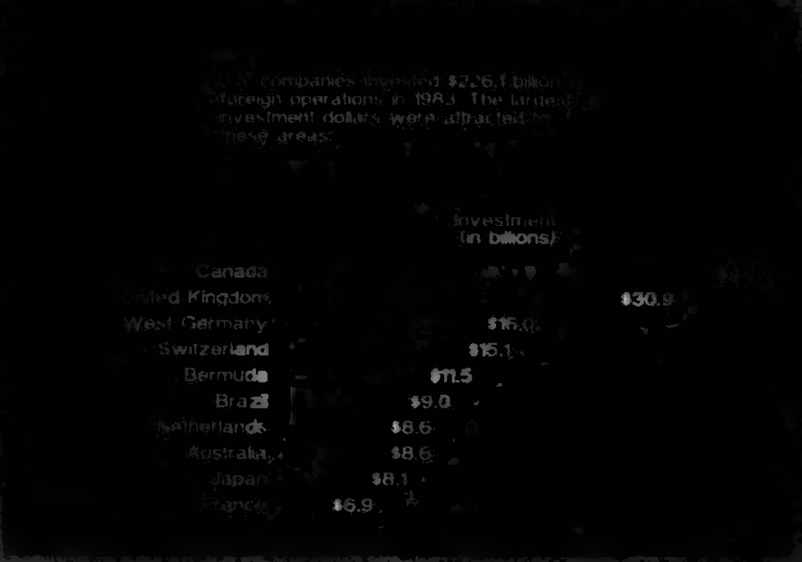
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IN DEPTH

A Fast way to define system requirements

By Gary Rush

Facilitated application specification techniques — Fast — bring end users and DP together to define needs, gather information and propose solutions. The goal is a system that suits everyone on the first try.

MIS has long applied productivity techniques to the problems of coding and testing computer applications. Now DP planners also are trying to develop better application requirements and design specifications as a way to increase productivity.

Over the past eight years, several companies have developed specific techniques to address the problems of communication between data processors and end users. Facilitated application specification techniques (Fast) focus on the information-gathering stage of system design. Fast sessions bring DP staff and end users together, making design an interactive process.

Corporate clients are trained in the technique of their choice by one of several vendors and then conduct sessions in-house. The hope is that negotiations at the early stages will ensure smooth operations later on. If end-user requirements are spelled out in flow charts and brought face-to-face with DP considerations at this early stage, the final system design will suit the organization more precisely, boosting productivity over the system's lifetime.

As word of their success spreads, these interactive design techniques are finally being accepted and implemented in various companies in the U.S. Major corporations are investing in visual aids and training for session leaders. For the first time since these techniques were developed, a variety of consulting and training assistance is also available.

Interactive design has a direct impact on DP professionals' ability to deliver error-free applications. DP management is all too aware that reducing errors is one of the most effective ways to reduce the cost of computer systems. Now studies at ITT Corp., IBM, TRW, Inc. and Mitre Corp. indicate that error removal constitutes up to 40% of the cost of a system — and that between 45% and 65% of these errors are made in system design.

Numerous analytical methodologies, design methodologies and programming techniques have been developed to address the error problem. While these work well for analysis and design, they have not always successfully addressed the interviewing and information gathering process that must take place to provide input. Now Fast has made a science of information gathering.

The information gathering process bogs down for two major reasons. The first is the communication gap between DP and the business community. In *An Information Systems Manifesto* (Prentise-Hall, 1984), James Martin says, "When the traditional systems analyst and potential end users first come face-to-face, they come from widely different cultures. It is rather like a Victorian missionary first entering an African village."

This language difference brings about the second major problem: the invariable power struggles between the players involved. The end user demands systems faster than DP can deliver them, or else DP creates a sort of technological blackmail over the end user. Often these power struggles are not even intentional but result from widely different approaches to and views of the same problem.

Four major techniques have been developed since the late 1970s to address the information gathering problem. They are Joint Application Design (JAD), Consensus, Wisdm and The Method.

In 1977, IBM developed JAD to help extract requirements for distributed systems implementation. Boeing Computer Services Co. adapted a technique that was used to design the Boeing 747 aircraft and started Consensus. Wisdm was developed by Blair Burner at the Western Institute of Software Engineering (Wise). Performance Resources, Inc. took the JAD technique, modified it to work better for decision support systems and called it The Method.

Structured agenda

All of these methods are geared toward the front end of the system design life cycle. They help users define an application from its first conception through the complete design. These techniques can

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Gary Rush is president of MG Rush Systems, Inc. in Newton, N.J. He implemented JAD at CNA Insurance Co. and initiated the JAD project at IBM's user group, Guide, in 1984.

be used for every new development or maintenance system project in a company.

Fast sessions range in length from one three-day workshop to more than 30 workshops to bring the design to a point where it can be turned over to technicians for programming. Any project that requires more than one person's input on decisions can profit from interactive design techniques such as these.

Typically, the project manager will initiate using Fast in the company before the start of a new project. The project manager may contact a Fast vendor for training or licensing or else present the idea to top management to make the contact. Occasionally, other DP staff members or even end users will be the initiators. In any case, the project manager will not end up actually leading the sessions, as the session leaders' success depends ultimately on their position as objective outsiders.

Diverse views

Each Fast method focuses on a slightly different aspect of the customer's needs. JAD primarily addresses the detailed external business design problem. It has a structured agenda that follows the flow of work through a work area and details each stage: planning, receiving, tracking, assigning, processing, recording, sending and evaluating the work.

Each JAD session is lead by an impartial session leader who is responsible for controlling the agenda and the numerous visual aids. The session leader, with the project manager's help, prepares beforehand, tailoring each session with application-specific information. The leader must also ensure that management, users and DP come to the session with the same purpose and objectives and that the scope of the session is clearly laid out.

JAD stresses the use of business rather than technical language to encourage participation and enhance group dynamics. Visual aids in the form of vinyl magnetics, slides and Vu-Graphs help drive the detail and quality of the design.

JAD sessions typically run three days and involve both technical and managerial personnel. Participants are key staff within the business area for which the system is being developed — whoever is in the best position to describe the business functions, information and data needs, transactions, design screens, reports and document changes to the work flow.

Companies such as American Airlines, Inc., Texas Instruments, Inc., IBM, Mutual Life Insurance Co. in New York and Bell Canada have been using JAD successfully. Some recorded increases in productivity ranging from 20% to 60% during the requirements and design process.

CNA Insurance Co. in Chicago conducted a trial of the JAD technique in 1983. CNA used the Function Point productivity measurement technique from IBM to evalute JAD's effectiveness. A control project that did not use JAD was measured along with the pilot project. The control averaged eight hours per function point during the requirements and external design phases of development, whereas the pilot averaged 2.5 hours per point — more than a 200% increase in productivity.

High-level planning

Consensus covers four areas: strategic planning, management planning, requirements definition/analysis and preliminary design. Like JAD, Consensus primarily covers the higher level planning issues. Consensus does not delve into screen and report design. It does, however, cover business functions and information or data needs in detail.

The session leader in a Consensus session will not use numerous visual aids other than Vu-Graphs and flip charts. On the flip charts, the session leader will draw graphic representations of the system using data flow and information flow diagrams to aid the discussion.

The workshops generally run long hours (12 to 14 hours a day) and often for up to two weeks for larger systems, with a majority of the participants staying the entire time. The users of Consensus report up to an 80% reduction in elapsed time and a 50% reduction in costs for the requirements fathering process. Consensus is used by such companies as AMP, Inc., Boeing Computer Services Co., First Interstate Bank and Blue Cross/Blue Shield.

Brainchild

Wisdm was conceived by Blair Burner while he was an employee at Boeing Computer Services in the mid-1970s. In the late 1970s, Burner formed Wise, where he perfected and began marketing Wisdm.

Wisdm is similar to Consensus in that it is aimed primarily at front-end analysis. The first step in a Wisdm analysis is a thorough Problem Definition and Analysis workshop, generally consisting of key managers from the business area involved, which defines the business problem clearly. The second step is a Requirements Definition and Analysis workshop, followed by the final step, a Business System Design workshop. Wisdm, unlike Consensus, runs six to eight hours per day for three to 10 days.

In the last step, the requirements, business flow, data needs and major processes are defined in a step-by-step process leading to a complete design:

- Defining the external interfaces.
- Defining the external inputs and outputs.
- Building an interface model of the input and output flow.
- Defining internal functions.
- Building a graphic model of the functional flow.

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- Defining the internal and stored data.
- Constructing an input/output specification model.
- Constructing a data flow model.
- Defining the general current and future requirements for the system.

Wisdm design workshops require two session leaders, one of whom sometimes takes the role of an apprentice in preparation for a future session. Wisdm makes heavy use of matrices and other visual aids to illustrate data elements. Unlike JAD, Wisdm does not extend into the detailed design portions of systems design. Wisdm is used extensively by the consulting firms of Wise and Comp-U-Staff and has been used at the Hartford Fire Insurance Co.

Hybrid technique

The Method is really a hybrid of the JAD technique. It was fashioned because decision support systems did not fit easily into the transaction flow agenda of JAD. Developed by Performance Resources, Inc. while working with AT&T, The Method is now used at CNA Insurance Co., AT&T, the Chase Manhattan Bank NA and some government agencies. The Method addresses decision support better than JAD in that it is more data driven: Data is identified earlier in the process and then is organized to help develop decision support.

The Method provides for planning sessions, a work analysis to set the scope of the sessions, a structured agenda and an impartial session leader. In this case, session leaders are certified before running any sessions. Session leader training includes instruction in group dynamics plus specific software support to aid the session leader in planning workshops, scheduling time and tailoring the workshops to particular applications.

Implementing the techniques does incur costs. Implementation requires investing in training and materials, customizing the technique, securing workshop facilities, recruiting session leaders and conducting pilots. Training and implementation expenses can range from $3,000 to more than $100,000, depending on the amount of consulting support desired, the number of leaders trained and the amount invested in workshop facilities.

> ”
>
> *The Fast methods are designed to extract high-quality business system specifications from end users in a compressed time frame using a workshop environment.*

But as a rule, this initial investment is easily recovered. On a typical 2,000-hour project, 20%, or 400 hours, of the time is spent in requirements and design. If the productivity of this phase of work is increased a conservative 25%, the requirements and design phase will require only 300 hours, saving 100 hours. Depending on internal company billing rates, this 100 hours can be worth from $3,500 to $7,000.

Even with a worst-case investment and return, the investment pays for itself after the 28th project — or much sooner when the technique is used on larger projects. Typical investments and returns are generally far from the worst case.

It is important to test or pilot the technique on one project with a good chance for success to determine how much customizing is necessary and how well the technique fits within the organizational climate. This initial pilot of the technique is the best way to sell the concept internally and gain acceptance.

Each of the four Fast methods has strengths and weaknesses. But boiled down, they are all structured meeting techniques designed to extract high-quality business sytem specifications from end users in a compressed time frame using a workshop environment. They are not replacements for analytical methodologies, but they can all work with and supplement any methodology.

Fast elements

All of these techniques have certain common elements that both characterize them and determine their success. If customers modify or customize a technique, they should take care to preserve these key elements: a structure or formalized process, a dynamic workshop environment, an impartial session leader, a focus on information gathering and business system design and well-defined goals (producing system specifications and objectives and predefined documentation forms).

Each technique also stresses end-user input and ownership of the system and requires end-user commitment both at the outset and the completion of the sessions. Good visual aids and comprehensive documentation are also important.

Structure is important to these techniques because the structures chosen are built on proven methods. The sessions have an agenda, a purpose and objectives. The workshops are orchestrated, not ad hoc, which helps ensure that they do not turn into time-consuming brainstorming sessions or uncontrolled discussions.

Often the structure is as simple as following the flow of actions against a piece of work and asking end users the following questions at each stage:

- What functions are you performing at this point?
- What information do you need to complete these functions?
- What do you want done with the information?
- How do you want the information displayed?

These questions are repeated for each step of the work flow.

The workshop environment and dynamics of

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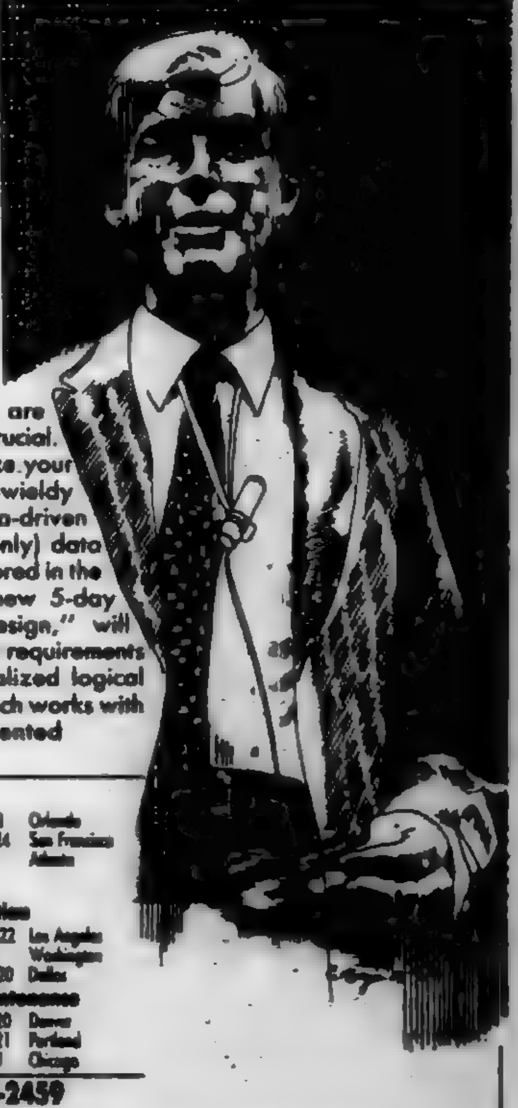


a group help session participants concentrate on idea sharing, avoid politics and ensure that the information provided is complete. Group dynamics help avoid politics because groups tend to police themselves. The participants develop into a team by working together; in such a group pettiness and politics are seen for what they are and quickly disappear.

A key to creating this group environment, however, is having the right people in the workshop. These people need to be knowledgeable about the business and have the authority to make decisions about the design. In the workshop, end users will be asked to describe their business functions, information needs, data elements used and how they want to interface with the system. They will describe how the screens and reports should look and how the system will affect their business.

The type and number of participants vary, based on the level of detail being discussed in a workshop. In high-level planning workshops, there are up to 25 participants. These participants are the decision makers and managers of an organization. In workshops concerned with details of screens, reports and workflow design, there are fewer participants (usually a maximum of 12), and these will be the lead technical people in the end-user departments, their supervisors and perhaps a manager or two.

DP is represented by the project leader and one or two lead technical advisers, who assist in answering questions about other systems, feasibility of design items and some cost estimates. The advisers make alternative suggestions when cost becomes a deciding factor. The session leader and one or two people to capture the documentation round out the participants.

An impartial session leader can eliminate the power struggles and communication gaps. A 1984 study, "Management Science," by DeBrabander and Thiers of the State University Centre Antwerp in Belgium found that "the presence of a third part which stimulates the user to neglect the possible implications of power asymmetry . . . nullifies [this] disturbing effect." Their study noted that the most effective type of facilitator is an active question elicitor. This type of session leader induces the quieter or less assertive workshop members to ask more questions or to respond when someone else takes a position.

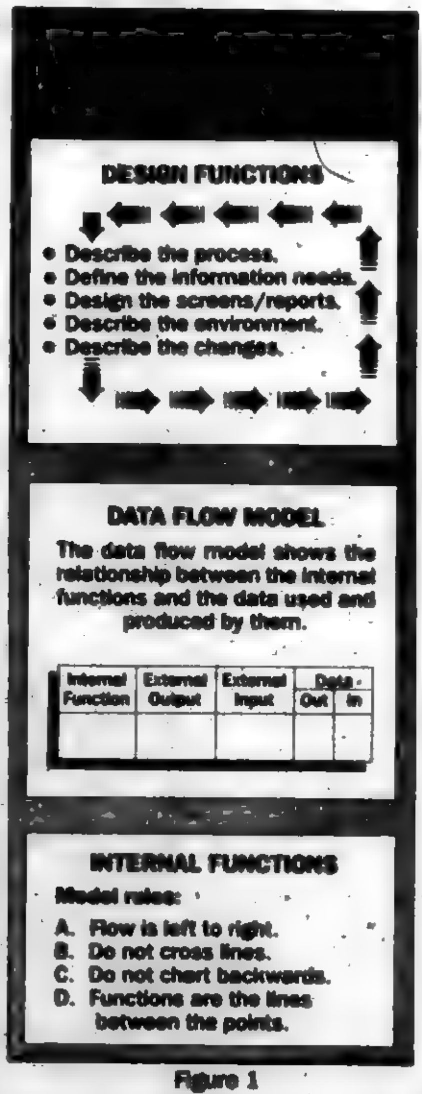
This type of facilitated discussion puts DP and end users on equal terms and sets them up as partners. The session leader assumes the role of a referee at times, arbitrating debates between DP and end users or between groups of end users. When an issue arises that cannot be decided in a workshop, the session leader notes down the issue, and the group assigns someone to be responsible for its resolution. The goal is to discuss ideas fully and to reach decisions as a group without delaying the process in undue haggling.

Most of the techniques rely on **the use of visual aids** to help with communication. Better communication is, after all, the primary reason for structure, session leadership and the workshop environment. Often problems arise because the participants define terms in different ways. Defining terminology and building pictures of the evolving application serve to avoid misunderstandings and boost the group's productivity.

Magnetics, slides, Vu-graphs, charts and drawings are all used in Fast sessions. Figure 1 illustrates slides used to help clarify terms and workshop process. Understanding what "input," "data flow" or "function" means eliminates ambiguities and confusion. Through charts, the workshop can build up an application step by step.

Well-defined documentation is important to the consistency of the methods. Documentation is usually specific information recorded during the sessions. The documentation itself actually becomes the requirements specifications, so recording the sessions thoroughly determines, to some degree, the workshop's usefulness.

The level of documentation detail will depend upon the level of the session. Planning sessions document



DESIGN FUNCTIONS

- Describe the process.
- Define the information needs.
- Design the screens/reports.
- Describe the environment.
- Describe the changes.

DATA FLOW MODEL

The data flow model shows the relationship between the internal functions and the data used and produced by them.

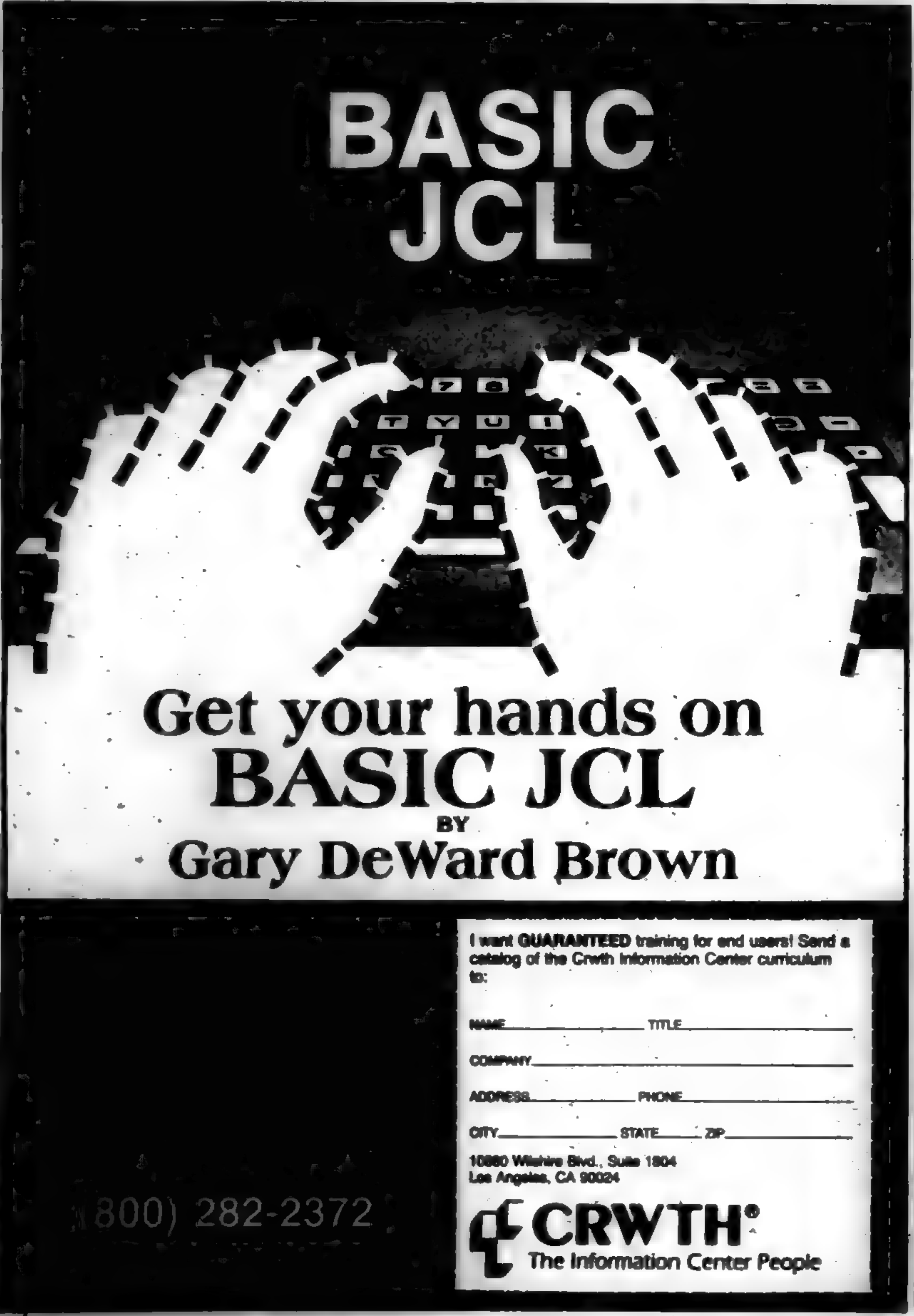
Internal Function	External Output	External Input	Data	
			Out	In

INTERNAL FUNCTIONS

Model rules:

A. Flow is left to right.
B. Do not cross lines.
C. Do not chart backwards.
D. Functions are the lines between the points.

Figure 1



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More than a meeting

New Fast customers will often ask "What is the difference between these techniques and a well-run meeting?" There are several answers.

The Fast method can be repeated because they are internally consistent and have been tested. Leaders can be trained in any of the techniques. Each technique holds known, explicit objectives.

Well-run meetings, on the other hand, depend on the skills of the meeting leader, who has not been specifically trained for the task. In general, the results of even a well-run meeting are unpredictable. In organizations where meetings are well run, Fast methods provide additional benefits to the application design information-gathering activities.

Each technique has its strengths and weaknesses. No one is all encompassing. Documentation during the sessions has been a problem, and there is no well-developed automated documentation tool. The techniques all have been modified when brought into a company other than the developing company, and since these are relatively new and implemented differently in each organization, help for customers has not been readily available until just recently.

Most corporate customers do not feel comfortable implementing these techniques without help from a consultant or the product vendor. Many vendors license individuals rather than companies to use their techniques and are reluctant to customize their technique for a particular company. Those that will customize their technique often charge a hefty consulting fee to do so.

There are six primary companies offering services relating to interactive design sessions. IBM Information Systems Services and JAtech Designer Systems Ltd. offer contract JAD session leaders and JAD training. Performance Resources, Inc. offers contract session leading plus training and certification in The Method. Wise offers contract session leading as well as training and licensing in Wisdm.

Boeing Computer Services offers contract session leading and training in Consensus. MG Rush Systems, Inc. offers contract session leading and training in a combination and adaptation of various techniques. In addition, various consulting companies are beginning to offer contract session leaders as part of their services.

On the plus side, Fast methods have worked very well. End users are satisfied and generally become better allies of DP. In one case, the users emphatically told the vendor to provide more support for the process so that they could use it on all of their systems. At least four companies (AT&T Communications, American Airlines, CNA and TI) have trained numerous session leaders and use interactive design for many of their projects.

The specifications developed from these methods have been more thorough, better documented and more consistent than with a less rigorous approach as well as being obtainable more quickly and at less expense. Using a facilitated technique helps reduce maintenance because specifications are more fully developed and users know their system better. These methods can also enhance other analytical and design methodologies, including prototyping.

To succeed, the initial project should have the following:

- End users hungry to have a system developed for them.
- Cooperative, committed DP and end-user personnel.
- A project requiring no more than 12 to 18 months of development effort.
- A project that is primarily an on-line, transaction-based system.
- An application for which the underlying business is well defined and not controversial.

The initial use of a technique in a company is more critical for a session leader than the first workshop. Companies will not give a technique a second chance if it fails on the first try. A session leader, on the other hand, can often recover if the first session is not a great success.

Tools are available to help. Diagramming aids such

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as Index Technology Corp.'s Excelerator, IBM's System A or Technology and Information Products Corp.'s Extim facilitate thorough, well-organized documentation. Data dictionaries such as CGI Systems, Inc.'s Pacbase or IBM's Data Dictionary can help make the documentation a living portion of the application.

The data dictionaries also can help in developing prototypes or feeding prototyping tools. Finally, word processors and specification languages can be used to capture documentation.

Good training has not been easy to find. Most developers of the techniques teach only the technique itself. But training must also cover group dynamics, the facilitator concept, the specific implementation of the technique, systems analysis, tools for use in the workshop and the documentation process.

Regardless of the technique, each session will be somewhat unique, and the session leader must be capable of adjusting to different situations. Knowing the technique alone will not be enough.

The only vendors or consultants that provide extensive training are Performance Resources and MG Rush Systems. Both provide training in the design technique as well as in facilitation and group dynamics.

Performance Resources trains students in The Method using effective presentation techniques and facilitation training to enhance the session leader skills while providing basic instruction in the design technique. MG Rush trains students in a variety of design concepts using group development, adult learning and facilitation training to enhance the session leaders' skills. Some customers have developed their own in-house programs that do a good job of training session leaders.

Selecting session leaders is also not easy. These people need to be well respected and feel comfortable standing in front of a group of people. They need to be able to control controversies and stay flexible. Above all, the session leader must be confident and well prepared.

Almost all session leaders have come from the DP ranks. A few have come from marketing backgrounds. Most session leaders are capable technical people with a high degree of communication and people skill.

The DeBrabander and Thiers study found that the most effective facilitators "are characterized by an interpersonal, time and goal orientation. They must have high influence throughout the organization . . . derived from technical competence."

Need for change

The future for these techniques is bright, but all will need to evolve. Vendors need to keep the techniques current with the changing business environments. For example, non-DP personnel are not as unfamiliar with computers as they were in the mid- to late 1970s. The types of applications being developed are changing from heavy transaction systems to smaller decision support, information or specialized transaction systems.

Fast techniques are also being used for more than data processing. They have been used to design robots, grain elevators, strategic planning — even to improve staff meetings. Customers need to understand the techniques fully so that they can integrate the techniques into their existing ways of building applications. If a methodology is being used successfully in a company, then it should be integrated so that it augments rather than replaces the methodology.

Guidance in planning, understanding, documentation and training is needed and must come from vendors and practitioners. The techniques need to be customized and integrated fully with local methodologies without compromising either one.

The techniques do work. They work well when customers invest some effort in understanding them. Sessions should evolve from the proven techniques and build on the experiences of the practitioners.

Most DP professionals will agree that getting better requirements and more user involvement will ensure better systems and reduced maintenance. Clearly these techniques assist in this; furthermore, involving users in the process of designing their business systems makes the users feel that the system being developed really is *their* system.

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SMALL TALK
Eric Bender
CW Senior Editor

CD-ROMs eye big payoffs

OK, so now we have cheap desktop drives that can read half a gigabyte off those jazzy-looking little optical disks, but what will we do with them?

The first commercial systems based on compact disk read-only memories (CD-ROM), the optical read-only systems based on the same technology as the Compact Disc audiodisk players, are just appearing. Next year the storage systems will be configured for standard personal computers, in the same size as today's disk drives, with off-the-shelf price tags expected to slide below $700.

Major hurdles must be overcome before CD-ROMs storm the desktops of America — including production ramp-up glitches, slow turnarounds on the disks, a lack of standard data access methods and the never-ending chicken-and-egg problem involved in getting software written for new equipment. But some intriguing applications already have emerged.

This month Grolier, Inc. of Danbury, Conn., is scheduled to ship its 21-volume *Academic American Encyclopedia* on a CD-ROM disk for $199. IBM Personal Computer users equipped with an optical drive will be able to complete a search for a particular word or group of words throughout the nine-million-word encyclopedia in three to five seconds, according to Grolier.

Early next year Ingram Book Co. in Nashville will market Lasersearch, a book identification and purchasing system also built around an IBM micro and an optical player. Designed to give librarians access to information on 1¼ million titles, the system also will make

Continued on page 63

Consulting firm's micros blur lines between jobs

By Eric Bender

CAMBRIDGE, Mass. — Along with aiding in many jobs at Arthur D. Little, Inc. (ADL), personal computers have raised some unanticipated short-term problems and some unanswered long-term questions about the way professional and support staffs will work together, a recent roundtable discussion showed.

The international consulting firm, which employs approximately 2,600, began a big push to replace IBM Displaywriter word processors with IBM Personal Computers during the past year in many groups. "One reason we went to the [Personal Computers] was that we didn't want to buy those $10,000 machines anymore," MIS manager Toby Choate said. Another important rationale was that personal computers can handle many different types of tasks, he said.

As the IBM machines have been added to the company's collection of micros, more professionals have joined the early adapters who type up initial drafts of letters and reports themselves.

Homer Hagedorn, a consultant who made that shift two years ago, is an enthusiastic proponent of the Tandy Corp. Model 100 laptop. "I produce a first draft that is more articulate, more concise and better organized than my second draft used to be," Hagedorn maintained. Previously, he would dictate to his secretary, and "she'd probably spend four or five hours just trying to type it," he said. "And worse than that, she'd have to listen to me."

Hagedorn also gave rave reviews to the micro's ability to tap into GTE Telenet Communications Corp.'s Telemail service. Once a message gets into Telemail, "I've indicated all the people it's supposed to get to, and they get it simultaneously," he said. "It doesn't make any difference to me whether they're in Wichita or Washington, they will open the mailbox and find what I have to say, and there are no pink

Continued on page 66

Orchid board announced

Orchid Technology of Fremont, Calif., has introduced an expansion board for the IBM Personal Computer and Personal Computer XT that is said to incorporate three boards in a single card slot.

Conquest is a multifunction board, complete with IBM-compatible serial and parallel ports as well as a clock. It is also an expanded memory board, supporting the Lotus Development Corp./Intel Corp./Microsoft Corp. Expanded Memory Specification.

Additionally, Conquest offers the ability to adapt an Orchid PCNet local-area network daughtercard without taking up a second slot in the personal computer.

Conquest offers up to 2M-bytes of memory that can be used to fill both conven-

Continued on page 66

Lotus rolls out 1-2-3 Release 2

Lotus Development Corp. shipped Release 2 of its best-selling 1-2-3 analytical software package last month for IBM Personal Computers and compatibles. The version costs $495, the same price as the original product, the Cambridge, Mass.-based vendor said.

The upgrade kit for Release 2, selling at retail for $150, includes a coupon from Intel Corp. offering a $40 rebate on the Intel Above Board expanded-memory product. That promotion will run through July 31, 1986.

The new version supports Intel 8087 and 80287 coprocessors, and its maximum worksheet size has been expanded to 256 columns by 8,192 rows.

- Data General cut pricing on its Data General/One laptop micro/54
- Santa Cruz Operation announced Xenix System V software for the IBM Personal Computer XT and AT/54

INSIDE

Software/55

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ORACLE is currently installed on over 1000 supermini and mainframe systems around the world, as well as on thousands of PCs and compatibles. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and many government agencies.

For further information, contact Oracle Corp., Dept. C, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350.

Xenix System V debuts for IBM micros

Santa Cruz Operation, Inc., a Santa Cruz, Calif.-based software firm, has announced Xenix System V, a multiuser, multitasking version of AT&T's System V.2-operating system, for the IBM Personal Computer AT and XT.

Xenix System V consists of three packages: the Xenix System V Operating System, Xenix System V Software Development and Xenix System V Text Processing.

The Xenix System V Operating System consists of a full set of Xenix utilities to run business applications, administer the system, edit files and communicate with other users. Standard features include the Unix System V command interpreter shell, C shell, full screen visual editor, system administration commands and electronic mail, according to the vendor.

With the Xenix System V Multiscreen feature, a user can press one key to call up a screen display from up to 10 applications programs. With a "set color" option, a user can control the background and foreground color of a color monitor display, the company said.

Xenix System V can support up to 10 remote users on serial ports in addition to the console. The product supports the use of floating-point instructions. A hard disk drive can be shared between Xenix System V and the IBM PC-DOS operating system, allowing the user to alternate between systems. The operating system also includes utilities for moving files between PC-DOS and Xenix.

According to Santa Cruz Operation, the Xenix System V Software Development Package supplies tools needed to write C and assembly language programs.

The Text Processing package contains tools for the preparation of documents.

Xenix System V Operating System and the Software Development package each cost $495, and the Text Processing package costs $295. Together, the three products sell for $995. They are all scheduled for October availability.

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Leasametric, you see, has one of the broadest inventories of quality DP equipment anywhere. In addition to the TI Model 865 and its easy-to-change type fonts, you can get PCs, terminals, modems, multiplexers and protocol convertors.

Plus service that you just can't buy. Immediate delivery. Equipment that's fully tested and ready to work for you, complete with manuals, cables and other accessories. A toll-free number to call for on-line diagnostics. On-site maintenance if it's needed. And just in case something doesn't work as it should; immediate replacement.

With financing just as you like it. In addition to standard rental agreements, we offer volume pricing, rentals with options to buy, leasing and even used-equipment sales.

So when you need a printer that's just your type, just in time, or just the best—just give us a call: Leasametric.

In California: 800-528-6891. Outside California: 800-228-6314.

Texas Instruments

Rent the best from the best.

LEASAMETRIC

• DATA COMMUNICATIONS DIVISION

DG lowers laptop prices

Data General Corp.'s Desktop Division in Westboro, Mass., has cut prices between 23% and 32% on the three models of its Data General/One laptop computer.

A model with 256K bytes of internal memory and a single disk drive now costs $2,195, down from $2,995. A dual-drive system with 256K bytes of internal memory costs $2,695, reduced from $3,495, and a dual-drive version with 512K bytes of internal memory costs $3,195, down from $4,695.

Price tags on add-on memory also were slashed. Incremental memory of 128K bytes now costs $250, down from $600, and 256K bytes of memory costs $495, down from $1,200.

Polytron airs bundling pact with Quadram

Polytron Corp. of Hillsboro, Ore., together with Quadram Corp. of Norcross, Ga., announced that Polytron's Polywindows Deskplus desktop utility management system is now being bundled with certain Quadram board products.

Polywindows Deskplus is a memory-resident program designed for the IBM Personal Computer, Personal Computer XT and AT. It is said to enable users to access several desk tools and other micro enhancements via windows appearing over the other program being used.

Purchasers of Quadram's Quadboard, Gold Quadboard, Silver Quadboard, Liberty Board or Quadsprint personal computer add-on boards will receive a version of Polywindows Deskplus without copy protection as well as a user's manual.

The non-copy-protected version of Polywindows Deskplus costs $84.95.

Ericsson cuts cost of desktop, peripherals

Ericsson Information Systems, Inc. in Greenwich, Conn., has cut the prices of its desktop personal computer and peripherals by between 15% and 25%.

The basic 128K-byte personal computer with a single floppy disk drive, monochrome monitor and graphics card now costs $2,145. With 256K bytes and two disk drives, the system sells for $2,450. A 256K-byte hard-disk version with two drives and a monitor is priced at $3,760.

Prices of color and monochrome monitors, 128K-byte memory cards, internal modems, letter-quality printers and all Ericsson PC Ergo options were reduced by an average of 15%.

SOFTWARE

■ **Applied Microsystems, Inc. has announced an enhanced version of its icon-driven Office software for the IBM Personal Computer.**

The product's on-screen handling functions have reportedly been rewritten completely in assembly language for faster response time. Other new features include cursor selection of documents to be edited from a menu, a scan feature to preview documents without opening them for editing and an on-screen paper tape to display visually results of the calculator icon.

Like the previous version, the new version of Office runs on the IBM Personal Computer, Personal Computer XT and Personal Computer AT with 256K bytes of main memory and a color or monochrome monitor. The program may be copied onto a hard disk.

The enhanced version of Office costs $79.95. Current users may upgrade for $10.

Applied Microsystems, P.O. Box 832, Roswell, Ga. 30077.

■ **STSC, Inc. has announced that its APL Plus UNX System for APL applications development is available for an IBM Personal Computer AT running Microsoft Corp. Xenix.**

The product requires the AT with a minimum of 1M byte of memory. The Xenix version is said to incorporate all the multiuser capabilities of the APL Plus UNX System that runs on larger computers. Features include concurrent file sharing and updating, multiple function and variable full screen editing and partial compilation of APL code.

The software includes an external process interface for access to non-APL programs, such as data base management systems and graphics. Nested arrays, compatible with IBM APL2, provide for APL arrays of greater than 64K bytes.

The price of the APL Plus UNX System is $995.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

■ **Matchware Computer Services has introduced a software selection package for the IBM Personal Computer and compatible machines.**

Known as Matchware, the diskette software was designed to assist small business users with the selection of accounting and vertical-market software.

The Matchware system poses a series of questions to users about features desired in a software product. Requirements are weighed by importance and compared to a group of products listed in the Matchware's data base.

A list of products that meet a user's requirement are generated in a printed report.

Matchware Level II allows the user to choose five of 10 application areas, including accounts payable, accounts receivable, billing, general ledger, inventory control, job costing, payroll, purchasing, sales order entry and client time and billing, the vendor said.

The Matchware package costs $795.

Matchware Computer Services, Suite 125, 6435 Castleway Drive, Indianapolis, Ind. 46250.

■ **Relational Database Systems, Inc. has announced a query language that works with Cobol applications developed on the AT&T Unix operating systems.**

Informix-ESQL/Cobol is based on IBM SQL and reportedly enables Cobol programmers to embed SQL statements in programs. The software can be used to create, maintain and query data bases and to integrate Cobol programs with existing data bases created by the Informix-SQL data base management system.

Informix-ESQL/Cobol requires a minimum of 512K bytes of memory, and 1M byte is recommended for multiuser systems.

Prices start at $749, the vendor said.

Relational Database Systems, 4100 Bohannon Drive, Menlo Park, Calif. 94025.

■ **Concentric Data Systems, Inc. has announced a report writer for use with Ashton-Tate's Dbase II and Dbase III micro software packages.**

DB Report Writer is said to enable preparation of reports from any Dbase file. It allows flexible formatting with page sizes up to 250 printer columns by 112 lines. Reports are printed exactly as they appear on the user's screen, and report definitions can be saved or modified for future use. The program features plain English query with AND and OR commands, full selection rules and parenthesization. It allows up to four sort levels with subtotals, averages and counts.

DB Report Writer operates on the IBM Personal Computer, Personal Computer XT, AT and compatible personal computers with a minimum of 256K bytes of memory, the ability to read a 360K-byte program disk and PC-DOS 2 or later.

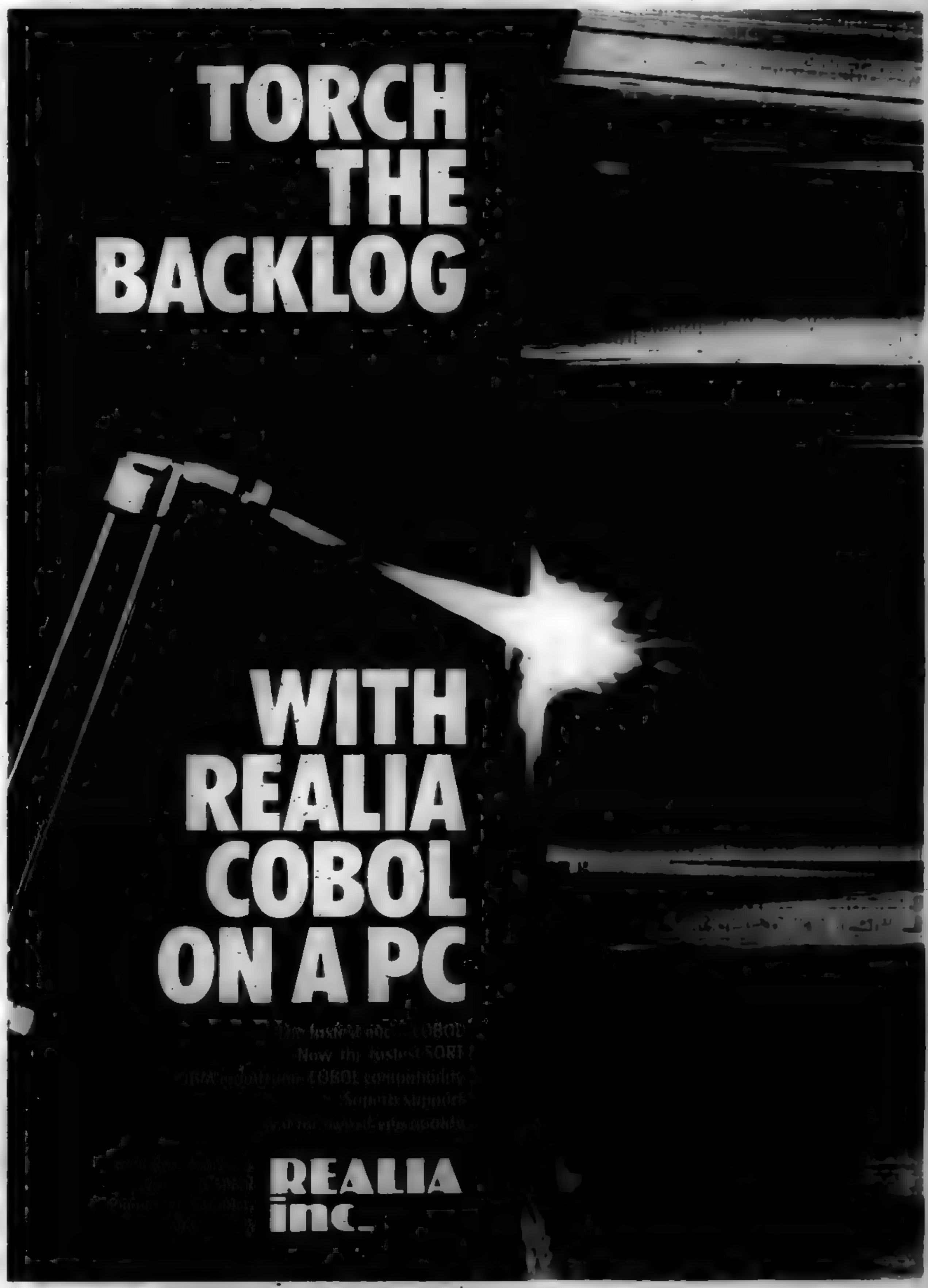
The cost is $125 including an on-line Help system, a user's guide with tutorial and a support hot line. A $99 introductory price is being offered through Dec. 25.

Concentric, 18 Lyman St., Westboro, Mass. 01581.

■ **Multi Mini Programs, Inc. has announced a software program for calculating compound interest that runs on Microsoft Corp. MS-DOS-based personal computers.**

Loanshark produces amortization schedules of up to 100 trillion dollars to the nearest cent, without error or adjustment in the final payment. It requires a 320K-byte drive and a minimum 128K-byte memory.

Continued on page 56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The best of both worlds.

For owners of IBM Personal Computers, combining personal productivity and business applications is now less of a leap than ever before.

There's a new IBM product that marries the IBM System/36 and the IBM Personal Computer to give you the best of both worlds.

Meet the newest member of the System/36 Family.

It's called the IBM System/36 PC.

Very small but it opens up new worlds for your personal computer. Very affordable with a price starting at $5,995, yet capable of running System/36 programs that will help you run your business.

Even if you've never owned a computer before, this can be your first business system, instantly offering the capability of running your business right now and expanding it in the future.

Multiuser system.

System/36 PC can be a standalone computer for small companies or a departmental system or even part of a distributed network for larger companies, providing multiuser access to data.

The System/36 PC is made up of a 5364 Processor attached to an IBM PC, PC XT or PC AT. And you can connect up to three more of these personal computers. Or you can connect terminals such as System/36 printers or displays.

Flexibility.

Whether your business has two employees or more than 2,000, the System/36 PC can combine the personal productivity of your PC with the business applications of the System/36 Family.

The System/36 can handle all facets of your business—distribution, sales analysis and general ledger functions. Accounts payable, inventory control and payroll.

IBM System/36 PC.

And you can get traditional PC functions such as spreadsheets and word processing.

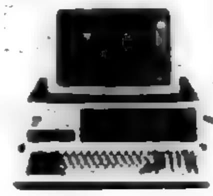
Software for the System/36 has been developed over the years and has proven invaluable in all kinds of businesses of all sizes. And with the thousands of programs written for both IBM PC and System/36, the sky's the limit for business and planning applications.

The System/36 PC even provides you with data security features so that the right data gets into the right hands.

Small yet powerful.

All of this processing power can sit right on a desk or under it—either horizontally or vertically. It measures a mere 21¼"x16¾" x6½"—about the size of a small suitcase.

Yet as small as it is, this little box has multiple processors, with main memory that can be dedicated to running your business functions. In plain English, this means you can get better response time. The System/36 PC comes with a 1.2 MB diskette drive and either 40 or 80 MB disk storage, depending on your information storage needs.



Easy to use.

The System/36 PC is easy to learn and to use. If you need assistance, it has over 2,800 "help" screens that take you step-by-step through any rough spots. You can merge data you've generated on your PC with information that's on your System/36 PC. And you can share information that is stored in the System/36 PC with other attached IBM Personal Computers or System/36 terminals.

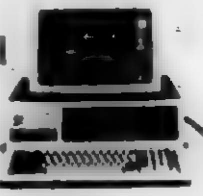
Compatibility is high so that you can keep on using many of the PC peripherals and programs you may already own.

Easy growth.

What happens when your small office becomes bigger?

That's what the System/36 Family is all about. No matter what size your business, there's a member of the System/36 Family that can help you do whatever you do, better.

As your needs become greater, there's the mid-sized 5362 processor that offers greater performance and can handle up to 22 personal computers or System/36 terminals.



Then there's the original System/36—the 5360 processor—the largest member of the System/36 Family, which can handle up to 36 personal computers or System/36 terminals.

Any one of these processors can function as the central processor in your office. Each can communicate with PCs or larger systems, giving communication and connectivity new meaning by allowing departments to share data.

So if your dreams are big but your office is small, the new System/36 PC is the perfect step for you to take. You not only get the best of both worlds, you also get IBM product reliability. And authorized IBM on-site service is available anywhere in the U.S.A.

For a free brochure on the IBM System/36 PC or for information on product availability from participating IBM Product Centers, Authorized PC Dealers or Value Added Dealers, call 1 800 IBM-2468, ext. 90, LL. Or call your IBM marketing representative.

IBM

MICROCOMPUTERS

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The cost for Loanshark is $100. Additional uses, updates, revisions and additions to the program are available for a handling fee of $25.

Multi Mini Programs, P.O. Box 6067, Linglestown, Pa. 17112.

■ **Computer Systems Research, Inc. has announced a computer-aided instruction system designed to allow the development, presentation and administration of self-study courses on the IBM Personal Computer, Personal Computer XT and AT.**

CSR Trainer 4000 is composed of an authoring system used to develop courses, an administrative system to track and report student progress and a presentation system that presents the courses to the student. The package has a sound-editor and a graphics editor, and it enables interactive videodisk and videotape support, according to the vendor.

Screen colors can be defined, and text can be displayed in 40- or 80-char. mode. Data on up to 50 students registered for as many as 15 courses each can be stored and reported.

The system requires a minimum of 256K bytes of memory. Courses can be uploaded to and downloaded from IBM mainframe computers that use IBM's Interactive Instructional Authoring System and Interactive Instructional Presentation Systems.

The CSR Trainer 4000 is priced at $1,820.

Computer Systems Research, 40 Darling Drive, Avon, Conn. 06001.

■ **Master Class Corp. has announced a runtime version of its AT&T Unix-based authoring system, Cast, for users of Microsoft Corp.'s MS-DOS.**

Cast is a software tool said to enable the development of interactive computer-based training. The MS-DOS release enables courseware developed under the Unix version to be transferred without modification to any MS-DOS environment having a minimum of 128K bytes of internal memory.

The cost for Cast's MS-DOS runtime version is $100.

Master Class, 1721 Black River Blvd., Rome, N.Y. 13440.

■ **Reference Software, Inc. has announced that its Reference Set software package is now available for use with Microsoft Corp.'s Word software package for IBM Personal Computers and compatibles.**

Reference Set reportedly provides writers with access to Random House, Inc.'s *Random House Dictionary* and *Random House Thesaurus*, allowing the user to check spelling, find synonyms and change text without having to exit or save files.

Reference Set for use with Microsoft Word runs on the IBM Personal Computer, Personal Computer XT and AT and requires PC-DOS or MS-DOS Version 2 or later and two floppy disk drives or a hard disk drive.

Reference Set is available for $89.95.

The dictionary or thesaurus can be purchased separately for $69.95.

Reference Software, 2963 Boulevard Circle, Walnut Creek, Calif. 94595.

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The Chubb Institute has been providing quality DP training for 15 years. Our training is skills oriented and learning is reinforced by in-class drills so students are immediately productive at the end of each course.

Registration Code	Course	Dates	
JCWS	Job Control Language	Nov 4-6	NJ
		Dec 2-4	NYC
UCWS	Utilities/IDCAMS*	Nov 7-8	NJ
DCWS	MVS Dump Debugging	Nov 11-13	NJ
ACWS	ANS COBOL*	Dec 2-13	NJ
CCWS	CICS (Command Level)*	Nov 6-21	Evns.
		Dec 16-20	NJ

*Hands-On

In addition to these courses, our applications training curriculum includes Assembler Language, VSAM in COBOL, and TSO/ISPF.

Our PC curriculum provides separate training for DP professionals and the general business audience.

Discounts provided for multiple enrollments.

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■ **Knight-Ridder Software, a division of Knight-Ridder Newspapers, Inc., has announced Hewlett-Packard Co. HP 2648 and 2623 graphics terminal emulation software for the IBM Personal Computer, Personal Computer XT, AT and compatible processors.**

The package, known as Picture Link, reportedly supports HP 2648 graphics modes including zoom and rubber band line. In addition, users reportedly can configure personal computers to include a graphics printer.

A minimum hardware configuration consists of a Hercules, Inc. monochrome graphics board and 256K bytes of random-access memory (RAM). Communications require either an asynchronous communications adapter and cable to the host or an internal modem and phone line. For color support, the Sigma Information Systems, Inc. Color 400 board, Princeton Software Co. Graphics SR12 monitor and 512K bytes of RAM are needed, the vendor said.

Picture Link costs $400.

Knight-Ridder Software, 25 Hudson St., New York, N.Y. 10013.

■ **Prentice-Hall, Inc. is offering a full implementation of the mainframe high-level programming language, Snobol4, for IBM Personal Computer and MS-DOS-compatible micros.**

Called Snobol4+, the compiler is said to operate on all Intel Corp. 8086-, 8088-, 80186- and 80286-based computers with a minimum of 128K bytes of random-access memory. Written in assembly language, Snobol4+ compiles source programs at a rate of 900 to 1,500 line/min.

The compiler also supports a hybrid memory model that reportedly provides up to 320K bytes of user program and data memory.

Snobol4+ costs $95.

Prentice-Hall, Business and Professional Division, Rt. 9W, Englewood Cliffs, N.J. 07632.

■ **Woolf Software Systems, Inc. has released Version 4 of Move-It, a communications package for microcomputer users.**

Version 4 adds automatic file compression, keyboard macros, scripting files, multiple Xmodem protocol support, in-filter and out-filter commands and the ability to send and receive files automatically.

The system is said to automate the communications session, including setting start time, log-in sequence and exception processing.

Priced at $150, Move-It Version 4 runs on most micros running PC-DOS, Concurrent DOS, Digital Research, Inc.'s CP/M 86 and Microsoft Corp.'s MS-DOS.

Woolf Software Systems, 6754 Eton Ave., Canoga Park, Calif. 91303.

■ **Intermedia, Inc. has introduced a software security program that requires users to enter a correct identification code and special password before gaining access to a personal computer.**

Called PC-Lock, the program operates on any IBM-compatible Microsoft Corp. MS-DOS system running Version 3.1 or lower and costs $19.95.

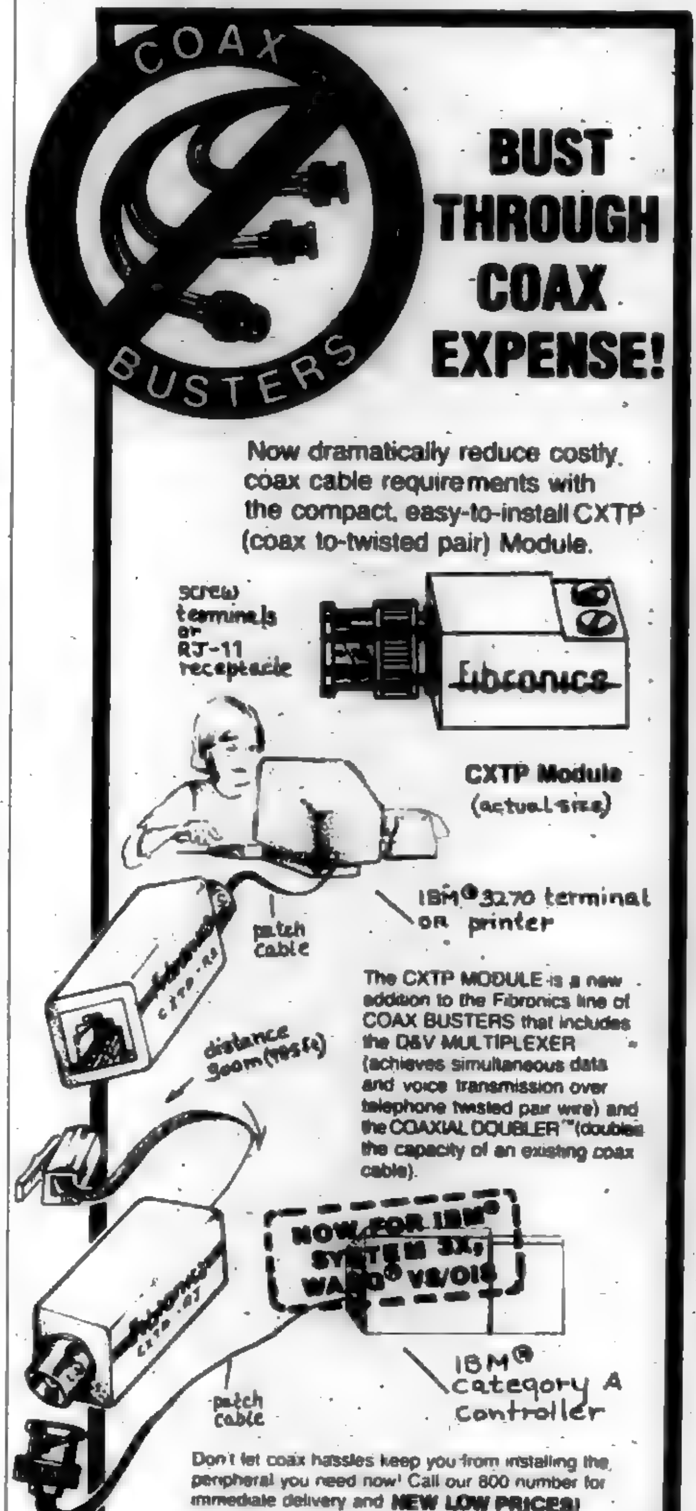
Intermedia, 1077 Celestial St., Cincinnati, Ohio 45202.

■ **Union National Bank/Noosphere Software Co. is offering Inventory, a micro program said to help purchasing agents keep track of expendable items in supplies inventories.**

Inventory maintains the quantity-on-hand and first-in, first-out value of each inventory item. Graphs of monthly use can be viewed to pinpoint slower moving items and adjust reorder points, a spokesman said.

The program provides three data bases: inventory, past transactions and vendor. Other features include on-order, reorder and user-defined fields; five reports that can be sorted on any of

Continued on page 59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MICROCOMPUTERS

Continued from page 58

10 fields; and an audit trail made up of vouchers printed for every transaction.

Priced at $495, Inventory runs on the IBM Personal Computer and Personal Computer XT and AT and compatible processors with 128K bytes of random-access memory and DOS 2 or higher.

Union National Bank/Noosphere Software, P.O. Box 1541, Little Rock, Ark. 72203.

■ **The MacNeal-Schwendler Corp. has unwrapped MSC/Mate, a program that reportedly allows IBM Personal Computer XT and AT users to solve matrix-oriented mathematical problems.**

Matrices can be created and modified with a full screen, spreadsheet-like matrix editor. A programming language with a program editor lets users develop algorithms so problems can be set up once and solved for many sets of data, according to the vendor.

Menu-driven MSC/Mate contains a library of mathematical functions and a library of linear algebra routines for solving linear systems, extraction of eigenvalues and eigenvectors and calculating determinants and inverses of matrices.

The program handles up to 100 defined matrices, 100 scalar variables, matrices of up to 200 rows by 200 columns and program command files containing up to 735 lines.

Priced at $495, MSC/Mate requires Microsoft Corp.'s MS-DOS 2.1 or higher, 512K bytes of random-access memory, a color graphics card, one hard disk and one floppy disk drive and an Intel Corp. 8087 or 80287 math coprocessor.

MacNeal-Schwendler, 815 Colorado Blvd., Los Angeles, Calif. 90041.

■ **Intex Solutions, Inc. has enhanced X-Y-Z, a package that consolidates and compares multiple data sheets, making it compatible with all versions of Lotus Development Corp.'s Symphony and 1-2-3.**

X-Y-Z Version 2 can consolidate or compare files from Versions 1A and 2 of 1-2-3 and Versions 1 and 1.1 of Symphony. The software also can consolidate any combination of 1-2-3 and Symphony files, even if they are of different formats, the vendor claimed.

Upgrading products shipped prior to Sept. 16 costs $60. Otherwise, Version 2 is priced at $145 for the 12-worksheet version and $395 for the 255-worksheet version.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

■ **Universal Intergraphix Corp. has released Version 3.4 of 3-D Graphixx, a three-dimensional graphics package for microcomputers running IBM's PC-DOS 3 operating system.**

Version 3.4 enhancements include an on-line Help facility; step and repeat with an automatic-execute mode; ability to learn, step and repeat a process; parabolic cubic splines; bisectors and autobisector connection; snap to point or line; automatic X-, Y- or Z-axis distortion; and 32 windows for viewing a drawing.

Other features are entity clip, flat or curved surfacing, ability to interface Ascii word processing text to Graphixx output, angled dimensioning and animation of dynamic layers with static layers.

The program requires 640K bytes of random-access memory, a clock calendar, a 10M-byte hard disk, a math coprocessor, two serial or one parallel communications port, a Microsoft Corp. bus-compatible mouse, a graphics adapter and a color or dual-mode monochrome monitor.

Version 3.4 of 3-D Graphixx $2,995 for PC-DOS 2 and $3,995 for PC-DOS 3.

Universal Intergraphix, Suite 108, 2990 E. G St., Ontario, Calif. 91764.

■ **Software West, Inc. has unwrapped an upgraded version of its RPG-II compiler that runs on the IBM Personal Computer line.**

The enhanced compiler is said to provide RPG language implementation based on IBM's System/34 RPG-II; sequential, direct and Isam file processing; ability to link to user-coded assembly language routines; and a disk sort/merge utility.

Priced at $1,500, the compiler runs on a minimum of 128K bytes of memory under IBM's PC-DOS 2 or higher.

Software West, P.O. Box 2276, 637 S. Wrightwood St., Orange, Calif. 92669.

■ **Electrohome Ltd. has developed software that adds videotex capability to Apple Computer, Inc. Macintosh computers.**

Called MACNAPLPS, the package allows the Macintosh to function as a videotex decoder without loss of picture information, even though it operates in two colors and MACNAPLPS works with a color format, a spokesman claimed.

Providing 512- by 322-pixel resolution, MACNAPLPS preserves color information by using dither patterns. It allows users to store and retrieve downloaded slides locally in the Macintosh and modify these slides locally using Macwrite, Macpaint and other Macintosh application programs.

Other features include a local charting function for creating business presentation slides, the ability to use Macintosh fonts for slides pull-down menus for setting up communications and selecting and operating on screen keypads using the mouse.

MACNAPLPS comes on a 3½-in. diskette and sells for $99.

Electrohome, 809 Wellington St. N., Kitchener, Ont., Canada N2G 4J6.

Continued on page 62

...if Phil in Accounting needs [illegible] and so does Ted. [illegible]
information on page 63, item 178.

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NEW YORK GENEVA SYDNEY

COMPUTER FAT.

HOW TO AVOID IT, FROM THE LEADER
IN ON-LINE TRANSACTION PROCESSING.

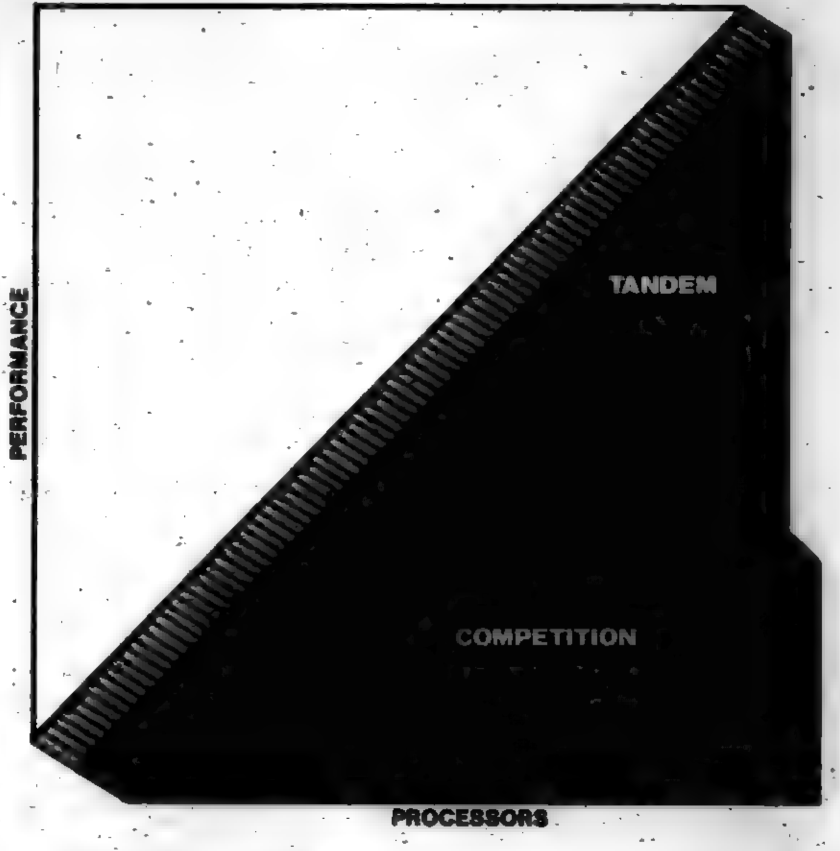
WHAT COMPUTER FAT IS.

Computer fat is created when you buy more computer than you need. With conventional computer architecture, you have no other choice. You buy the closest fit available and "grow into it."

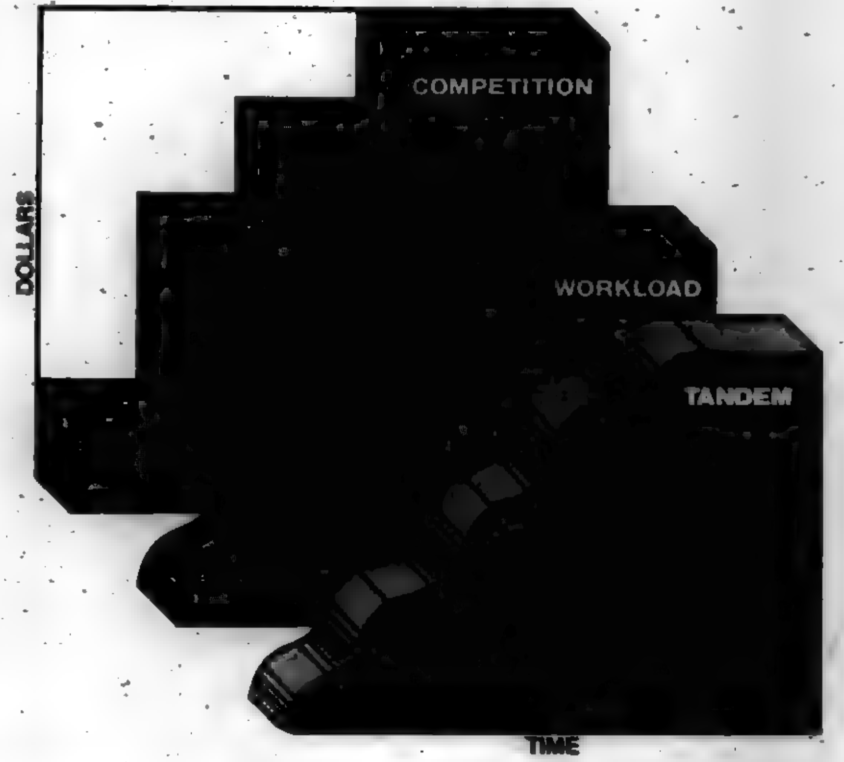
So there is always waste and inefficiency. And you pay dearly for it.

WHAT IT COSTS.

The performance cost. With conventional computer architecture, doubling your processors does not double your performance. With Tandem, each incremental increase in processing power provides matching performance.



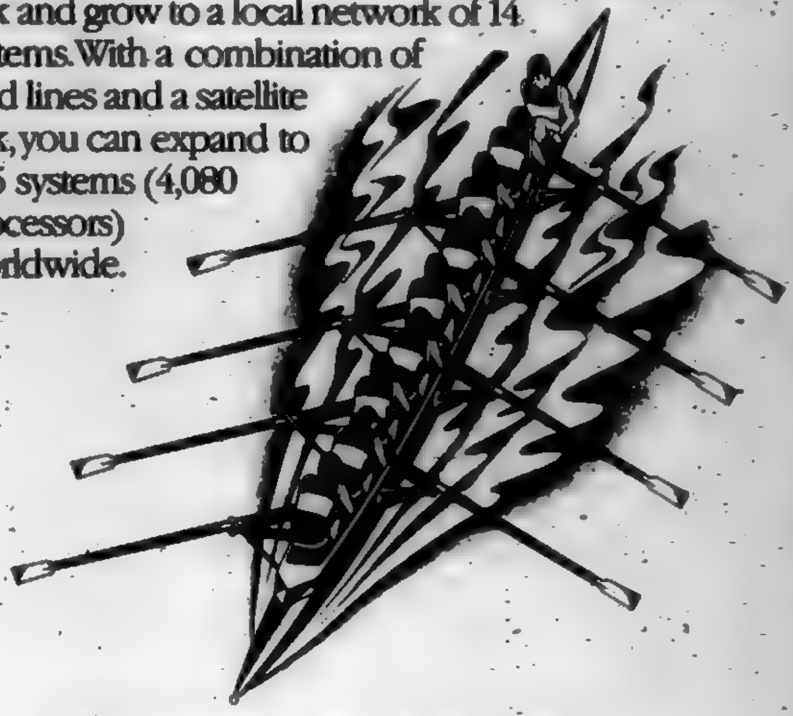
The dollar cost. With conventional computer architecture, growth is convulsive. You must continually over-invest to assure sufficient processing power. With Tandem, growth matches need. You never invest more than you have to.



TANDEM'S NON-FAT ARCHITECTURE.

Tandem Computers has developed the ultimate system for on-line transaction processing. It is the fault-tolerant system that can grow as your needs grow, expanding at any increment you choose.

You can start with two processors and grow to 16 processors in a system. You can put in a fiber-optic link and grow to a local network of 14 systems. With a combination of land lines and a satellite link, you can expand to 255 systems (4,080 processors) worldwide.



In a Tandem system, there are no idle backup components: They all share the workload.

With Tandem, your software expands, too. All systems work like one system, and you'll never have to rewrite a line of applications code.

The Tandem NonStop™ system is also enhanced by a high-performance, relational data base that can be geographically distributed to wherever it's needed. And no single component failure can shut you down.

LET'S CHEW THE FAT.

Tandem systems are already at work for FORTUNE 500 companies in banking, telecommunications, manufacturing, transportation, retailing and energy, as well as several branches of the U.S. Government.

To find out what we can do for you, call (800) 482-6336. Or write for our annual report. Corporate Headquarters: 19191 Vallco Parkway, Dept. 762, Cupertino, California 95014.

TANDEMCOMPUTERS

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Software

■ Westford Systems, Inc. has enhanced Micro-Track, a computer usage recording and reporting package for the IBM Personal Computer line.

Version 2 enhancements feature the ability to include summary dollar totals for computer usage billing, the ability to report by account code and optional automatic account code entry during logon, according to the vendor.

Micro-Track runs under PC-DOS and requires 96K bytes of memory. A single system license costs $59.95. Site licenses are available at $295 for 10 systems, $995 for 100 systems and $1,695 for 1,000 systems.

Westford Systems, P.O. Box 26, Still River, Mass. 01467.

■ Decision Graphics, Inc. has offered a program that lets users create, edit, save, retrieve and plot text slides in multiple fonts.

The software, DGI Type Shop, is compatible with these plotters: Hewlett-Packard Co. HP 7220A, HP 7475A, HP 7550A and HP-GL; Enter Computer, Inc. Six Shooter; Gould, Inc.; IBM 7371 and 7372; Nicolet Instrument Corp.; and Roland DG DXY-880.

DGI Type Shop offers the ability to plot across the width or length of a page; set full or manual page size, automatic or manual letter size and starting location; plot on paper or transparencies; and set justification.

Priced at $175, DGI Type Shop comes with six type styles. Additional fonts are available at $25 each.

Decision Graphics, P.O. Box 2775, Littleton, Colo. 80161.

■ Prophecy Development Corp. has unwrapped Profit Tool, software that runs on a number of microcomputers and automates the telemarketing process.

Profit Tool is said to produce sales presentations, research surveys and telemarketing dialogues based on user inputs prompted by data entry forms. The software also manages client phone files and comes with an automatic dialer that can dial numbers from the client data base.

In addition, Profit Tool compiles and profiles telemarketing data collected by the user. Tabulate, list and compare functions help create target data bases for mailings and follow-up phone calls, according to a spokesman.

The package runs on the IBM Personal Computer and compatibles, Wang Laboratories, Inc.'s Professional, Data General Corp.'s Data General/One, and Apple Computer, Inc.'s Macintosh.

Profit Tool costs $1,995 for a single-user license.

Prophecy Development, 308 Boylston St., Boston, Mass. 02116.

■ Software for accessing real-time security market data with a personal computer and linking it to a host is available from Monchik-Weber.

Called PC Passthru, the package allows an IBM Personal Computer to receive information from the vendor's real-time market broadcast system, Ticker III, which contains securities data from international exchanges. Users can format data on any combination of stocks, options, bonds or futures, the vendor claimed.

A data base resident in personal computer memory is said to allow a host mainframe to rebuild its pricing data base in the event of data loss.

With PC Passthru, the vendor supplies an IBM Personal Computer, software and its Pricelink coprocessor that reads Ticker III data via satellite or leased lines.

For IBM mainframes, a Digital Communications Associates, Inc. Irma board in the personal computer emulates an IBM 3278 terminal. PC Passthru uses an asynchronous interface for other host computers.

PC Passthru licenses for $15,000 plus hardware and communications charges and monthly fees.

Monchik-Weber, 11 Broadway, New York, N.Y. 10004.

■ A word processing package that runs on the IBM Personal Computer line and requires no codes or complex keystroke sequences is available from Lexitronics, Inc.

The package, known as Lexitype, presents text on the screen as it will appear on hard copy, duplicating margins, spacing, centering and underscoring.

Most functions are invoked by pressing one labeled key, like Space Bar, Backspace, Return and Underscore, which work as they do on a typewriter, according to the vendor.

Lexitype, which is fully compatible with the Lexitron/Raytheon Data Systems Co. dedicated word processor, includes a spelling checker and corrector and an import/export function said to permit Lexitype to exchange information with other software packages.

An optional utility package allows documents to be transferred from Lexitron to Lexitype without rekeying or cleanup, the vendor claimed.

Minimum requirements are at least 256K bytes of memory and one diskette drive. Lexitype retails for $595. A demo package is available for $5.

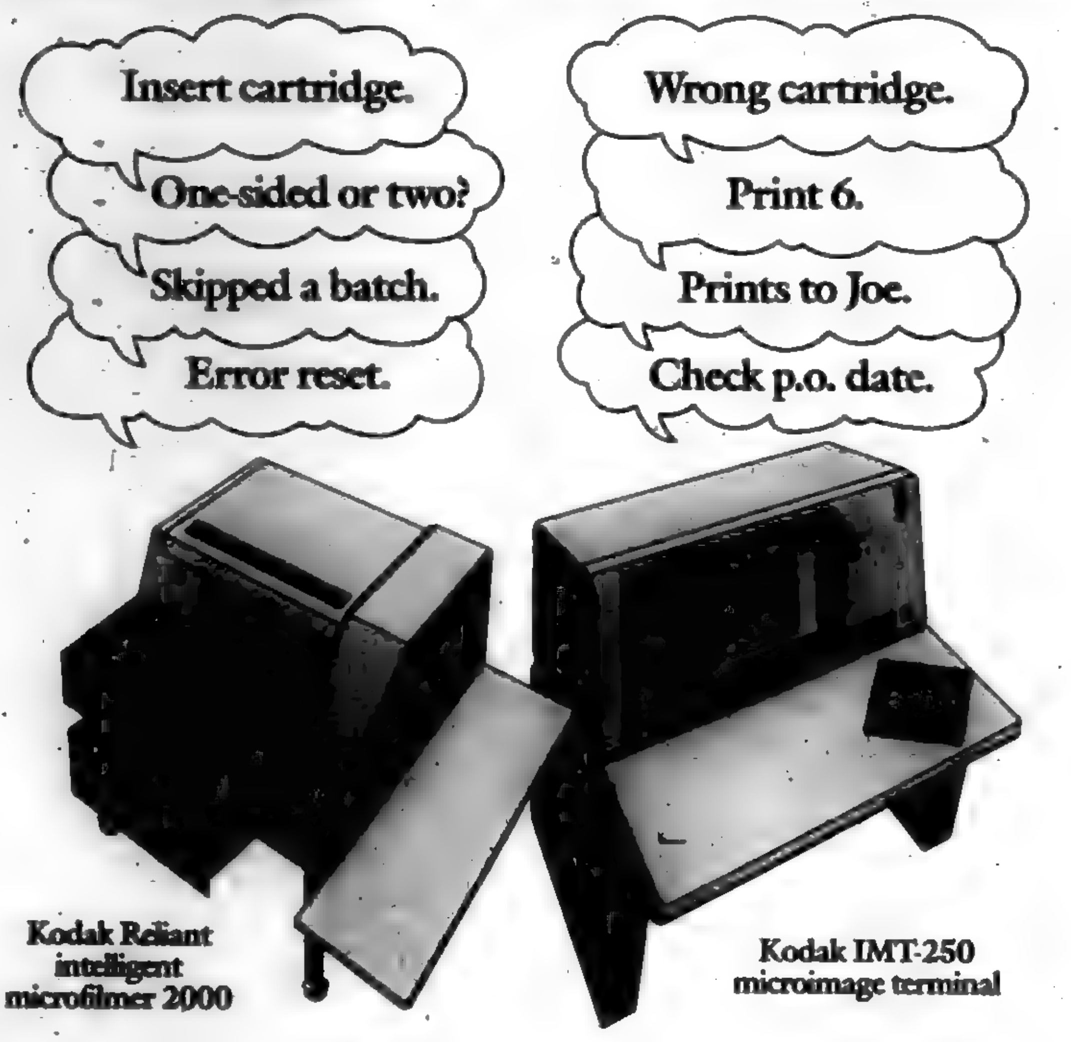
Lexitronics, Suite 14, 101 E. Holly Ave., Sterling, Va. 22170.

■ Reference Technology, Inc. has announced Clasix STA/F Text, an optical information delivery system that reportedly gives mainframe-level text search capability to IBM Personal Computers and compatible processors running IBM's PC-DOS.

The software supplies personal computers with the ability to retrieve textual information, such as large text data bases, stored on read-only optical disks in any format and

Continued on page 63

Kodak presents intelligent conversation.



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From page 53

CD-ROMs eye big payoffs

it very easy to buy from the 65,000 books Ingram offers.

"Libraries are really at the forefront of commercial applications of CD-ROMs on any wide scale," according to Larry Price, Ingram's marketing manager for libraries. "You can get information that is very difficult to get to otherwise." Currently, many tasks require librarians to either wade through paper, which is primitive; or go on-line, which is expensive, he said.

While suppliers of on-line data bases such as Mead Data Central clearly are examining potential roles for CD-ROMs, particularly for nonvolatile data, the industry is busily grappling with pricing questions.

CD-ROMs are likely to find a role more quickly in private than in public data base distribution, said Edward Schmid, Digital Equipment Corp.'s market development manager for CD products.

In most private applications, "the customers are the owners of the information, and they can manage a project for implementing the technology," he said. Public data base distribution "takes the collective efforts of many groups."

> ”
>
> *As a rule of thumb, optical disks make economic sense for distributing information to groups exceeding 50 people.*

DEC, the first major computer vendor to offer a CD-ROM subsystem, began selling the device for use with its Microvax II in July. Schmid predicted that five to 10 turnkey applications will surface among customers by year end, including sending out catalog information, documenting equipment for insurance purposes (with textual and pictorial descriptions) and offering technical data bases.

DEC's own field service group is putting information about 80 products on CD-ROM disks, and the supplier also is examining other potential applications such as storing sales information. As a rule of thumb, Schmid suggested, optical disks currently make economic sense for distributing information to groups exceeding 50 people.

"There's tremendous potential for in-house production as an alternative to microfiche for a report or a data base distributed internally," commented Wil Zachmann of International Data Corp., a Framingham, Mass.-based market research firm. He noted that CD-ROMs may provide a good route for micro-to-mainframe data access.

While high-volume magnetic disk drives and write-once optical storage systems also will be available next year, "in a lot of applications you don't want to be able to destroy the data," remarked Anne Armstrong, managing editor of "CD Data Report" in McLean, Va. Among these applications she mentioned insurance records, banking information and stock part lists.

CD-ROMs also may carve out a niche in software delivery. "Theoretically you don't need backup copies" because the disks are so robust, Armstrong noted. "It's possible that CD-ROM could solve some of the piracy problems," she added, although like others she is doubtful that any scheme is proof against hackers.

One challenge the industry must overcome is figuring ways to handle all that information. The task of defining and retrieving what you want "becomes finding a needle in a haystack," Armstrong stressed.

"With such large files, you'll get a limited use of this technology until software, particularly artificial intelligence software, evolves to deal with a random walk through a body of knowledge," suggested Alan Hald, chairman of Microage Computer Stores, Inc. "People need a novice system — a system that will help them isolate the question," Hald said. Once past that barrier, he forecast "tremendous applications, particularly in the area of training."

Continued from page 62

of any size, the vendor claimed.

Menu-driven STA/F Text is said to maintain index information and the location of each word in a document so users can search for text based only on words used in the target document.

The vendor also has added a service to its Clasix Data Services that produces an index to words in a STA/F Key text data base and allows information to be converted into optical disk format for master disk production and replication.

STA/F Text is priced at $395. The Clasix Data Service to produce STA/F Text indexes costs $1,500 plus $35 per megabyte of memory and an initial index and screen layout definition fee of $1,500.

Reference Technology, 1832 N. 55th St., Boulder, Colo. 80301.

■ **Advanced Logic Systems, Inc. has announced a spelling checker for the Apple Computer, Inc. Appleworks word processor.**

Called Spellworks, the spelling checker contains approximately 90,000 words on one diskette and will check 10 words per second on the Appleworks word processing program for Apple IIe and IIc micros. Spellworks reportedly will allow Appleworks' data base to merge with the word processor.

Spellworks sells for $49.95.

Advanced Logic Systems, 1195 Arques Ave., Sunnyvale, Calif. 94086.

■ **United Software Security, Inc. has unveiled a hard-disk backup system for the IBM Personal Computer, Personal Computer XT, AT and compatible computers plus most IBM-compatible local-area networks running PC-DOS 2 or higher.**

The system, known as Taketwo, provides users with screen displays for setting up parameters for backup. This configuration information includes which files and directories to back up, how often backups should occur and how many days of old file versions to retain.

Continued on page 66

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MICROCOMPUTERS

Continued from page 63

Taketwo automatically formats backup floppy disks, indicates which and how many backup floppies to insert and shows how long the backup will take along with backup status information while it is under way, the vendor explained.

Restore functions operate for single files, single directories or entire hard disks.

Taketwo costs $16,126 for a perpetual corporate license for an unlimited number of copies of the software. Other licenses are available.

United Software Security, Suite 100, 6867 Elm St., McLean, Va. 22101.

■ **Omtool Corp. has enhanced its Dibol-compatible Softbol compiler for microcomputers running under Digital Research, Inc.'s CP/M 86, Microsoft Corp.'s MS-DOS and Xenix, AT&T's Unix or Unix look-alike operating systems.**

Version 2.1 has also increased runtime processing speed by between 40% and 200%, depending on the operation.

In addition, the sort utility in Version 2.1 can sort 5,000 records in 1 minute, 37 seconds. Previously, this task took 36 minutes, 51 seconds, a spokesman claimed.

Softbol is said to permit Dibol programs written for Digital Equipment Corp. minicomputers to run on microcomputers without changing the applications.

A development system costs $625. Prices for runtime systems range from $240 to $750.

Omtool, P.O. Box 477, Tewksbury, Mass. 01876.

From page 57

Consultant's micros blur lines between jobs

slips going back and forth."

However, a professional who types "is not always a help to the secretaries," according to Linda Austin, secretarial coordinator for one ADL group. One consultant had to be told to capitalize the first word of every sentence and put two spaces after each period.

"It was more work for me to go in and fix all that than to sit and retype 20 pages," she noted.

Another staff member "came in one night and went through all his secretary's diskettes and reorganized everything," Austin said. "Then the next day he expected her to get out a final report, and she didn't know where anything was." Professionals "have to live by the same set of rules we've been living by," she added.

Some successful applications bring new difficulties in their wake, pointed out consultant Scott Stricoff. In one case, he said, he can talk with a client on the telephone and make changes in a draft document himself rather than mark up a piece of paper and hand it to a secretary. "I can now directly effect the final product and eliminate an intermediate step."

Unfortunately, "the efficiency of my secretary in keeping track of all this stuff — keeping files straight, keeping archival copies — is gone," Stricoff said. "And I'm terrible at that. That's the biggest problem we have."

Using personal computers for financial analysis, the creation of presentation graphics or other tasks also may complicate life for support staff.

Some professionals have "unbelievable expectations" for their secretaries, according to Ann Laynor, an information systems consultant. "If they are doing [Lotus Development Corp.] spreadsheets at home and she's come out of a three-day word processing training class, she is supposed to be able to print out that Lotus spreadsheet. That, to me, is like playing Beethoven's Ninth after three hours on a piano."

"When a professional who knows 1-2-3 expects his secretary to learn it overnight by doing nothing but having it sit on her desk, we get into all sorts of problems," Stricoff agreed.

The flip side

The flip side of this issue is that support staff may be trained in 1-2-3 or other packages, "and then they may come back and never have the time to do it because the proposals and reports come first," Austin said.

With many consultants in his group equipped with personal computers, "the secretarial workload in terms of traditional tasks has really declined," Stricoff said. "Now a secretary with an assignment of three professionals is not nearly as pressed." Over the next few years, he said, the company either will end up with fewer secretaries or will redefine their jobs.

Micros also have helped to boost the role of research assistants, who "are spending most of their time spreadsheeting and preparing presentation graphics," Hagedorn said. "These four-year graduates can do many of the analytic things that you couldn't do unless you had an MBA or equivalent before because you had to understand more of the math and other methodologies. Now all you've got to know is a bunch of dumb computer commands."

Taking a broader view, Hagedorn predicted that micros will help cut down on layers of management in U.S. offices and factories.

From page 53

Orchid board announced

tional memory and expanded memory. Conquest also features disk caching, a random-access memory (RAM) disk utility for expanded memory and print spooling software.

Conquest is available installed without RAM and 2M-byte capacity for a cost of $395.

There is also a nine-chip set of 256K-byte RAM available for a cost of $95.

Micros:
The big picture.

In November's
Computerworld Focus,
we put micros
under the scope.

Since the last year has been so wild and unpredictable, we're not only going to take a look at microcomputer hardware in our November 20th issue, but we're also going to broaden our view to try to get a handle on the micro market in general.

We'll have a special section on hardware—what's available and what's expected to come. And the changing relationship of micros and the 3270 terminal.

We'll also dissect the entire industry—one aspect at a time. Among user companies, we'll tell you who's buying and who's *not* buying—and why. And look at the reasons in great depth.

Then we'll dig deep into the industry shakeout. Discover who's got the edge and who doesn't. Who's expected to survive. And how that will mold the future.

We'll see how the slowdown is affecting the way user organizations are planning. Whether they're simply making do with what they've got until the shakeout is over. Or if they've actually satisfied their needs.

But that's not all. We'll also take a look at how communications and networking are coming along. And the developing trends in printer technology including the laser printers. And what's happening in the portables and lap size micros.

And of course, we'll deliver all this information to the people who use it most. Our 129,000 paid *Computerworld* subscribers. Thousands of passalong readers. Plus attendees at Comdex in the fall in Las Vegas.

So if micros are a big part of your business picture, our **November 20th** issue of *Computerworld Focus* should be a big part of your advertising picture. But hurry, the closing is **October 11th**.

To reserve space, contact Ed Marecki, Vice President/Sales, *Computerworld Focus*, 375 Cochituate Rd., Framingham, MA 01701 (617) 879-0700. Or call your local sales office listed below

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COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

Ad campaigns miss the mark

OK. We can giggle at AT&T and the divested Bell operating companies for advertising high-speed digital communications services and operating systems in the popular media. The apparent marketing blunder is funny and forgivable, the poor, confused monoliths.

But it's catching.

Normally rational companies are now hawking things on television like optimized IBM Systems Network Architecture (SNA) networking and memory disks to hapless millions who do not have the foggiest idea what these things are and why they may be important — and probably never will.

Pity the uninitiated.

Centrex advertisements on television. What's that? New England Telephone Co. is advertising it in the evening. Should I trade in my Princess phone and upgrade? Reliability is a big feature. I can use my phone even if the power fails, the company claimed. Actually, I thought I could do that with my current black tabletop rotary phone.

And maybe when I'm having Centrex installed I'll inquire about the 56K bit/sec. data service they're advertising. It sounds advanced, even though I'm not sure I need it. What's a bit, and how can you get so many into a single second? After all, a second is a measure of time, not a measuring cup. They say it's digital. Does that mean it's displayed numerically like on my watch? I'm wondering, too, if I'm "getting

Continued on page 77

Installed systems make 'box' converters viable

By Bob Albright
Special to CW‡

Rumors of the death of the stand-alone protocol converter market have been greatly exaggerated. While demand for the devices will decline as converters are built into new computers, box-type converters will still fill a need for some time to come.

Stand-alone converters, for example, are needed to serve existing equipment. Millions of IBM 3270-type terminals exist that still require protocol converters to switch from synchronous to asynchronous data transmission. Additionally, personal computer users need converters to switch into different protocol environments.

While terminal emulation boards encroach on the demand for stand-alone converters, the box-type converters offer greater flexibility. Terminal emulation boards meet the specific needs of personal computer users who require something more than a way to convert asynchronous Ascii to a synchronous protocol.

But board manufacturers cannot build a board for every system; market needs are too wide to make it profitable. In addition, not all existing personal computers will accept emulation boards. Stand-alone converters, on the other hand, can be connected to the back of a micro and then later used with another type of device.

Continued on page 77

Albright is a product manager with Black Box Corp., a mail order communications equipment supplier in Pittsburgh.

Sequel switch eases extension

Sequel Data Communications, Inc. of Cary, N.C., recently unveiled a data switch that can be split in half, separated by up to 1½ miles and interconnected with two twisted-pair wires.

The Sequel switch supports from six to 192 asynchronous ports, each operating at a maximum of 19.2K bit/sec. It costs less than $100 per line at 30 ports, the company reported.

By splitting the switch in half, users in nearby buildings can be supported without requiring line drivers, modems or other devices normally needed to extend the reach of an RS-232 link. The switch halves are interconnected with two twisted-pair wires which, through time division multiplexing, support 96 concurrent circuit con-

Continued on page 76

NCR 3690s get link options

NCR Comten, Inc. of St. Paul, Minn., has broadened the link options available with its 3690 communications processor family to include two high-speed options.

The High-Speed Link Controller-Modem Interface Module (HLC-MIM) terminates 256K bit/sec. links in the 3690 communications processor. It replaces four Comten Data Link Controllers-Modem Interface Modules, each of which supported a 64K bit/sec. line. The HLC-MIM concurrently supports asynchronous, bisynchronous, IBM's Synchronous Data Link Control and Binary Synchronous Communications protocols, as well as X.25 High-Level Data Link Control.

NCR Comten said the HLC-MIM will be available in the first quarter of 1986 with

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- **Racal-Milgo** has announced a series of diagnostic data service units, a fiber-optic multiplexer, encryption devices and enhancements to its network management systems/68
- **New from Wang Information Services** is a text and data messaging service for customers with multiple locations or traveling employees/69
- **Western Union** has reduced daytime rates for its Optimized Wats service by up to 10%/72

INSIDE

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Network Services/69
Test Equipment/72
Auxiliary Equipment/76

Infotron Systems offers T1 net monitoring program

Infotron Systems Corp. has released a program that runs on the IBM Personal Computer AT and provides network monitoring and tracking for T1 lines.

The Cherry Hill, N.J., company's ANM1500 package can be used with up to eight T1 networks with 16 Infostream 1500 time-division multiplexers. The software provides dynamic monitoring of the networks, automatic alarm notification, real-time graphics, histograms that illustrate events and network utilization and trouble tickets.

ANM1500 lists types, numbers, physical names and logical names of attached devices; priority assignments of each channel; end-to-end channel assignments and nodes; and slot and channel numbers. The software can make configuration changes for any channel without interrupting system operation.

ANM1500's error reports consist of out-of-synchronization reports, number of frames lost and configuration of a node when an error occurred and total duration of an outage. Whenever an outage is longer than a user-set threshold, a trouble ticket is generated and a problem escalation feature goes into effect.

System diagnostic features include link loopback, channel loopback, read/write channel interface control status and read/write voice channel signaling bit status.

Event reports consist of logic status reports, configuration changes, attempted breach of security, reset network control, master clock source changes and time slot contentions.

The price of the network management package ranges from $5,000 to $7,000.

Comdesign unveils switch, modems and AS-1000 mux

Comdesign, Inc. of Goleta, Calif., has added a data switch, two modems and a multiplexer to its product line.

The CX2000 private branch exchange is a virtual circuit switch used to connect asynchronous devices to CPUs. The product fits in a 19-in. rack and holds 17-line cards, each with a maximum of 24 channels, for a total of 408 lines. The chassis supports two system-control cards or four cards for redundant control logic, circuit maintenance and switching. The CX2000 includes redundant power supply and backplane and a hot-spare backup.

The switch ranges in cost from $100 to $125 per line depending on configuration.

Modems introduced include 4.8K and 9.6K bit/sec. modems designed for point-to-point applications. The CM-4800 and CM-9600 support full-duplex operation over four-wire leased lines and half-duplex operation over two-wire dial-up circuits. The products are compatible with CCITT V.29 and V.27 standards. Eight front-panel displays provide operation and test status. Six push-button switches control the modems' diagnostic features.

The modems each cost $1,395.

The AS-1000 multiplexer is designed for airline companies that support the widely used Programmed Airline Reservation System protocol. Other protocols supported include asynchronous and IBM's Binary Synchronous Communications and Synchronous Data Link Control. Each node can support up to 16 input channels operating at speeds of up to 9.6K bit/sec.

A four-channel unit sells for $4,000.

Racal-Milgo tools announced

Racal-Milgo, Inc. of Sunrise, Fla., has announced a series of diagnostic data service units (DSU), a fiber-optic multiplexer, encryption devices and enhancements to its network management systems.

The DSU Remote Diagnostic 500 and 556 provide central-site and unattended remote-site diagnostics for digital communications facilities. The products support operations at speeds from 2,400 bit/sec. to 56K bit/sec. in point-to-point or polled multidrop networks.

In-band diagnostics include line and digital loopback, end-to-end testing, self-testing and antistreaming capabilities.

The units can be controlled by a terminal, minicomputer or network management system, the vendor said.

DSU Remote Diagnostic 500 is priced at $850, and the DSU Remote Diagnostic 556 is priced at $895.

The Omnimux 3200 is a time division multiplexer for local applications that supports transmission of asynchronous and synchronous data. It can accommodate up to 32 ports at channel rates of up to 64K bit/sec.

Without repeaters, the products operate at distances of up to six miles. An eight-channel model costs $5,390.

Datacryptor 64 uses the Data Encryption Standard algorithm and operates in single-bit cipher feedback mode for protocol-transparent operation. The device can work at speeds up to 64K bit/sec. with synchronous protocols and 19.2K bit/sec. in asynchronous networks.

The encryptor supports RS-232, V.11 and V.35 interfaces and sells for $1,900, according to Racal-Milgo.

VOICE/DATA COMMUNICATIONS

■ **Metapath, Inc. has introduced a 20-port data switch designed for a medium-size network.**

The DDS-20 supports up to 16 serial devices at speeds of up to 9.6K bit/sec. and four parallel devices at speeds of up to 40K bit/sec. DDS units networked with other units by coaxial cable can support up to 1,125 ports.

Prices for the DDS range from $1,500 to $3,300.

Metapath, 222 Lincoln Centre Drive, Foster City, Calif. 94404.

■ **Cohesive Network Corp. has announced that its T1 network nodes are compatible with AT&T Communications's Accunet T1.5 Service and Accunet Reserved 1.5 Service.**

The products were tested in May at AT&T's Bell Laboratories test center in Holmdel, N.J. The tests, which proved that Cohesive's D4 framing technique is compatible with Accunet, also demonstrated that Cohesive's equipment can receive synchronization from AT&T Digital Access and Cross-Connect system.

Cohesive Network, 1680 Dell Ave., Campbell, Calif. 95008.

■ **VMX, Inc. has added a Verbal Bulletin Board to its Voice Message Exchange system.**

The company's Verbal Message Exchange is available as a stand-alone package or can be integrated with a variety of private branch exchanges.

The Verbal Bulletin Board software package enables a company to provide a listing of information that can be accessed by a user with a Touch-Tone telephone. Employment opportunities, seminars, schedules and community events are a few examples of possible applications.

Customized voice prompts guide callers through the process of receiving a message. After receiving the information a caller can leave a message if he desires more information or a follow-up telephone call.

The Verbal Bulletin Board costs $7,000.

VMS, 1241 Columbia Drive, Richardson, Texas 75081.

■ **Southwestern Bell Mobile Systems, Inc. has implemented a cellular phone rental plan for the Dallas-Fort Worth area.**

The Southwestern Bell Mobil Systems Retail Division will rent the phones for $35 to $55 per month, depending on models. Rates include insurance and maintenance fees. If a customer wants to buy the phone, 70% of the previous monthly payment will be applied toward the purchase.

Southwestern Bell Mobile Systems, 17330 Preston Road, Dallas, Texas 75252.

■ **Urix Corp. has introduced an interactive voice response system that will interface with up to 32 incoming telephone lines and allow callers to access selectively more than 65,000 phrases stored in digital form.**

The Urix-100 allows callers to use standard tone-generating telephones to make their selections in response to audio prompting messages. Urix-100 provides up to eight outgoing lines which can be used to transfer incoming calls under program or calling party control, the vendor said.

The system can be programmed to operate as a stand-alone unit or as a voice front-end for a host computer and costs from $15,000 to $50,000.

Urix, 124 Gaither Drive, Mt. Laurel, N.J. 08054.

■ **Adacom Corp. has announced Adalink, a transmission device that provides remote attachment of IBM 3270 Type A coaxial terminals to local or remote controllers over dial-up or leased lines.**

Adalink consists of a CP-100L Controller Adapt-

er and the CP-101L Terminal Adapter. Together the devices create the so-called Adalink. When used in a dial telephone environment, terminals with CP-101Ls can share a CP-100L controller port.

Adalink allows the option of synchronous or asynchronous RS-232 communications at data rates of up to 19.2K bit/sec., according to the vendor. It includes built-in data detection and correction capabilities, password security and manual/auto disconnect functions.

The CP-100L and CP-101L cost $890 and $690 individually or $1,500 for the pair.

Adacom, 505 N. Mur-Len Road, Olathe, Kan. 66062.

■ **Digital Speech Systems, Inc. has announced a price reduction on its Telemessenger series of multiline voice storage and forwarding systems for the IBM Personal Computer XT.**

Other features also have been added to the series, including a hard-copy mailbox utilization report, message broadcast and message-wait indicators.

The list price for a two-line system is now $14,500.

Digital Speech Systems, 1732 N. Greenville Ave., Richardson, Texas 75081.

■ **Network Products, Inc. has announced the addition of two line cards designed to increase the networking capabilities of its Virtual Circuit Exchange system, a data switch.**

The V.35 and the V.11 cards can be used with twisted-pair wire, short-haul modems, microwave links, fiber-optic links, T1 subchannels and digital services. They complement the previously available RS-232 interfaces. Each card is said to support two trunks, and one chassis can hold up to 19 line cards.

The V.35 and the V.11 are priced at $2,500 each.

Network Products, 4020 Stirrup Creek Drive, Research Triangle Park, N.C. 27709.

MULTIPLEXERS/ MODEMS

■ **The RF Systems Division of General Instrument Corp. has introduced two modems for its Broadband Local Area Network family of communications products.**

•The M-1700 is a 1.54M bit/sec. T1 modem for trunking applications that is said to incorporate a polling feature that facilitates remote loopback for diagnostic purposes.

The M-1200 is a broadband data modem for 56K and 64K bit/sec. transmission. Units can be ordered for speciality applications. The unit has separate adjustments for transmit and receive frequencies.

The M-1700 costs $2,995, and the M-1200 costs $1,695.

RF Systems Division, Suite 500, General Instrument, 2350 W. River Park Drive, Tucson, Ariz. 85745.

■ **Lightwave Communications, Inc. has announced a fiber-optic multiplexer that supports eight asynchronous RS-232C channels.**

The FO-232/8 MUX multiplexer is said to transmit and receive at rates up to 19.2K bit/sec. The data channels are accessed at the rear of the unit through 25-pin D subminiature connectors. Front-panel indicators allow for diagnostics and error conditions. The optical link is full- or half-duplex and operates at distances up to 2 kilometers over 50 micron fiber-optic cables.

The FO-232/8 MUX costs $995.

Lightwave Communications, 650 Danbury Road, Ridgefield, Conn., 06877.

■ **Gandalf Data, Inc. has announced several new modems, including the 2,400 bit/sec. Access Series 24S, which costs $650 and is compatible with Hayes Microcomputer Products, Inc. modem commands.**

The asynchronous/synchronous modem offers multiple number recall, automatic redialing, alternate number dialing and automatic logon. The Access Series 24S has fallback rates of 300 bit/sec. and 1,200 bit/sec.

The Access Series 212 modem is full duplex, asynchronous or synchronous and equipped with automatic dialing, logon and answering features. It is compatible with AT&T 212A or 103/113 standards. The Access Series 208 is synchronous only, supporting half-duplex traffic over two wires or full-duplex over four wires at speeds up to 4.8K bit/sec.

The Fastrak 96 and 96FP full-duplex, synchronous modems can transmit at rates of 4.8K, 7.2K and 9.6K bit/sec. They are V.29 compatible and designed for point-to-point applications.The Fastrak 14.4 modem is synchronous and operates point-to-point over unconditioned leased lines. The modem works with Trellis coded modulation and is compatible with 9.6 bit/sec. V.29 modems.

The modems range in price from the $545 Access Series 212 to $3,950 for the high-end Fastrak.

Gandalf Data, 1020 S. Noel, Wheeling, Ill. 60090.

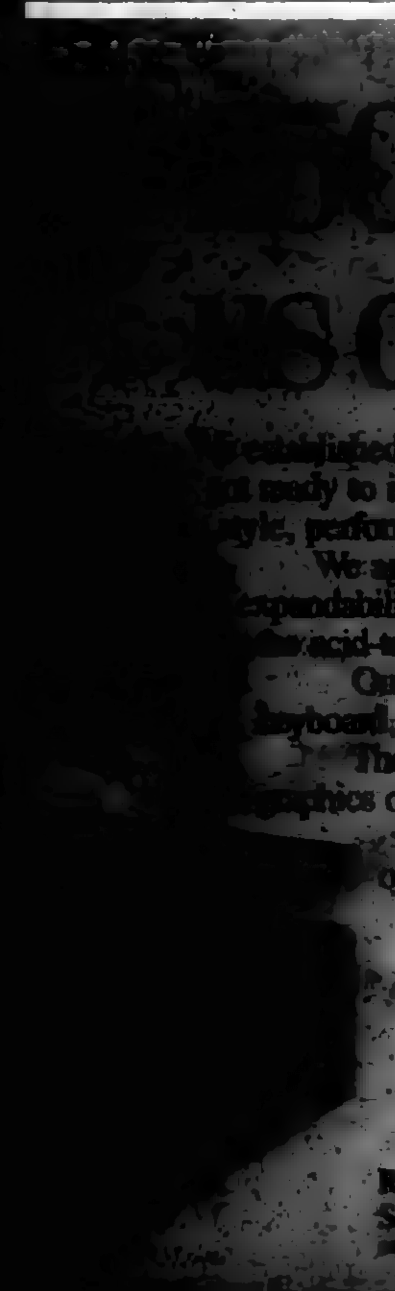
NETWORK SERVICES

■ **Wang Information Services Corp., a division of Wang Laboratories, Inc., has announced its Text and Data Messaging service for customers with multiple locations or with employees who travel.**

Text and Data Messaging features WP 600, a portable terminal, a 16-char./sec. printer and Wang Model 7000 modem, a snap-on AT&T Bell Laboratories 103-compatible communications device that plugs into an RJ-11 telephone jack. The product enables users to access host data bases through asynchronous ports.

The battery-powered WP 600 weighs 6¼ lb. In addition to operating as a terminal, the product can function as a typewriter or word processor. Word processing capabilities include automatic centering, under-

Continued on page 72



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There's also an IBM PC/XT compatible model with a 10-Megabyte Winchester disk. A color graphics option is available on either model.

For more information about how much less all this costs from Wyse, call the regional office nearest you.

WYSE

Regional Sales Offices: Northeast (201) 725-5054; Southeast (305) 862-2221; Midwest (313) 471-1565; Southwest (818) 340-2013; Northwest (408) 559-5911; OEM Inquiries (408) 946-7115.

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Continued from page 69

lining, reformatting and deletion.

The new service is available for $90 a month plus 35 cent/min of measured long-distance communications usage accessed through Wang Information Services Corp.'s toll-free telephone numbers.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

■ **General Electric Information Services Co. (Geisco), has announced Quik-Gram, a paper mail product that allows users of its Quik-Comm electronic mailbox service to communicate with anyone that has a U.S. postal address.**

Quik-Gram messages are transmitted electronically to sites where they are printed on specially designed stationery, folded, inserted into envelopes and prepared for delivery by the U.S. Postal Service.

Options include an address storage function that allows the user to create, store and update a mailing list.

Quik-Gram is priced at $2.25 per message for the first page of up to 40 lines and $1 for each additional page of up to 50 lines.

Geisco, 401 N. Washington St., Rockville, Md. 20850.

■ **Tymnet, Inc., a unit of McDonnell Douglas Network Systems Co., announced recently that it has completed the expansion of its 2,400 bit/sec. asynchronous communications service to 80 U.S. cities.**

The 2,400 bit/sec. service would carry the same hourly rate as its 1,200 bit/sec. service, Tymnet said. The 2,400 bit/sec. service complements its 300 to 1,200 bit/sec. dial-up service, which is accessible with a local phone call in 540 U.S. cities, according to the vendor.

Tymnet, 2710 Orchard Pkwy., San Jose, Calif. 95154.

■ **McDonnell Douglas Applied Communications Systems Co. has announced Ontyme Connection, an electronic messaging system for the IBM Personal Computer, Personal Computer XT and compatible computers. The firm also announced an enhanced version of Tym/Comm, a communications package that lets the Personal Computer function as a terminal-to-host computer.**

Ontyme Connection uses menus and prompts to lead users through the tasks associated with sending and receiving messages. One keystroke connects the micro to the Ontyme messaging net.

Tym/Comm Version 3 is said to offer file transfer capability in IBM environments and full screen terminal emulation. It carries a monthly subscription charge of $200.

Ontyme Connection costs $149.95 in quantities of one to nine; $129.95 in quantities of nine to 99; and $109.95 for quantities of 100 or more. Tym/Comm costs $170.

McDonnell Douglas Applied Communications Systems, 20605 Valley Green Drive, Cupertino, Calif. 95014.

■ **Western Union Co. has reduced daytime rates for its Optimized Wats long-distance telephone service by up to 10%. The rate reduction also extends to Operation Bigpipe, the packaged Optimized Wats service, and to the Software Defined Network Services.**

Daytime, short-haul (less than 600 miles) rates, with charges for less than 80 hours of calling per month were cut by 10%. Long-haul (more than 600 miles) daytime rates at the same hourly usage levels were reduced by 5% for less than 60 hours of calling per month.

Optimized Wats service off-network rates were trimmed by about 10% with the average commercial Western Union customer realizing a 5% reduction. Per-minute rates are 31 cents during the day, 24 cents in the evening and 16 cents at night.

Western Union was able to reduce these rates by raising off-peak hourly rates.

Western Union, One Lake St., Upper Saddle River, N.J. 07458.

TEST EQUIPMENT

■ **Adtech, Inc. has announced a sim-**

Continued on page 76

From page 67

Link options added to NCR 3690 family

a CCITT V.35 interface, and the remaining interfaces will be available in the third quarter. The purchase price for a fully configured HLC-MIM is roughly $30,000, the company said.

The Comten T2036/2034 High-Speed Multiplexer provides the 3690 Comten processor with a T1 interface, supporting 1.54M bit/sec. or 2.04M bit/sec. digital transmissions.

The multiplexer divides the T1 link into as many as 128 lower speed channels ranging in speed from 50 bit/sec. to 1.54M bit/sec. The unit can be set up as a stand-alone device or integrated into the 3690 processor.

When used with the 3690 console, the multiplexer can provide line management and diagnostic capabilities, including reconfiguration from a local or remote console; display channel, trunk and remote site statistics; and perform diagnostic tests, the company reported.

The unit will be available in the fourth quarter of 1985 on a stand-alone basis with voice capability with the other configurations coming in the first and second quarters of 1986. Depending on configuration, NCR Comten is pricing the multiplexer between $11,000 and $100,000, the vendor said.

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Continued from page 72

ulator to test how delay and random errors associated with satellite data links can affect digital data.

Available in bench- or rack-mounted units, the SX/11 can mimic a full-duplex data link or can be used in testing to add errors or delays to an existing link. The product operates with standard data transmission rates between 2,400 and 64K bit/sec.

The SX/11 injects bit errors generated by a random code sequence into two data streams. Error rates can be zero, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6} and 10^{-7}.

It costs from $2,670 to $2,790.

Adtech, 1814 Algaroba St., Honolulu, Hawaii 96826.

■ **Telecommunications Techniques Corp. has released a DS1C/DS2 Data Interface for is Fireberd family of data error analyzers.**

The interface is said to allow Fireberd users to test data communications systems at DS1C/T1C (3.152M bytes) or DS2/T2 (6.312M bytes) rates. The interface tests isolate line troubles for periodic maintenance and evaluate the installation of communications links and equipment operating at T1C and T2 rates.

The DS1C/DS2 Interface costs $995.

Telecommunications Techniques, P. O. Box 6027, 444 N. Frederick Ave., Gaithersburg, Md. 20877.

AUXILIARY EQUIPMENT

■ **Western Telematic, Inc. has introduced a switch that enables up to four users to share an RS-232 port.**

With TAS-41, a user can access the port by entering a Return code from a keyboard. A Ready message indicates a port connection; no response means that the port is in use.

If it is busy, a Port Available message indicates when it has become free.

To disconnect a port connection, a user enters a two- or four-character logoff sequence.

Users can set the device so it will automatically log off someone after a period of inactivity, according to the vendor. A user can select data transmission rates from 300 to 9.6K bit/sec.

TAS-41 costs $395.

Western Telematic, 2435 Anne St., Santa Ana, Calif. 92704.

■ **Signal Processing Systems, Inc. has announced a plug-in board that interfaces Digital Equipment Corp. or DEC-compatible processors with Gould, Inc. computers.**

The HSD/Unibus Adaptor connects the Gould high-speed data I/O processor to DEC's Unibus, enabling any Gould Concert 32 computer to communicate with a DEC computer or compatible, the company claimed. The plug-in board adapter performs in master and slave modes on the Unibus and maps an 18-bit Unibus address to 24-bit Gould addresses.

The HSD/Unibus Adaptor includes a set of control registers set up by the Gould computers to specify the desired function.

The HSD/Unibus Adaptor is priced at $19,500.

Signal Processing Systems, 223 Crescent St., Waltham, Mass. 02154.

■ **Electronic Specialists, Inc. has announced Kleen Line Model PDS-11, a modem protection package that works with standard four-pin, RJ-11 modular phone connectors.**

The product was designed to suppress telephone line spikes caused by lightning or telephone-office switching gear. Kleen Line incorporates a two-stage semiconductor and gas discharge tube suppression technique. An isolated ground is employed to protect equipment from lightning surges.

Model PDS-11 suppresses spikes on the red and green wires within a phone line — pins three and four — and brings yellow and black lines straight through.

Model PDS-11 costs $69.95.

Electronic Specialists, 171 S. Main St., Natick, Mass. 01760.

From page 67

Sequel switch eases extension

nections, the vendor said.

When divided, the halves are identified as local and remote. All port configuration changes are entered with the local portion, which updates the remote accordingly.

Although not currently available, the company is working on a T1 1.54M bit/sec. interface that will enable switch parts to be separated at "virtually any distance," the company reported.

Standard switch features include rate conversion, which enables a computer to communicate at its fastest rate with slower peripheral devices; port contention by name, number or class; a Help menu; the ability to toggle between two ports; priority queuing; automatic speed adoption; and password protection.

An optional feature is security callback. Users accessing the switch through dial-up lines are disconnected after entering a password and then called back at a predetermined number. The $800 option works with Hayes Microcomputer Products, Inc.-compatible modems and supports 36 ports.

The Sequel switch has a two-level configuration capability that enables the switch ports to be configured one way during the day, for example, and then automatically reconfigured at night to meet different needs.

A basic switch unit costs $800, and line cards cost $450 each. A typical 96-port switch would cost $8,000, the company said.

Lotus™ on a VAX™?

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Friday! on a Micro VAX?
Condor on a PDP-11?
PFS:File on a PRO?
Personal Pearl on a VAX?
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PerfectWriter on a PRO?
RM/COBOL on a PDP-11?
RTCS/UDI on a VAX?
Mass-11 on a PDP-11?
Milestone on an Eclipse?
Lotus 1-2-3 on a Micro VAX?
Peachtree on a VAX?
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From page 67

Ad campaigns miss the mark

the most out of my SNA network through Digital Equipment Corp.'s Decnet," a question posed by an ad on the New England Sports Network cable channel.

But does it work with Frigidaire

Truth be told, I'd never thought about it much. Never really networked before, either. As to getting the most out of SNA, I can't say I've tried any of the other methods yet, and I'm not sure if I would try doing it with Decnet. Does it work with Frigidaires? How about my Caloric range? Will Sears, Roebuck & Co. install it if I charge it?

If I do get these services, I suppose I should check to make sure they can be used with AT&T Unix System V. I saw an advertisement in Sports Illustrated for it. There, among stories about baseball and football, nestled ads for this operating system, a developing industry standard.

But what's an operating system? What did the other four systems do? What makes a system operate, and when it is going how can you tell? Can System V help prevent rust on patio furniture? Will it support the gentle cycle on my Hotpoint washer? If I add it to the gas in my Buick will it reduce engine knock?

It's so confusing. It all started when Apple Computer, Inc. heralded 1984 with spooky advertising about how a computer was going to change the world. That year seemed to leak away without any noticeable changes, except one thing: Other befuddling ads began to appear.

In one, elephants parade through the financial district of an unnamed city stressing the benefits of this company's diskettes. Although it is unclear what the ad is for, I imagine it has something to do with the circus.

And, in the middle of a Celtics-Lakers basketball game, my local telephone company came on to inform me that they offer one-stop shopping for Data General Corp., Wang Laboratories, Inc. and other office equipment. I'm not stupid. Data General must hawk data that can be used to serve general business needs, but I'm not sure of Wang's role. Maybe it sells furniture or typewriters.

While I still have to bone up on a few of these things, at least I have a firm understanding of what IBM sells: computers that help manage ducks and hats, right?

From page 67

Box converters are still viable

Box-type converters can be justified for other applications. It would cost much more, for example, to upgrade a computer from IBM's Binary Synchronous Communications protocol to Synchronous Data Link Control (SDLC) than it would to provide SDLC support via a protocol converter.

And it is impractical to throw out an installed base of asynchronous devices to get better data integrity. A protocol converter offers an instant solution — without the problems associated with new systems.

Ideal for temporary problems

Protocol converters are also ideal as a solution to a temporary problem. For example, a user with an eight-year capital equipment write-off period may have a hard time replacing computer equipment in mid-cycle. A protocol converter can bring the system into the required operation mode, such as enabling a DEC VAX-11/780 to communicate with an IBM 3270 cluster controller.

The converter may be justified on four years of service, after which it may be viewed as a throw-away item.

Cost, in fact, no longer is the primary selling point for protocol converters. The one feature that makes these devices viable today is connectivity. People are buying protocol converters to overcome compatibility problems and complete a system.

Protocol converters are adaptable devices that can open a broad range of interface capabilities and will continue to do so for many users for some time to come. Most protocol converters are easy to install and maintain. But there is no question that discrete stand-alone protocol converters will start to diminish as newer computers equipped with emulation capabilities displace those now in operation.

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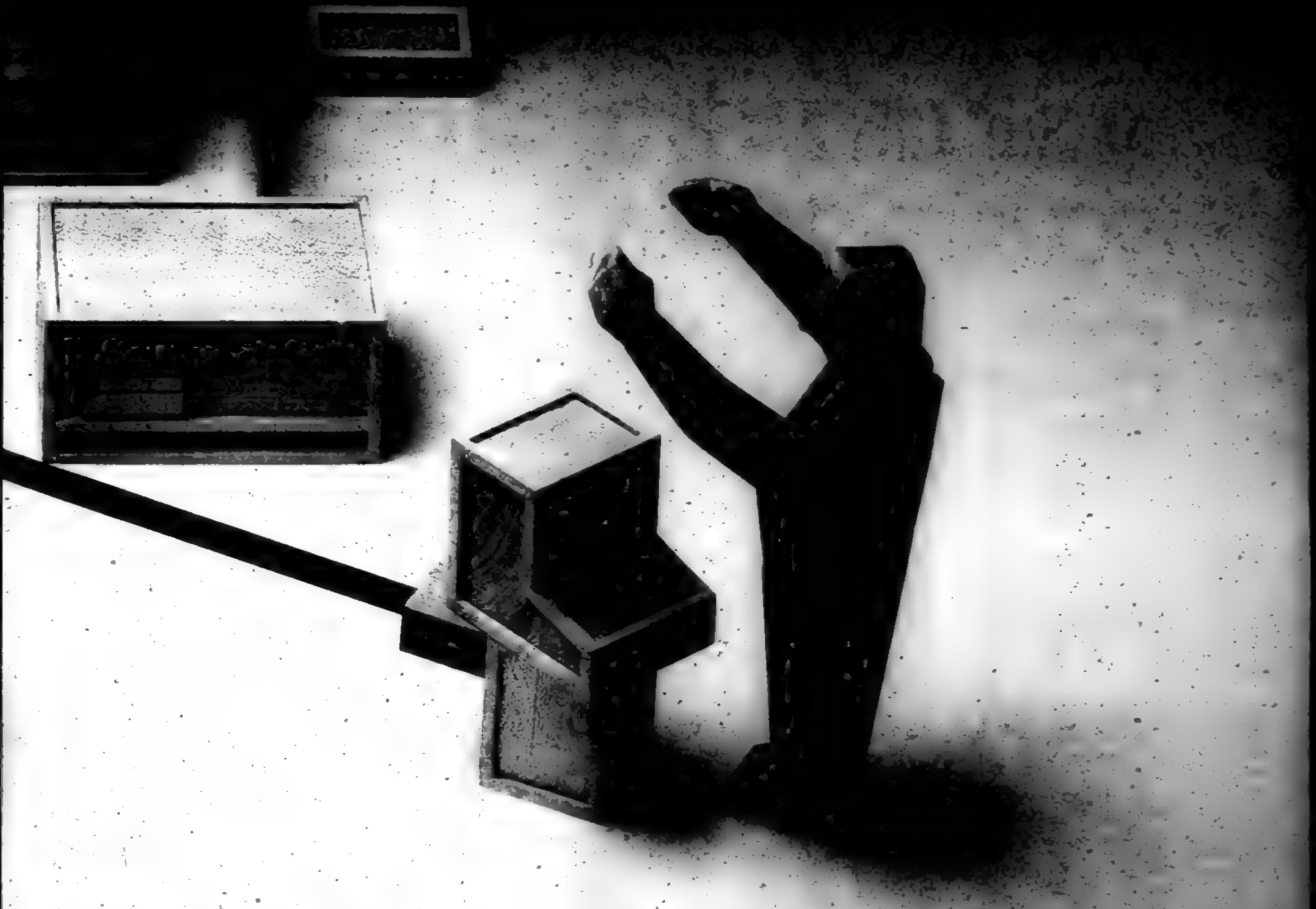

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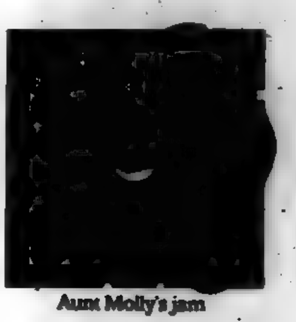
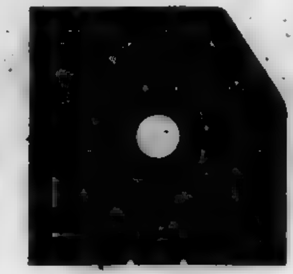
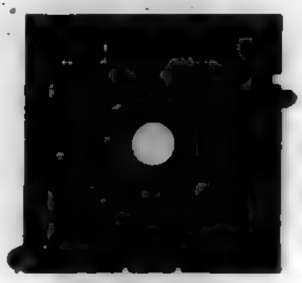

Aunt Molly's jam

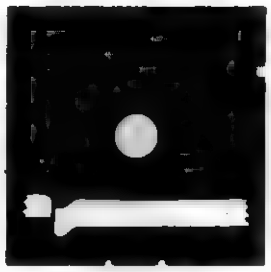

Dog-eared jacket

Regular coffee, two lumps

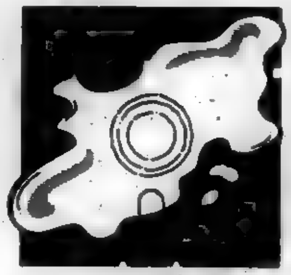
Maria's liquid cover

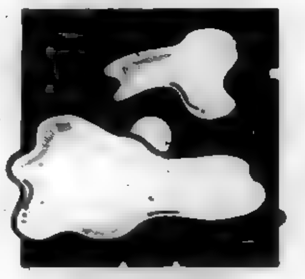

Hot dog mustard

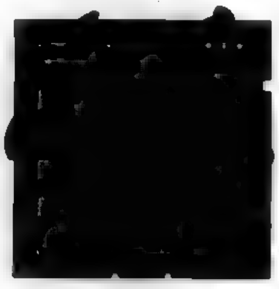
Dust (cough-cough)

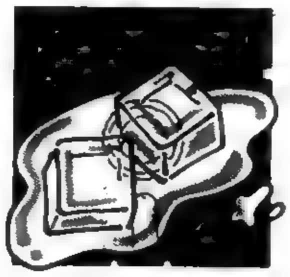

Tacky white tape

Boss's cigar ashes


Dry martini, one olive

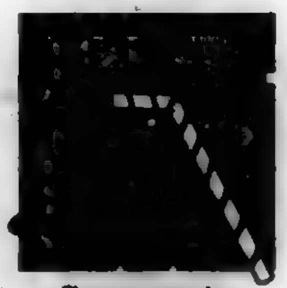

Spilled milk

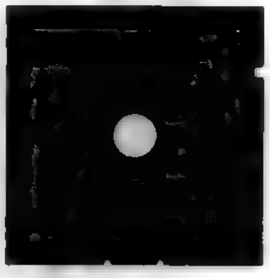

Potted plant—no pot


The big chill

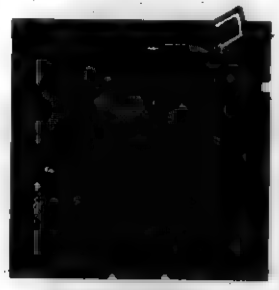
Lunchcounter ketchup

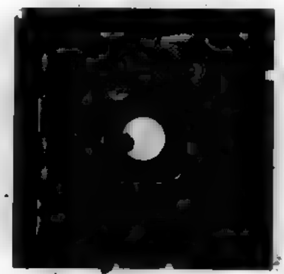
Clouds of smoke

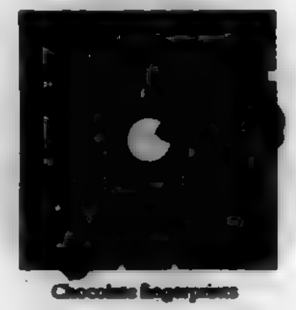

Fizzy orange soda


Waterbased ink spots

Sunny side up


English breakfast tea


Eraser bits


Chocolate fingerprints

Sudsy soap bubbles

One scoop of ice cream

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

Users await HP Spectrum

Now it's waiting time for Hewlett-Packard Co., time to wait for users to decide if they like what they hear or dislike what they don't see.

Executives at the Palo Alto, Calif.-based company have promised a smooth migration path from HP's existing minicomputer lines — the HP 3000 general-purpose computer, the HP 1000 real-time system and the HP 9000 design system — to the next generation of HP machines, the Spectrum. That promise from HP President John A. Young is the company's guarantee that software running on current lines will be transferable to the reduced-instruction-set-based Spectrum with no loss of performance and no recompiling when Spectrum is introduced in early 1986.

Running an HP 3000 program through a 5-minute compiling process reportedly will provide improved performance, although it might not match the 10 million instructions per second performance of a program written for Spectrum.

Reaction to Young's promise and first public prediction of a Spectrum introduction time frame has begun to drift in.

From an HP users conference came bitter comments about Spectrum being too little, too late and threats of users jumping ship from HP 3000 Series 68s to the IBM 4300.

From that same conference came reports that HP was backing off from its migration promise for some HP 1000 applications.

In the Midwest, a manufacturer said it doesn't matter what Spectrum looks

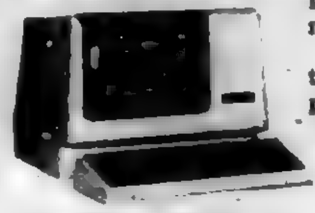
Continued on page 86

DEC's VT100 terminal faces certain retirement

By Donna Raimondi

MAYNARD, Mass. — The ubiquitous Digital Equipment Corp. VT100 terminal is about to retire.

The line of asynchronous terminals became a standard second in popularity only to IBM's 3270 series terminals in the six years of its existence, with approximately 800,000 installed in the U.S. alone. Although official notice has not come from DEC, a spokesman verified that production of the line has stopped, and the company will soon announce price slashes designed to clear out the inventory.



Out to pasture: the VT100

The VT100's demise comes as no surprise in the industry. When the VT220 line was introduced in November 1983, DEC promised to support the older line for two more years, according to Tom Madden, product manager for terminals. "It is a normal end-of-life situation," Madden said. Maintenance will continue as usual.

The VT100's detachable keyboard and support of the X3.64 protocol version of Ascii prompted dozens of companies to emulate the product since its 1979 debut. Because the terminal was DEC's choice of display for its popular VAX series machines, demand for the unit was higher than the company anticipated, said Ilene Goldman, research analyst for the workstation market program at International Data Corp., located in Framingham, Mass.

Historically, DEC did not take advantage of the market position that it created with the VT100, Goldman said. It often took three to five months to buy the terminals from DEC, a factor that strengthened the opportunity for the independent makers. DEC's pricing for the VT100 did not match what the rest of the industry was selling the emulators for, which gave the clones a chance to make inroads into the VT100 market.

DEC's strategy for the successor VT200 line of terminals is entirely different, Goldman said. The VT200 line is kept competitively priced, produced so that orders can be quickly filled and marketed not

Continued on page 82

- The University of Illinois is near completion of a parallel processing supercomputer/82
- Applied Digital Data Systems has announced two multiuser systems, the Adds 1720 and the Adds 1740/82
- A reconfigured disk system is being offered by Data General for its MV/10000 systems/86

Zero One processor debuts

Zero One Systems, Inc. of Santa Clara, Calif., a systems integrator, has introduced a front-end processor featuring high-speed communications and designed to be compatible with Cray Research, Inc. supercomputers.

The product is Zero One's enhanced version of the Convex Computer Corp. C-1 and is offered by Zero One under an agreement with Convex.

A Zero One spokesman said that the enhancements include a Fortran preprocessor and Network Systems Corp.'s Hyperchannel 6M byte/sec. local-area network equipment.

The system was designed as a Cray-compatible front-end machine or a Cray-compatible entry-level system. It features Cray disk and file system compatibility and the AT&T Unix 4.2 BSD version of the AT&T Cray Station Server, according to the spokesman.

Zero One also adds from one to six Ibis Systems, Inc. 1.4G-byte disk drives depending on customer needs.

The systems cost $1 million to $1.5 million, depending on the number of disk drives purchased. Delivery is scheduled for the fourth quarter of this year, the vendor said.

Lynk's first line targets IBM systems

Lynk Corp. of King of Prussia, Pa., is set to announce its first products this week, a family of workstations and printers designed for use with IBM's System/34, 36 and 38 minicomputers and mainframes.

The product line is said to include workstations designed to be field upgradable to an IBM-compatible desktop computer and a multimode printer that emulates three IBM printers through software overlays.

The Lynkstation/912 is an entry-level workstation said to be compatible with the IBM 5291 Model 2 display station and upgradable to the level of an IBM 3180 terminal. The Lynkstation/912, with a 15-in. screen, reportedly features 50% more viewing area than the 5291.

It costs $1,525.

The Lynkstation/802 is said to be an advanced capabilities workstation compatible with the 3180 Model 2 but with the added benefit of a dual addressing capability that allows attachment of a multimode printer.

The Lynkstation/802 costs $1,875.

According to the vendor, the Lynkstation/PC offers emulation of the IBM Personal Computer when used in conjunction with the disk storage of the host computer, providing the freestanding computation capability of the IBM Personal Computer and the workstation capabilities of the Lynkstation/802.

The basic Lynkstation/PC with 256K bytes of memory costs $2,175. Additional main memory and a dedicated dual 360K-byte disk drive also are available.

The company also announced Lynkwriter/214, a printer designed to provide draft-quality, near-letter-quality, letter-quality and color graphics printing capabilities at speeds up to 250 char./sec. It emulates the IBM 4214 printer. Working in combination with cartridge-resident Lynkstation software, the Lynkwriter/214 can be configured to emulate IBM 5256 and 5219 printers.

It costs $2,795, plus $230 for each Lynkstation emulation cartridge.

All of the products are scheduled to be available 60 days after receipt of order.

Memorex unveils storage subsystem

Memorex Corp. in Santa Clara, Calif., has announced a solid-state storage subsystem with an automatic data backup and recovery system.

The Memorex 6880 can emulate the IBM 3380, 3350 or 2305 Model 2 disk subsystem. Its dual-port device has 32M bytes of storage, which can be expanded to 128M bytes. Up to four 6880 storage units can be attached to a subsystem, permitting a maximum storage capacity of 512M bytes.

The product includes a built-in Winchester disk drive and uses an uninterruptible power supply or optional Memorex 6889 backup power unit for data backup in case of power loss or fluctuations.

Dual ports are said to increase performance by 15% to 20% over single ports by allowing two concurrent data transfers.

Purchase price of the 6880 subsystem, including a two-director 6888 control unit and one 128M-byte 6880 storage unit, is $431,250. An optional 6889 backup power unit costs $20,000.

Adds multiuser units debut

Applied Digital Data Systems, Inc. (Adds), based in Hauppauge, N.Y., has unwrapped two multiuser systems that support the Adds data base operating system — an enhanced version of Pick Systems' Pick operating system.

The company, a wholly owned subsidiary of NCR Corp., said the Adds Mentor 1720 and 1740 models in the 1700 system process applications exactly as they run on larger Mentor systems. The 1720 and 1740 models support up to three and eight users, respectively.

The 1700 system machines are said to be able to use up to 10 ports for connecting terminals, printers or communications lines.

Both computers have 16-bit Intel Corp. 80286 processors, 512K bytes of random-access memory, a keyboard, a terminal, a Centronics Data Computer Corp. parallel interface and a 1.2M-byte flexible disk, according to the vendor.

The 1720 has a 20M-byte hard disk and three RS-232C serial interface ports; the 1740 has a 40M-byte disk, eight RS-232C ports and a ¼-in. tape drive that takes either 45M- or 60M-byte tapes.

The 1720 costs $7,500, and the 1740 costs $12,750 without the operating system. The operating system adds $1,000 to the cost of the 1720 and $1,500 to the 1740 eight-user version.

University crossbar scheme connects processor clusters

By Donna Raimondi

CHAMPAIGN, Ill. — Clusters of processors interconnected by a type of crossbar switch system form the basis for the University of Illinois' entry into the multiple processor supercomputer arena.

"We're using floating-point processors that do 64-bit floating-point arithmetic, and we're using a very rich interconnection scheme," said David J. Kuck, director of the university's Center for Supercomputing Research and Development (CSRD). The CSRD's plan for a crossbar switch system is similar to those that a telephone company uses to allow any phone to "talk" to any other phone.

The crossbar switch system — impractical when more than a few tens of processors are clustered together — has been modified since the 1970s by Kuck and his associates, he said. The resultant network, dubbed the Omega, is being considered for IBM's Yorktown Heights, N.Y., RP III parallel processor project and for several universities' parallel processing schemes, he said.

Each processor of the type that the CSRD uses in its Cedar parallel processor project generates about 10M floating-point operations per second. The FX/8 processors were built by Alliant Computer Systems Corp. based in Acton, Mass., using Weitek Corp. 64-bit floating-point chip sets, and Motorola, Inc. 68020 instruction sets. Cedar processors also include the synchronization and interconnection hardware and software needed to execute CSRD's "do-loops" procedures across multiple processors.

There are differences between the Cedar and Alliant's FX/8 systems. "You can't, for example, solve the cache coherency problem in hardware when you get up to large numbers of processors. Alliant has a coherent cache-based cluster, but you can't use that same method with large numbers of processors. So there we are bringing in some software, and integrating it with the hardware at a higher level," Kuck said.

As with other parallel processing schemes, software that enables applications to take advantage of the architecture does not really exist, according to Kuck. The CSRD has been working on a software system called Parafrase for about 15 years, independently of the Cedar project. Parafrase was developed to analyze Fortran programs and to try to determine what constitutes a good computer architecture, Kuck said. Along the way, compiler algorithms for particular architectures evolved.

The Parafrase effort continues to produce research on new compilation techniques, but it also has been used for about five years to drive simulators of new multiprocessors.

A section of the supercomputer research is devoted to applications development. "We are using Parafrase to get applications in a parallel form as much as possible automatically,

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From page 81

DEC's VT100 terminal faces certain retirement

only within DEC's usual distribution channels but also in other areas.

Analysts expect DEC to announce a VT230 model before the end of 1985, Goldman said, although DEC denies that the announcement will occur. The current models in the VT200 family offer VT100 emulation, but users complain that some VT100 features are missing.

The VT200 keyboard is not as popular as that of the VT100 either, Goldman said, noting that those two problems will probably be addressed in the expected VT230 release.

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From page 82

Crossbar scheme connects processors

and then [Ahmed Sameh, applications director] is attacking them with new algorithms," Kuck said. Applications are being developed jointly with departments in the university and with outside companies. Applications include problems in meteorology, astronomy, physics, quantum chemistry, circuit simulation and geodetic network relaxation.

The university's project is funded by the National Science Foundation, the U.S. Department of Energy, the State of Illinois, IBM and other commercial backers.

Some of the products resulting from the university's research will be available in the public domain; others will be marketed by various members of the research team, said Edward Davidson, associate director of the project.

"We hope to capitalize in a variety of ways," Davidson said. Some of the people involved in the research hope to form a company to market software and hardware designs to industry, he said. At this stage, that company is a "gleam in the eye" of the designers, he added.

At present, there are two clusters of eight processors each. By the second quarter of 1986, Kuck hopes to have the two clusters hooked together, tested and working, he said. Then the software and applications will be added so that by the end of 1986 the project can show some performance results.

The project's funding allows for doubling the number of processors each year until a 128-processor machine is produced. However, Kuck believes that once the switch is in place, and if additional funding is available, he can double the machine's power at a still faster rate. Under those circumstances the team could have 512 processors by early 1987.

There are no plans to make copies of the machine within the university, Davidson said. "We will continue to build new architectures, and to improve, change and expand the Cedar system over a long period of time," he said.

■

Omega modifies crossbar switching

The crossbar switching scheme used on the University of Illinois' experimental Cedar parallel supercomputer is called an Omega network.

The Omega — under development at Illinois since the 1970s — differs from a true crossbar in that, instead of each processor being able to access any memory — for example, 64 simultaneous requests from 64 processors going out to 64 memories and all requests being honored at once — the process is broken down into stages.

The Cedar's 8-by-8 crossbar means that, of a hypothetical 64 processors (the computer now has 16), each group of eight processors is connected to one box with eight I/O channels. That box is then hard wired to each of eight boxes in stage two.

Each stage two box is connected to eight memories. Cedar's two unidirectional Omega networks enable data to flow from processor to memory or from memory to processor. In a bidirectional network, all processors and memories can carry information in any direction.

Factors that affect the quality and speed of crossbar techniques include the total size of the switch. A 64-by-64 true crossbar may be the fastest solution but also would be the most expensive. In an 8-by-8 Omega switch, each output is driven by a multiplexer, eight wide, to connect to all outputs. In a 64-by-64 scheme, each output would also be driven by a multiplexer, so the cost is directly proportional to the number of elements in the crossbar.

The data path width is another factor that governs performance. In the Cedar, 76 wires run between each processor and the crossbar switch because 64-bit data words plus extra checking bits are sent as a group. In contrast, a telephone crossbar switch can send data along one wire.

Extra buffering space in each of the boxes in the crossbar scheme enables users of the Cedar to wait in the buffer for available resources if the desired memory is busy. That small amount of first-in first-out buffering can increase the performance of the 8-by-8 crossbar switch scheme to that of a 64-by-64 scheme.

— Donna Raimondi

DG enhances disk system, reduces price

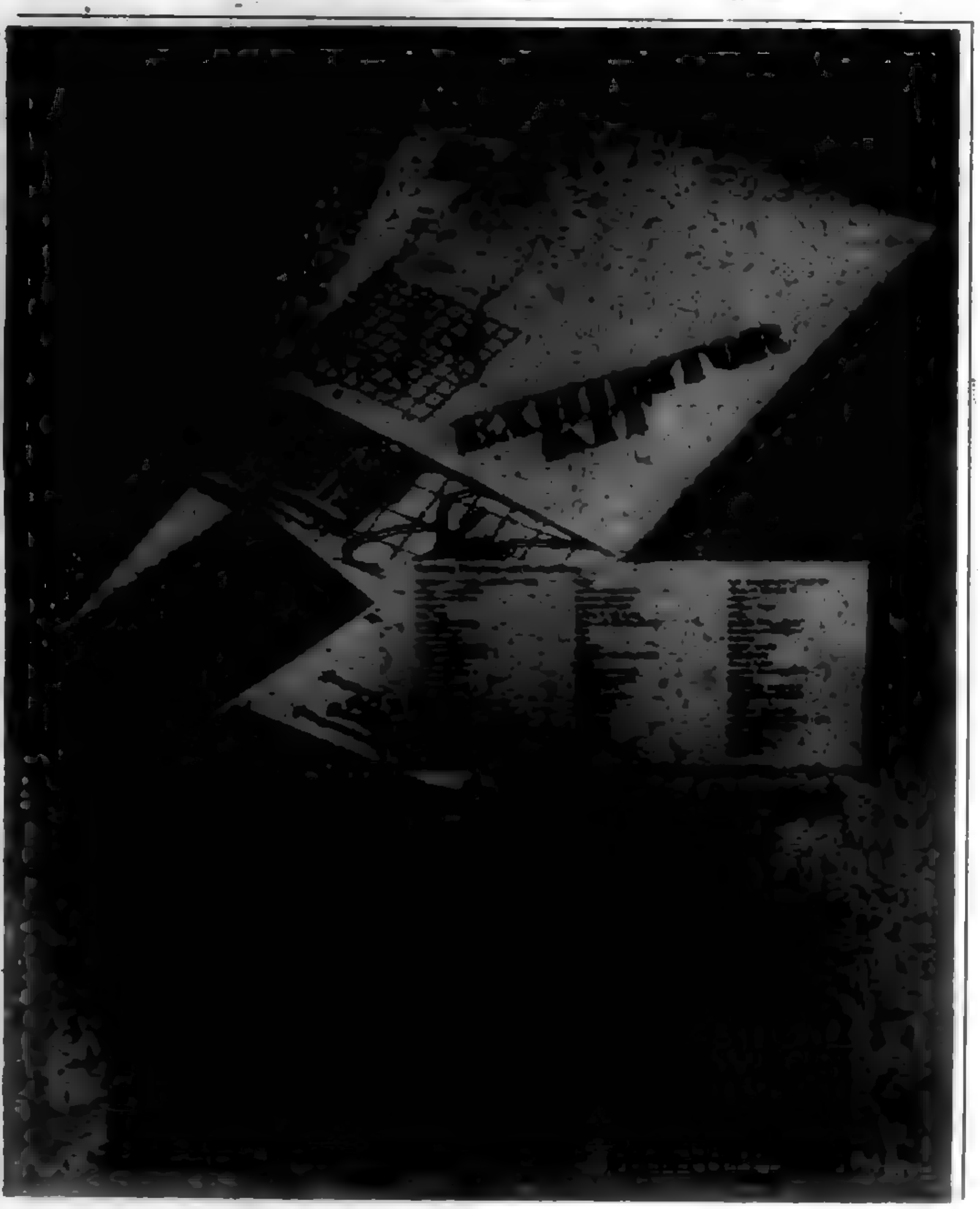
Data General Corp.'s Information Systems Division in Westboro, Mass., has announced a 5.3G-byte disk configuration designed to provide a $40,000 savings over the cost of previous configurations.

The Model 6350 disk subsystem features three intelligent disk controllers and nine 592M-byte Winchester disks. The subsystem costs $245,000. Previously, the 592M-byte disk drives were available only in groups of three, with a nine-drive system costing $288,000, according to DG.

The package, also available with DG's Eclipse MV/10000, is said to feature bad-block remapping, optimized and overlapping seeks, dual porting, logical-to-physical addressing and incremental backup.

A DG spokesman said the package is suited for customers who require large amounts of on-line storage. The disks and controllers are mounted in three, meter-high cabinets.

A package including the MV/10000, the 6350 disk system, 16M bytes of memory, a magnetic tape subsystem, system console and Data General's AOS/VS operating system costs $470,094.



From page 81

HP users await migration to next-generation Spectrum

like. They aren't even near capacity on their Series 68.

Further west, a data processing executive in a Colorado company using IBM mainframes and HP 3000s said his firm hasn't even looked at migration because it isn't concerned about more major and more pressing issues than those surrounding a minicomputer.

But back in the Midwest, a systems manager was upset that HP wouldn't let his company benchmark the test Spectrum models using their current applications. "Everybody would like to see Spectrum tomorrow, but I'm old-fashioned; I'd like to see it run," he noted.

And a Chicago DP executive reported that he was concerned about the migration issue until he sat down with HP officials and examined Spectrum. "We're much more comfortable than we were six months ago," he observed.

Clearly, DP shops that have outgrown their HP 3000s are concerned about where they can go. Many apparently had expected the Spectrum series, which will start at the high end with a system offering more than five times the performance of the Series 68, to be announced in the fall of 1985 for delivery in early 1986.

They may have based that expectation on HP's installation of more than 100 Spectrum machines in its own facilities. HP reportedly is allowing third-party software developers and software developers from some customer sites to work with those machines for which the hardware portion is said to be complete. Any delays are reported to be the fault of software problems.

But while some users' impatience is understandable, HP's goal is commendable. Minicomputer industry analysts have lauded HP for taking care of its installed base, because even if the new product is late, it doesn't mean a wholesale scrapping of existing programs and hardware.

HP is gambling on a new architecture, a reduced instruction set computer (Risc)-based architecture that also was designed to serve three diverse markets with three different systems. Moving to a Risc machine is a gamble in itself. But HP is complicating that move with a strategy that analysts say will mean sacrificing some processing power for the sake of a smooth, three-pronged migration.

The questions to be answered next year include, How much power will remain? How smooth can that migration be? And when can users get their hands on production models to answer the first two questions for themselves?

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Jeffry Beeler
CW West Coast Bureau

Apple divorce a trade reality

Apple Computer, Inc.'s current dispute with its recently resigned cofounder and chairman, Steve Jobs, is merely the latest in a long string of bitter corporate divorces that have periodically jolted the high-tech industry.

Nearly all the feuds have followed more or less the same familiar pattern: One or more prominent members of a successful, fast-growing vendor grows dissatisfied with his current station and quits to create a new business that competes head to head with his former employer. The defection stuns the established company and produces lingering hard feelings on both sides. In some cases, the grudges even escalate into lawsuits.

Illustrations of such stormy partings of the way abound. One of the most celebrated examples involved Edson De Castro, who left Digital Equipment Corp. during the 1960s to form a rival vendor, Data General Corp., after DEC rejected one of his designs for a proposed minicomputer.

A few years later, a somewhat analogous revolt rocked IBM when Gene Amdahl, who spearheaded development of the landmark 360 architecture, stunned his corporate alma mater by founding the first supplier of 370-compatible mainframes.

Now, the same kind of traumatic separation has overtaken yet another

Continued on page 95

Chip firms urge tariffs

Japanese vendors charged in antidumping petition

By Clinton Wilder

SAN JOSE, Calif. — In the most aggressive protectionist move to date in the U.S. semiconductor industry, three leading Silicon Valley chip vendors last week called for import duties on Japanese semiconductors that they allege are being sold below cost in the U.S.

Intel Corp., National Semiconductor Corp. and Advanced Micro Devices, Inc. announced the joint filing of an antidumping petition with the U.S. International Trade Commission and Department of Commerce against the Japanese imports. The three firms charged eight offshore vendors with selling erasable programmable read-only memory (Eprom) chips below their manufacturing cost in technical violation of U.S. trade agreements.

In calling for duties that would raise the market price of the Japanese chips, the three companies took a large step beyond the pending Semiconductor Industry Association petition seeking greater U.S. access to Japanese markets. With the exception of the smaller Boise, Idaho-based Micron Technology, Inc., U.S. chip makers had previously resisted calling for outright trade barriers.

But the economic pressures of the worst semiconductor slump in history apparently pushed the U.S. market leaders to the limit. "It is evident that Japanese manufacturers have targeted Eprom [chips] just as they did [dynamic random-access memory chips]," Intel General Counsel Tom

Continued on page 95

■ IBM Japan's agreement to work with Nippon on a value-added network met intense opposition from Nippon's competitors in Japan/**94**

SIA predicts 18% to 28% surge in 1986 semiconductor sales

By Maura McEnaney

SANTA CLARA, Calif. — The Semiconductor Industry Association (SIA) brought some welcome news to its members recently, predicting a "dramatic turnaround" in chip sales next year.

At the SIA's Annual Forecast dinner, the trade association said it anticipated an 18% to 28% growth rate in sales next year from the depressed levels of this year, which would bring worldwide semiconductor sales to $38 billion by 1988. The forecast was prepared for the SIA by the World Semiconductor Trade Statistics Committee and represents forecasts by 30 U.S., European and Japanese semiconductor manufacturers.

Worldwide sales this year are expected to total $21.6 billion, down 16.8% from the industry high of $26 billion in 1984. Next year, sales will increase to $25.5 billion, the forecast noted.

According to the SIA, the U.S. market will begin to recover in the fourth quarter this year, with sales inching 3.1% above third-quarter results. However, U.S. year-end sales remain grim at 33% below year-ago totals, the SIA noted.

Should the SIA forecast prove correct, the semiconductor industry still faces a long road to recovery. If U.S. sales increase 25% next year to the $10.3 billion predicted, the industry will still be left 11% behind record totals of $11.5 billion in 1984.

At a press conference preceding the SIA

Continued on page 94

CDC's financial situation still considered gloomy

By Clinton Wilder

MINNEAPOLIS — The financial situation at Control Data Corp. continued to look dismal last week with the expiration of some of its bank loan credit requirement waivers at the end of September.

CDC executives are attempting to renegotiate credit terms with the company's largest lenders, which include Chase Manhattan Bank Corp. and Citicorp of New York and Norwest Bank NA in Minneapolis. With CDC expected to report a substantial loss for the year, some financial analysts said they believe the mainframe vendor's future status hinges on the current negotiations.

"Because some loan covenants have been violated, it cannot be ruled out that one or more of Control Data's banks will demand immediate payment of the loan, forcing the company to test its solvency," Paine Webber, Inc. analyst Jonathan Fram said in a recent investment report on the company. "The company has used about $225 million out of its current $325 million bank line, which should hold the company through the end of this year but makes no provision for future needs."

CDC's financial situation was exacerbated by the recent last-minute cancellation of a $300 million sale of bonds and preferred stock that was intended to secure its current lines of bank credit [CW, Sept. 23]. Wall Street sources said they believe CDC must sell some of its profitable diversified businesses in order to raise needed cash.

CDC announced it is attempting to sell Ticketron, its computerized nationwide ticketing service. Ticketron and the media rating service Arbitron are expected to earn $18 million this year on $225 million in revenue, according to Fram. CDC had not found a buyer for Ticketron in previous sale efforts.

Continued on page 91

Cbema may not support current tax reform plan

By Mitch Betts

WASHINGTON, D.C. — The Computer and Business Equipment Manufacturers Association (Cbema) does not like the way tax reform legislation is moving through the U.S. Congress and has threatened to withdraw its support unless changes are made.

The staff of Congress' Joint Committee on Taxation recently drafted a tax reform plan for use by the U.S. House of Representatives Ways and Means Committee. But Ted A. Heydinger, a Cbema vice-president, said the proposal is a disaster for high-technology industries because it sharply reduces the value of the tax credit for research and development expenses.

This posture is a turnabout from Cbema's generally favorable comments about the Reagan administration's tax reform proposal, which provided high-tech industries with an extended 25% R&D tax credit and a cut in the capital gains tax rate.

As soon as the House Ways and Means Committee released its bill draft — an alternative to the Reagan plan — Cbema issued a statement last month attacking it. "While we're waiting for a final analysis from our tax experts, our understanding thus far forces us to seriously reexamine our support for this tax reform bill," Heydinger said. "We'll be working hard to change it."

Heydinger charged that the committee's draft proposal effectively reduces the R&D tax credit by at least 75%. The plan cuts the R&D credit from 25% to 20% and requires companies to subtract the credit from any R&D expense deductions, he said.

Furthermore, the proposal also requires firms to include R&D expenses when they calculate the proposed minimum corporate tax, which Heydinger said is tantamount to levying

Continued on page 91

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Remedies available to recover copyright damages

SIXTH IN A SERIES

By Jerome J. Roberts
and Michael P. Brownell
Special to CW

The last article examined many of the fundamental aspects of the proprietary protection provided to semiconductor mask work owners under the Semiconductor Chip Protection Act of 1984. This article summarizes the remedies available to a mask work owner to prevent or recover damages from an infringement of its rights under the act. It also discusses severe limitations of the act's protection.

REMEDIES

Subject to the exceptions listed below, any person who exercises a mask work owner's exclusive rights to reproduce, distribute or sell a chip without authorization from the mask work owner will be liable for infringement. The owner, or exclusive licensee, of all rights to a mask work may institute a civil action for infringement of the mask work provided the infringement occurs after the act's protection has commenced as explained in the previous article and the owner or exclusive licensee has obtained a certificate of registration for the mask work prior to filing the civil action.

The mask work owner or exclusive licensee is entitled to the normal equitable remedies to prevent or restrain infringement, including temporary restraining orders and preliminary and permanent injunctions. Upon finding infringement liability, the court may award to the plaintiff its actual damages and the infringer's profits to the extent they are not computed in the actual damage award.

Alternatively, at any time prior to final judgment, the mask work owner may elect to receive, in lieu of actual damages or the infringer's profits, statutory damages in an amount determined by the court but not more than $250,000.

While a civil action is pending, the court may impound all infringing products and related mask works. In a final judgment, the court may further order the destruction or disposition of such articles.

In addition to the foregoing civil remedies, any chip-based article imported in violation of the mask work owner's exclusive rights is subject to seizure and forfeiture in the same manner as property imported in violation of the customs laws. Under the act, the secretary of the treasury and the U.S. Postal Service are to issue separately or jointly regulations for the enforcement of a mask owner's exclusive rights with respect to importation.

LIMITATIONS

A mask work owner's exclusive rights are subject to several important limitations. First, it is not an infringement for a person to reproduce a mask work solely for teaching, analyzing, or

Roberts and Brownell are attorneys with the law firm of Bermand, Roberts and Kelly in Chicago. The firm's practice deals with legal issues related to procurement, distribution, management and protection of computer resources.

Guess who just unveiled seven

The new IBM 3161 ASCII Display Station is really seven different ASCII displays in one.

In addition to its own function-rich native mode, the new IBM 3161 can emulate:

- IBM 3101 Model 881
- ADDS Viewpoint*
- Hazeltine 1500*
- Lear Siegler ADM-3A*
- Lear Siegler ADM-5*
- TeleVideo 910*

Besides fitting nicely into existing systems, the IBM 3161 also offers impressive improvements in ergonomics.

Improved Ergonomics For Improved Productivity

Take the 102-key ASCII-style keyboard, for example. Its low profile, gentle contour and typewriter touch make for faster keying with fewer errors. The keyboard has programmable function and editing keys so it can be custom-tailored to meet your application needs.

Then, for comfortable viewing, there's the tilt and swivel of the 12" display. And the sharp, clear 8 x 16 character matrix for easy reading. Plus cursor, character and field attributes (blink, reverse video, underscore, dual intensity, etc.). And scrolling. And partitioning. And lots more.

The IBM 3163 with Plug-in Cartridge

And, as if that weren't enough, we're also announcing a second new ASCII display station with even higher function—the IBM 3163.

The sharp 8 x 16 character matrix helps make for easier reading and fewer operator errors.

Outwardly, these two new displays look alike. But the 3163, in addition to its built-in emulation of the IBM 3101 Model 881, also offers the ability to emulate the DEC VT 52 and VT 100* by means of a unique plug-in cartridge.

And while you'll like the power and flexibility of the 3161, for your high-function applications the 3163 goes even further. For example, a 7,680-character buffer and up to three windows enable you to view and modify portions of different host data bases. The 3163 lets you redefine and even recap the keys.

On both displays the setup is menu-guided and written in plain English, so it can be done easily and quickly. The point is, both are designed to improve your user productivity.

Very Attractive Prices

The price per terminal is $695 for the 3161 and $1,095 for the 3163. Quantity discounts are available. What's more, IBM maintenance offerings start as low as $35 per year per terminal for customer carry-in repair.

Now there's a new family of ASCII displays with the quality, service and support IBM is famous for. Both displays are available through IBM Authorized Distributors and IBM marketing representatives.

FEATURES	3161	3163
Lines x Characters	25 x 80	25 x 80
Double-sized chars	No	Yes
Line drawing chars	24	24
Vertical scroll	Jump	Jump/ Smooth
Definable function keys	24	24
Windowing	No	Yes
Partitioning	Horiz	Vert/Horiz

Call 1 800 IBM-2468, Ext. LE/90 for the name of an Authorized Distributor near you.

IBM

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evaluating the concepts or techniques embodied in the mask work or for a person who performs the analysis to incorporate the results of such analysis in an original mask work that is made to be distributed.

Second, the owner of a particular chip, including a product containing a chip, made by or with the permission of the mask work owner may import, distribute, dispose of or use the chip without the authority of the mask work owner.

Third, a mask work owner may be unable to assert its remedies against an "innocent purchaser" who purchases a chip made, imported or distributed in violation of a mask work owner's exclusive rights.

An innocent purchaser is one who buys a semiconductor chip product in good faith and without having notice of protection with respect to the semiconductor chip product.

Boeing restructures operations

BELLEVUE, Wash. — Boeing Computer Services Co. last week announced a major restructuring that consolidates its operations into government and commercial sales, with the latter aimed specifically at the energy and manufacturing markets.

The move combines sales, marketing and systems development activities under the newly created Government Information Services and Commercial Information Systems divisions.

In addition, Boeing will consolidate its sales organization into offices in 10 major U.S. cities.

The reorganization will be effective Jan. 1, 1986.

Company officials said the targeting of energy and manufacturing applications is a move intended to play up the company's strengths.

"We are focusing only on those products and services that best meet our customers' needs," according to Vice-President Paul M. Sibalik.

different ASCII displays in one.

The IBM [illegible] ASCII Display Station

From page 87

Cbema dislikes tax reform plan

a 20% excise tax on a company's R&D budget.

Inclusion of R&D expenses in the minimum tax would also hurt high-tech firms experiencing economic problems, he said.

"A high-tech company facing tough times still has to spend enormous amounts of money on R&D to remain competitive and get back on its feet," Heydinger said. "But under this proposal, it couldn't deduct those expenses when it calculates the minimum tax," he said.

The proposal raises the effective capital gains tax rate from the current 20% to 21%, rather than President Reagan's planned 17.5%, and cuts the top corporate income tax rate from the current 46% to 35%, rather than 33% as in Reagan's plan.

From page 87

CDC's financial situation gloomy

The company also pledged the stock of Commercial Credit Co., its financial lending service, to satisfy its lead creditors.

Approximately one-third of the assets of Commercial Credit are for sale, and it remains the company's most profitable business with estimated earnings of almost $100 million this year.

CDC has reached an agreement in principle to sell its remaining stake in Nimcos, a unit selling a computer system to monitor noninstitutional prison sentences, to joint owner BI, Inc. of Boulder, Colo.

Last month, BI purchased an additional 16% of the business to bring its share to 77%.

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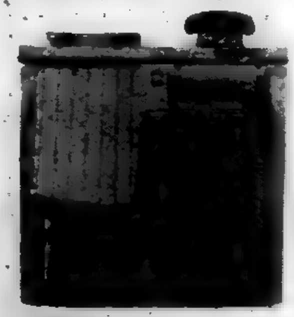

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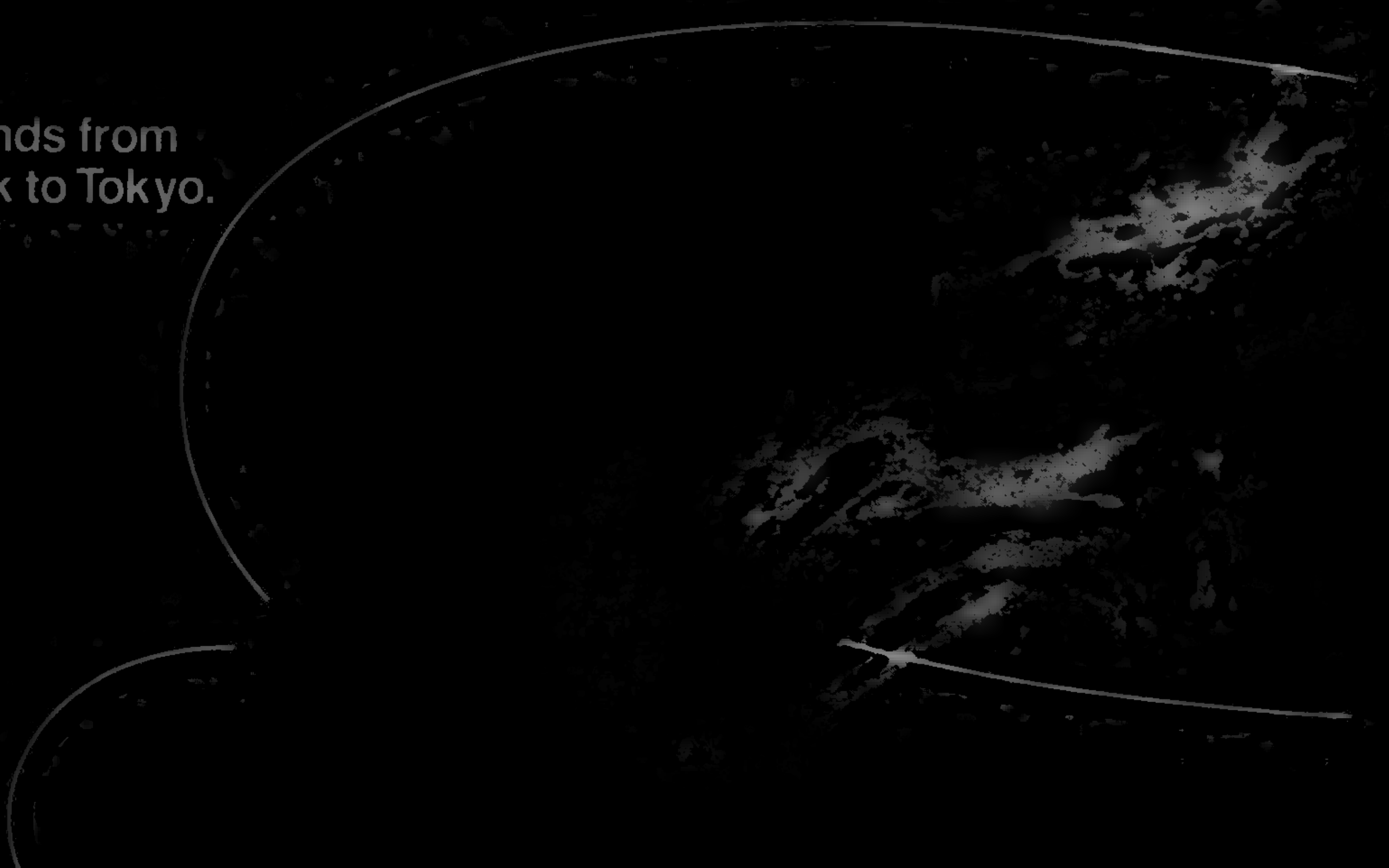

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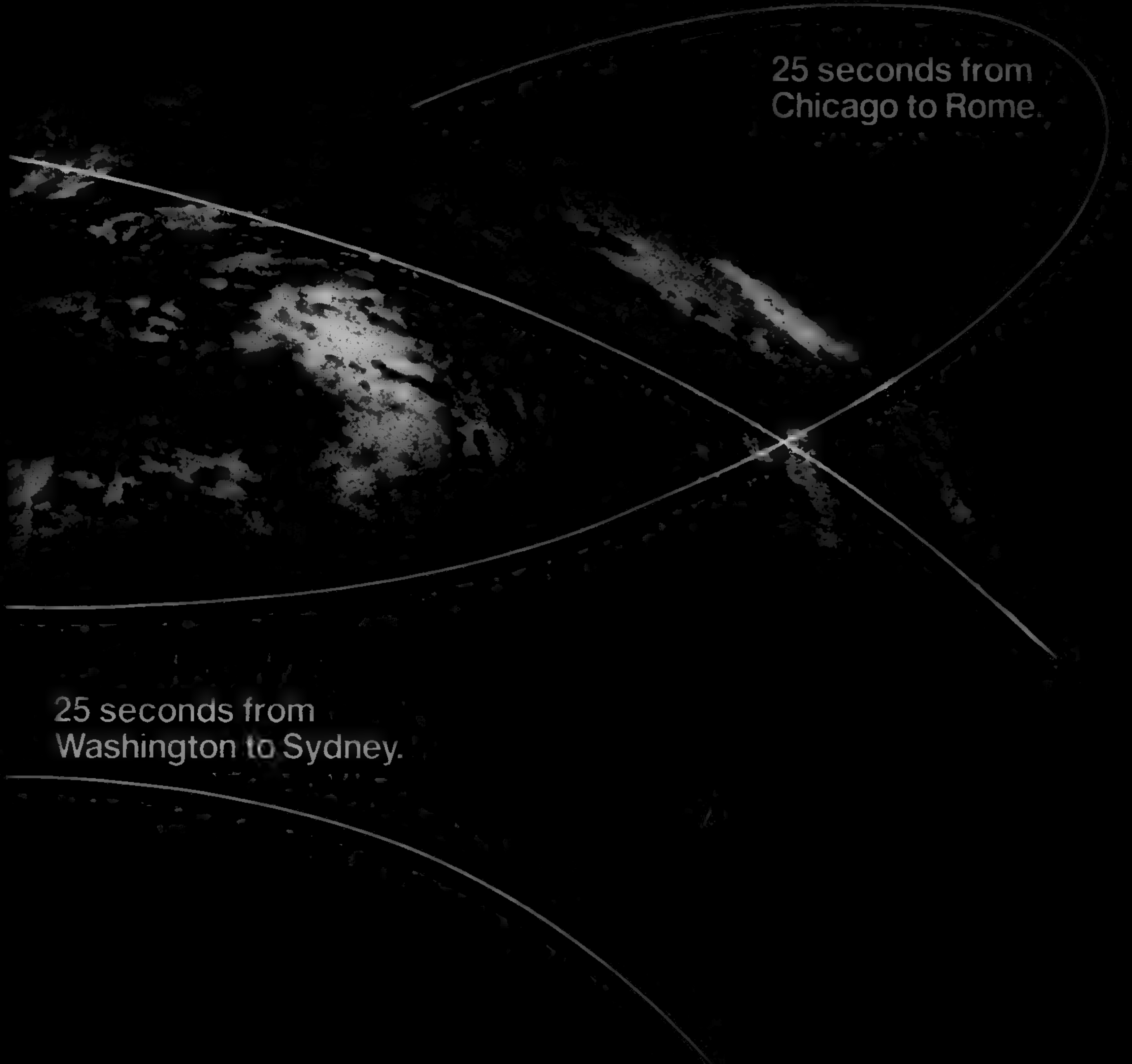
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Nippon-IBM Japan venture draws fire

By Takahisa Kondoh
Special to CW

TOKYO (CWN) — Leaders of the Japanese communications and electronics industries expressed fierce opposition to the agreement between Nippon Telegraph and Telephone Corp. and IBM Japan Ltd, to set up a joint firm for networked data communications [CW, Sept. 30].

The Communications Industries Association decided Sept. 27 to appeal to Megumu Sato, Minister of Posts and Telecommunications, expressing its opposition to the Nippon-IBM agreement. The association said the agreement would block the ongoing liberalization of the telecommunications market in Japan.

The association includes representatives of 209 major Japanese electronics and communications manufacturers. Its chairman is Takuma Yamamoto, president of Fujitsu Ltd. The group postponed the details of any counteraction until a steering committee meeting, to be held on a still-unspecified date.

Formation of joint concern

Nippon said that it and IBM's wholly owned Japanese subsidiary would establish an equally held joint concern later this year. The new firm, according to Nippon, will provide enhanced telecommunications services, including value-added networks, by connecting both firms' protocol architectures.

Some Japanese computer vendors that hold large shares of the country's communications market oppose the joint business agreement, terming it a gross violation of Japan's antimonopoly law and saying it clears the path for IBM to take up the lion's share in the nation's data communications market.

They are expected to ask the Japanese government to oppose the joint company and cite as precedent the British government's decision last year to abort a similar plan between IBM and British Telecom International.

Kondoh is international editor/Asia for the CW Network.

Computerland execs resign

OAKLAND, Calif. — Computerland Corp. Chairman and founder William H. Millard announced last week that company officer Edward Faber had assumed operational control from Millard, who was chief executive officer, and from Millard's daughter, Barbara, who was president and chief operating officer.

The chain of franchised computer stores, the largest computer retail operation in the world, has been under siege from two fronts in recent months. A California jury declared in March that a group holding a 9-year-old note for $250,000 has the right to convert it into a 20% share of Computerland stock and also awarded $140 million in punitive damages.

But the company has also been under pressure from disgruntled franchise owners, who have sought reduced royalty fees and greater corporate support.

Millard said he was resigning his post of CEO, but will remain as chairman of the board. His daughter has also resigned, but has accepted the post of president of IMS Associates, Inc., which is also owned by Millard, and will remain a member of Computerland's board of directors.

From page 87

SIA predicts surge in semiconductor sales

meeting, Gilbert Amelio, president of Rockwell International Corp.'s Semiconductor Product Division, blamed his industry's current woes on its $2.5 billion of excess inventory. Conditions will begin to improve once that inventory starts to decline, he said. "We are beginning to burn off that inventory," Amelio said. Semiconductor executives at the SIA press conference said they agreed with the SIA's optimistic forecast, but admitted they were not ready to start growing again.

"It is clear that the inventory is being absorbed," said Charles Sporck, president of National Semiconductor Corp. "But we don't forsee going into a hiring binge."

Last year the SIA forecast was off by about 39%, predicting growth in what proved to be one of the industry's worst years. "We did not foresee the flattening of the end-user consumption," Amelio said.

Industry analysts are also predicting improvements in the semiconductor industry, but at slightly different levels. "The SIA is saying the market will improve starting in the fourth quarter. We feel that it is going to take another quarter," said Fred Zieber, senior vice-president of Dataquest, Inc.

Dataquest predicts a more modest growth, anticipating a 10% increase in chip sales next year. Some inventory building, a slight stabilization of prices and a modest increase in the electronics business will help contribute to the industry's resurgence, Zieber said.

The largest area of growth in semiconductor sales will be in the custom market, according to the SIA. Integrated circuits will represent about 77% of the total solid-state sales this year. By 1988, that figure is expected to grow to about 84% annually.

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EnerConnect is the second major micro product from Enertronics, developers of the successful EnerGraphics package. As the ad for EnerConnect says, it is "... the first software package that puts mainframe graphics capability into the hands of anyone with an IBM PC ... or 3270 PC."

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Randy T. Andes, Director of Marketing, Enertronics Research, Inc., St. Louis, Missouri

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From page 87

Apple dispute an industry reality

victim — Apple, which last May found itself in the middle of a heated row when it reduced Jobs to little more than a figurehead in his own organization.

Unhappy with this turn of events, Jobs disclosed his intention to start a second business venture and began recruiting employees from Apple's work force even before he resigned as the company's chairman. Apple's management interpreted his hiring activities and business plans as hostile and countered by naming him as a defendant in a $5 million lawsuit.

So divergent are Jobs' and Apple's outlooks on the controversy in question that neither side is very likely ever to concede much merit to the other's position. But the truth of the matter is that quarrels between established vendors and their entrepreneurial former employees seldom involve morally or intellectually unambiguous issues. Each warring party can usually make a reasonably convincing case for the validity of its particular viewpoint.

On one hand, entrenched companies have a legitimate need to protect their proprietary technology from unauthorized disclosure and should rightly be able to enjoy the hard-earned fruits of their labor and investment. If hungry entrepreneurs were allowed to abscond at will with their former employers' expertise and then use the information as a competitive weapon against its own developers, companies would quickly lose all incentive to innovate. They would thus cease to furnish their customers with useful, attractive products and would betray their stockholders' best interests.

Entrepreneurial spillage vital

On the other hand, a certain amount of entrepreneurial spillage from large, established vendors is probably vital to the high-tech field's continued growth and prosperity. Small start-up ventures often surpass even corporate giants in technological inventiveness and supply new blood that continually revitalizes the industry even when some of its major players fall gravely ill.

Existing firms may view with alarm the emergence of new entrepreneurial rivals and feel doubly threatened when the competition is spawned by their own former employees. From the narrow perspective of self-interested vendors, such attitudes are easy to understand.

But in the final analysis, rifts of the sort that recently severed Jobs' ties with Apple are natural, probably even inevitable, occurrences in certain major companies. Just as mature oak trees perpetuate their species by scattering acorns, so do a few chosen vendors contribute disproportionately to technological progress by sowing the industry soil with the seed of their own former talent.

The current Jobs-Apple clash may temporarily harm both combatants, divert their attention from more strategic concerns and create a messy, distracting sideshow for hordes of ogling bystanders. But the short-term troubles that such convulsions may create for selected individuals are usually more than offset by the long-term benefits they yield for the industry as a whole.

From page 87

Semiconductor firms call for import duties

Dunlap said at a press conference. "We can sit back and let this happen in Eproms, or we can use every means at our disposal to prevent it."

The U.S. firms say they have suffered a shrinking domestic market share as Eprom chips have become an interchangeable commodity item as dynamic random-access memory (RAM) chips did before them. The petition charges that while the U.S. market for 128K-byte Eprom chips increased seventeenfold in the past two years, U.S. vendors' share of the market has dropped by 60%.

Intel, Advanced Micro Devices and National Semiconductor said 256K-byte Eprom chips, which were selling for $17 when the Japanese "aggressively entered" the market in January 1985, now sell for less than $4 or below the alleged Japanese production cost of $6.34. Japanese 128K-byte Eprom chips fell from $7.50 to $2.50 in the same period, the petition said.

Howard Bogert, a semiconductor industry analyst with Dataquest, Inc. based in San Jose, said the petition was a last-resort move by the leading firms in the beleaguered chip industry.

"The basic bias of this industry has always been toward free trade, so this is a step not taken lightly," Bogert said. "I believe they are fearing for the survival of the semiconductor industry in the U.S. There are other steps that could help them, such as low-cost capital equipment loans from the government, but they might come too late."

In addition to Hitachi Ltd., the petition charges dumping by Mitsubishi Corp., Fujitsu Ltd., NEC Corp., Toshiba Ltd., Matsushita Electric Corp., Oki Ltd. and Ricoh Corp.

Separately, Micron Technology, which had previously filed its own antidumping petition against Japanese dynamic RAM chip makers, reported a $6.5 million pretax loss for the year ended Aug. 28. Revenue fell from $87.3 million in fiscal 1984 to $75.9 million in fiscal 1985. After a tax credit, Micron Technology earned $154,000, or 1 cent per share, compared with $28.9 million or 76 cents per share in the previous year.

The firm was hit hard by its fourth-quarter after-tax loss of $7.3 million on sales that plummeted from $37.4 million in the year-earlier period to $6.1 million.

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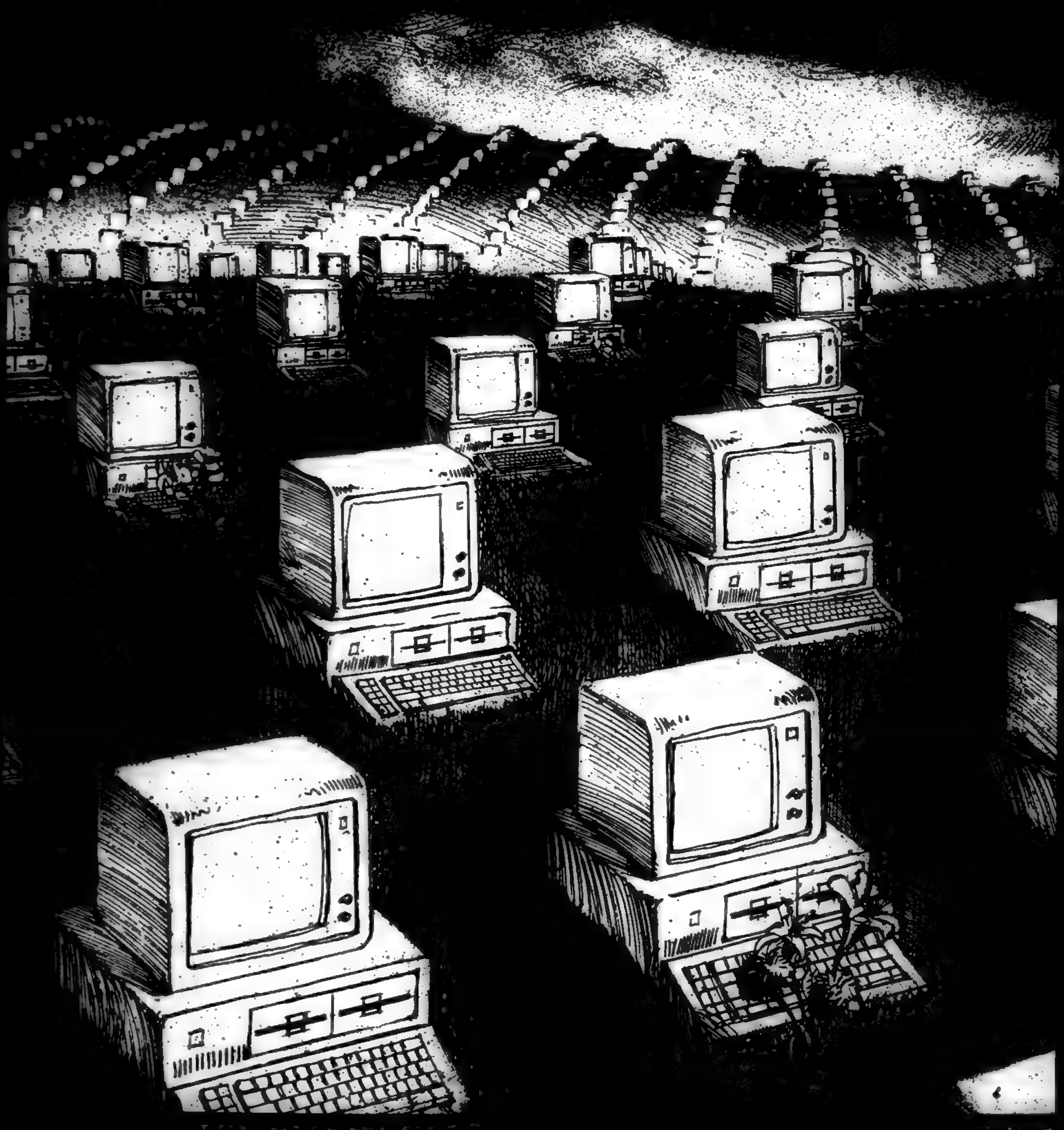

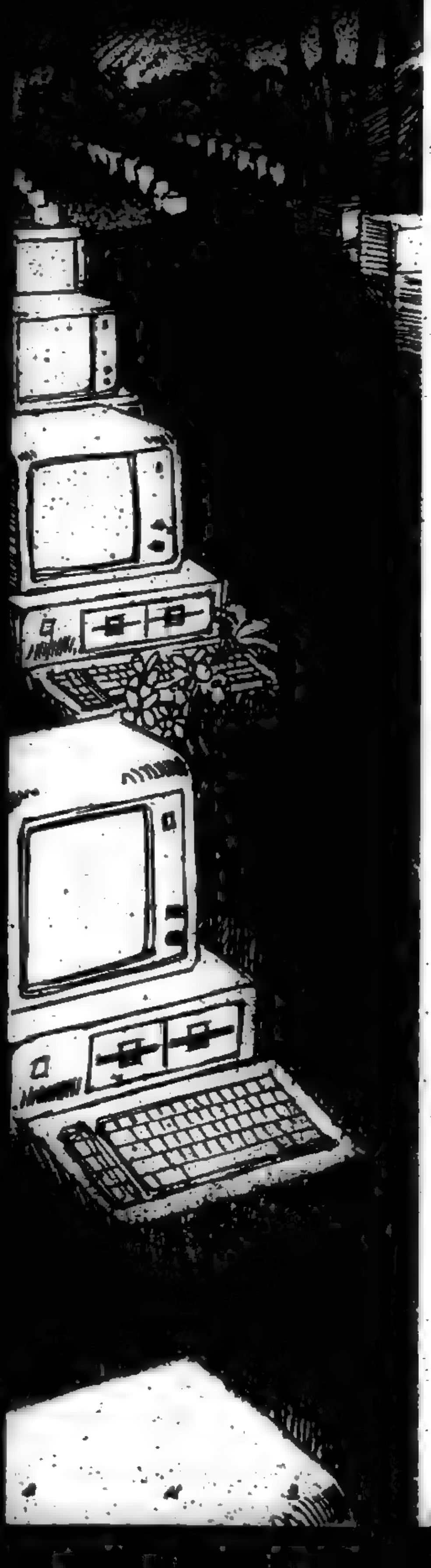

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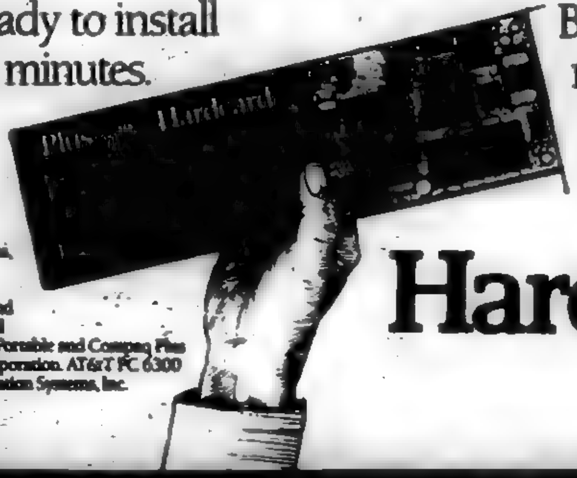

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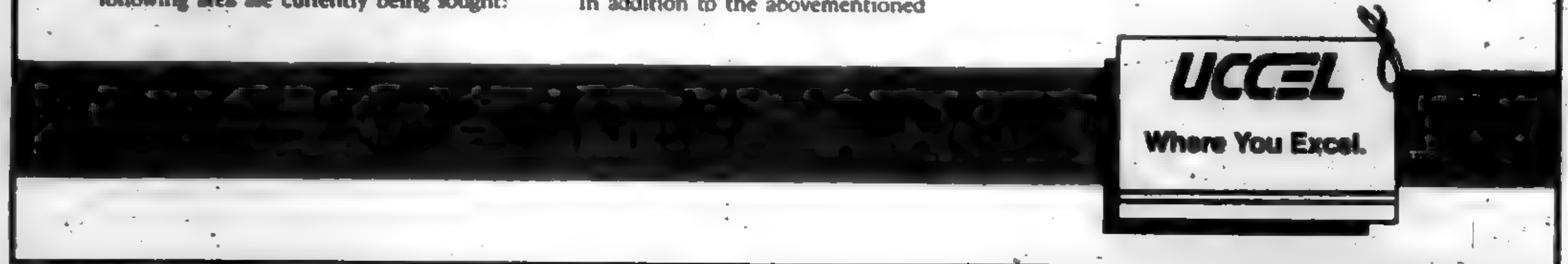

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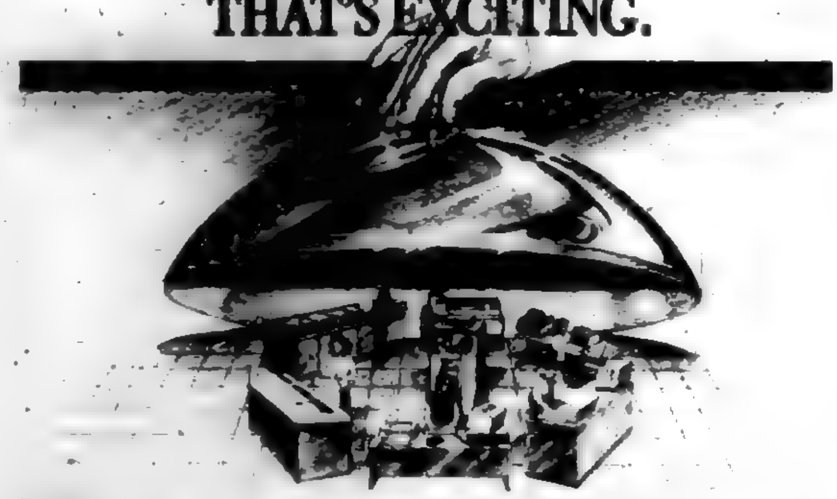

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We offer a competitive salary and a full range of benefits. For consideration please send resume in confidence to:

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Martin Marietta Data Systems offers a comprehensive compensation package, a stimulating professional environment, and the opportunity to advance as far as your initiative will allow. For immediate consideration, send your resume including salary history/requirements in confidence to: Martin Marietta Data Systems, Personnel Dept., 6303 Ivy Lane, Dept. SB-16, Greenbelt, MD 20770.

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Screening will commence October 30. Nominations; letters of application, resume, and four letters of recommendation should be mailed to:

James I. Hoffman
Chair, Search and Screen Committee
Dean, College of Letters and Science
University of Wisconsin Oshkosh
Oshkosh, WI 54901

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Dr. W. Max Ivey at West Virginia Network
for Educational Telecomputing
837 Chestnut Ridge Rd.
Morgantown, WV 26505.

Applicants should furnish the names, addresses, and telephone numbers of five references. Closing date is November 4, 1985. EOE

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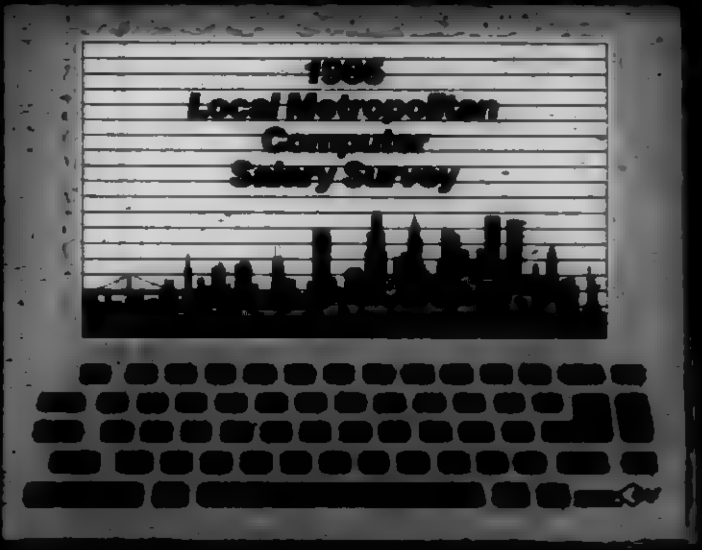

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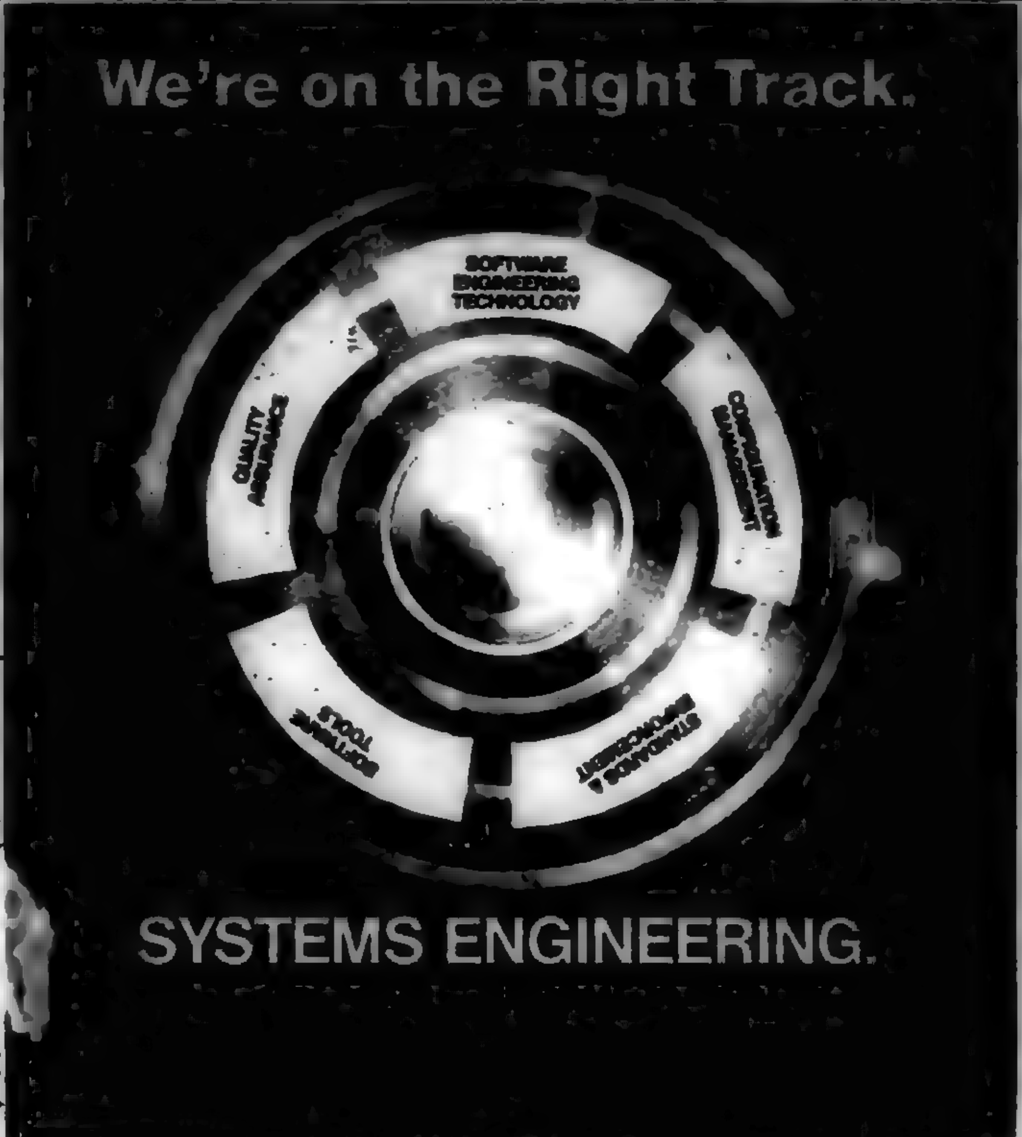

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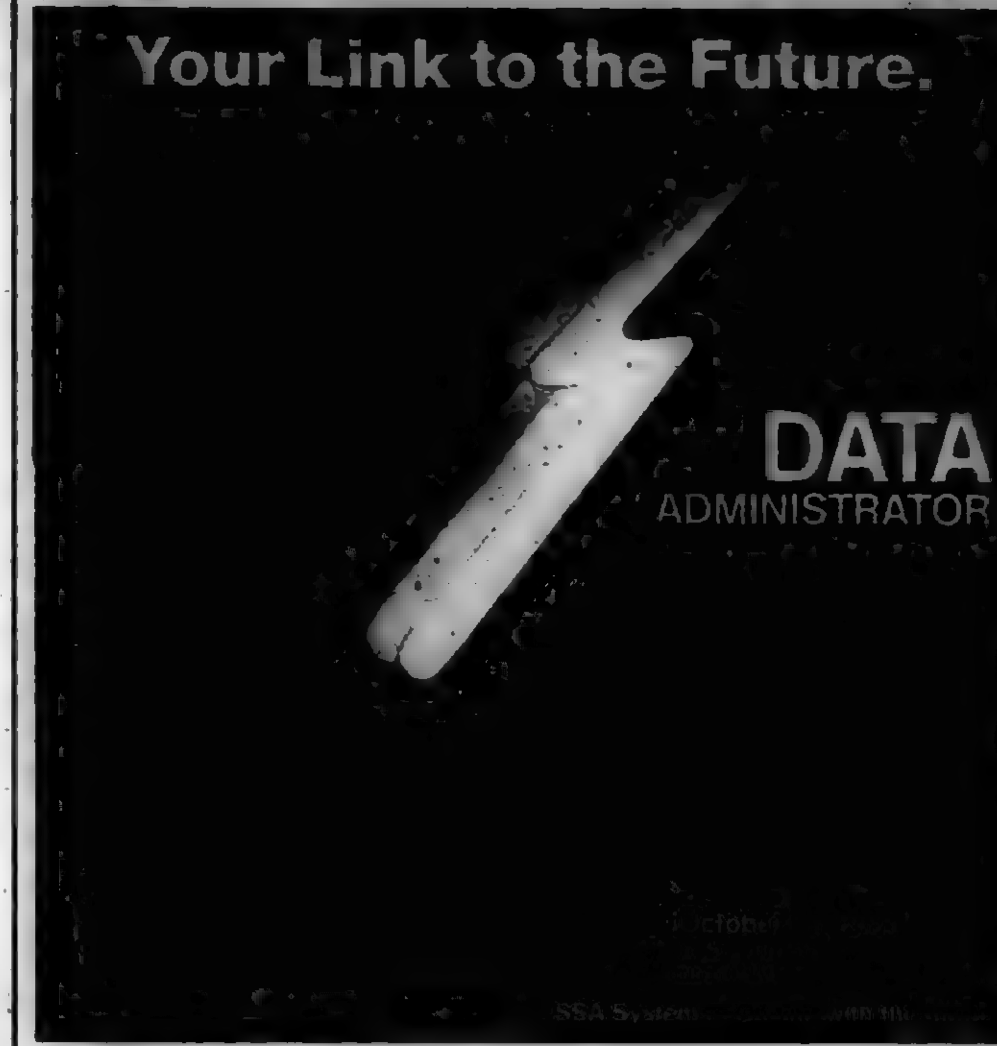

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IBM

SYSTEMS	MIPS (Millions of Instructions Per Second)	MEGABYTES	SYSTEMS	MIPS (Millions of Instructions Per Second)	MEGABYTES
4321	0.25	1	*4381-3	[illegible]	8 to 32
4331-1	0.25	0.5 to 1	3083E	[illegible]	8 to 32
4331-11	0.38	1 to 2	3033N	[illegible]	[illegible] 16
4331-2	0.50	1 to 4	3083EX	4.4	[illegible] 32
4341-9	0.52	1 to 4	3033UP	[illegible]	[illegible]
4361-3	0.70	2 to 4	[illegible]	[illegible]	[illegible]
4341-10	0.75	2 to 4	[illegible]	[illegible]	8 to 32
4341-1	0.88	2 to 4	[illegible]	[illegible]	8 to 32
4341-11	1.1	2 to 8	[illegible]	[illegible]	8 to 32
4361-4	1.15	2 to 12	[illegible]	[illegible]	4 to 24
3031	1.2	2 to 8	[illegible]	[illegible]	8 to 32
4361-5	1.45	2 to 12	[illegible]	[illegible]	16 to 32
4341-2	1.5	2 to 16	[illegible]	[illegible]	16 to 48
4341-12	1.65	2 to 16	[illegible]	[illegible]	16 to 64
3031AP	2.0	2 to 6	[illegible]	14.0	16 to 48
4381-1	2.1	4 to 16	[illegible]	15.5	16 to 64
3032	2.5	2 to 8	[illegible]	26.6	32 to 96
4381-2	2.7	4 to 32	3084QX	28.7	32 to 128
3033S	2.9	4 to 16	†3090-200	29.4	64 to 192
*3083CX	3.3	8 to 32	†3090-400	52.9	128 to 384

*First [illegible] †First installation 1987

AMDAHL

SYSTEMS	MIPS	MEGABYTES
470V/7	[illegible]	[illegible] to 32
470V/8	[illegible]	[illegible] 32
470V/[illegible]	[illegible]	[illegible] to 32
5840	[illegible]	[illegible] to 64
5850	[illegible]	16 to 64
5860	[illegible]	16 to 64
5867	22.0	24 to 64
5868	[illegible]	32 to 128
5870	26.6	16 to 64
5880	26.6	32 to 128

NATIONAL ADVANCED SYSTEMS

SYSTEMS	MIPS	MEGABYTES
AS/8043	5.2	8 to 32
AS/8053	6.5	8 to 32
AS/8063	8.4	*16 to 32
AS/9040	7.2	8 to 48
AS/9050+	9	8 to 48
AS/9060	11.2	16 to 64
AS/9070	16.2	16 to 64
AS/9080	20	16 to 64
†AS/XL-60	28	32 to 256
†AS/XL-80	50	64 to 256

†First installation 1986

The above information is intended as a guideline for computer users on relative computer system instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware/software configurations, and system manufacturers continually modify computer models as design improvements in hardware and software arise.

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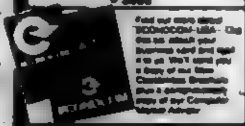

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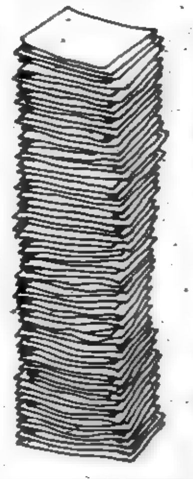

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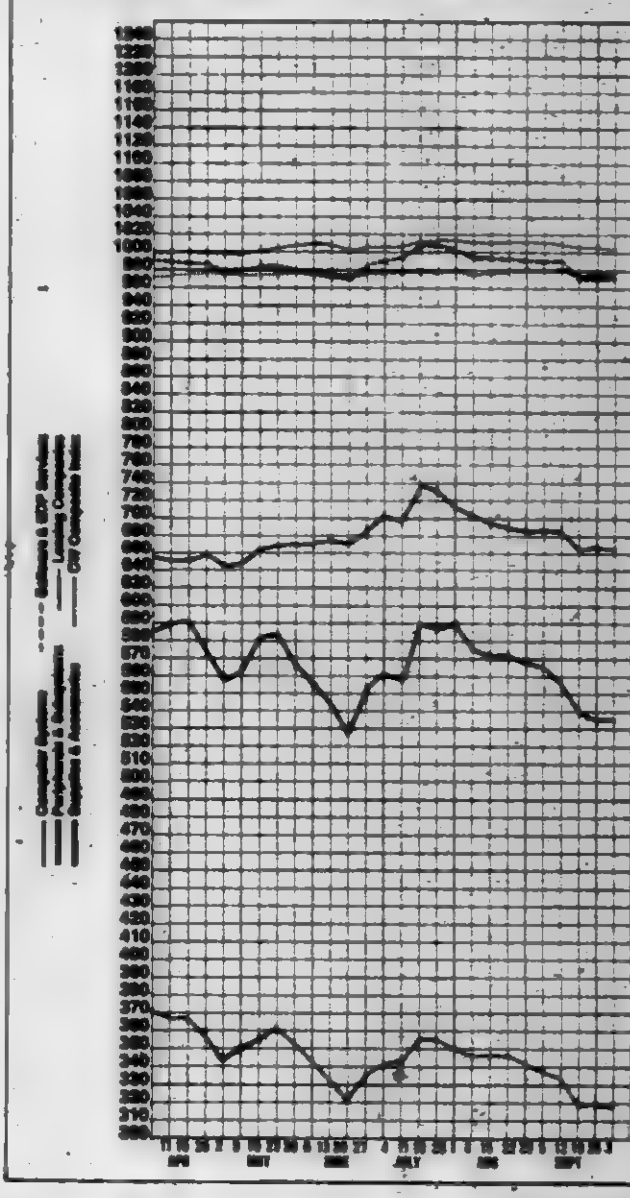

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	LEASING COMPANIES				
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	COMPONENTS				
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EXCH		1985 RANGE (1)	CLOSE OCT 2 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
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	PERIPHERALS & SUBSYSTEMS				
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EXCH		1985 RANGE (1)	CLOSE OCT 2 1985	WEEK NET CHNGE	WEEK PCT CHNGE
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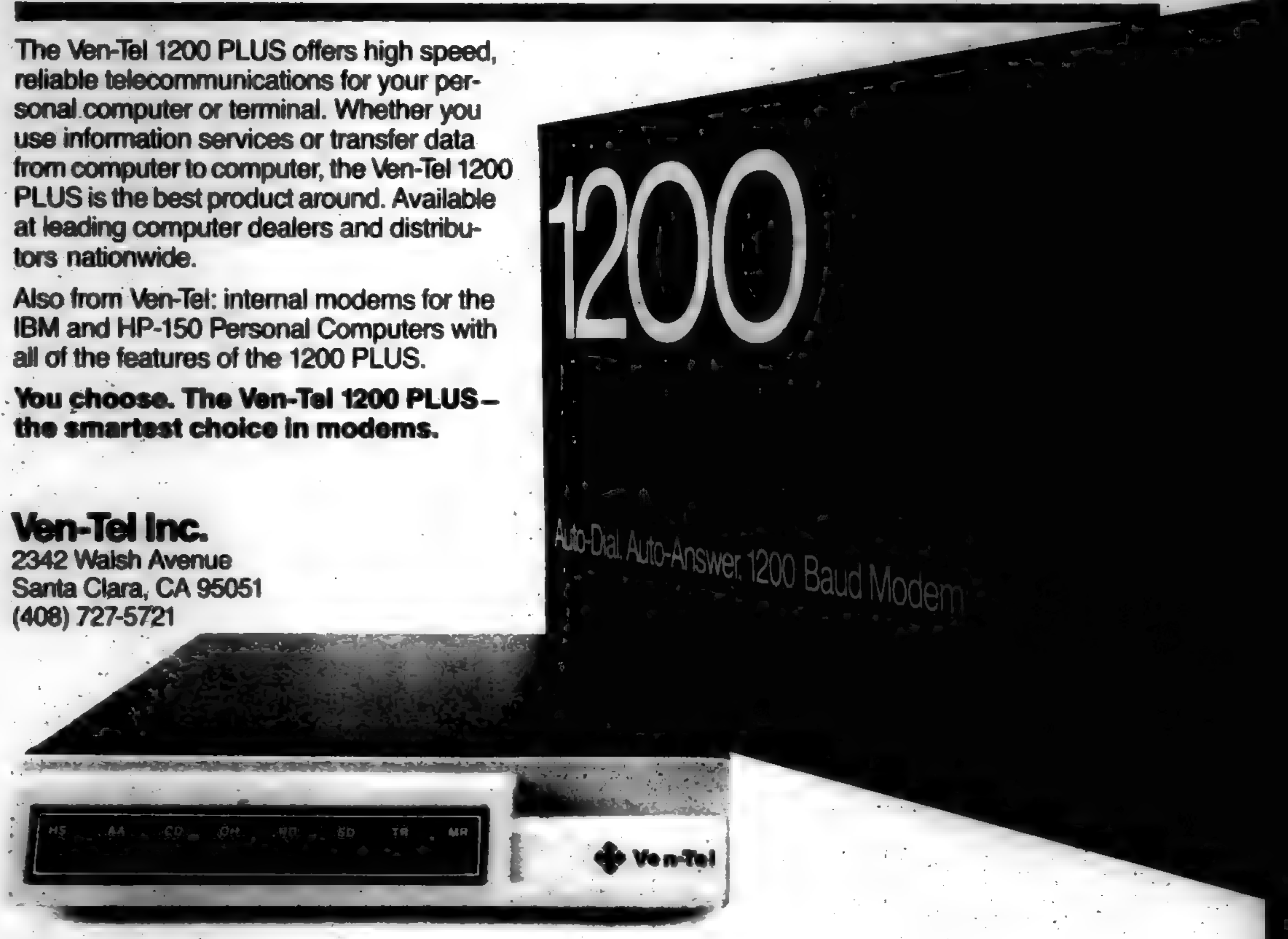

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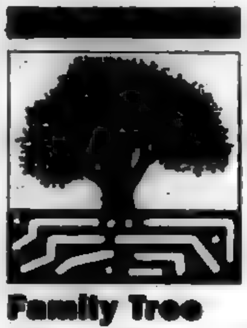

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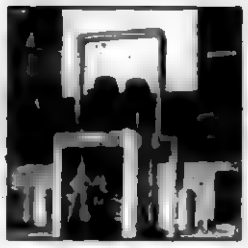

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Pagetec case represents first agency investigation

By James Martin

PHILADELPHIA — A scientific publishing firm here and a New York-based typesetting concern are under examination by the Federal Bureau of Investigation and face civil suits based on allegations that they illegally duplicated a software program sold by Pagetec, Inc. of Westlake Village, Calif.

A $3 million lawsuit, filed Oct. 4 in U.S. District Court in Philadelphia by attorneys for Pagetec, alleges that the Institute of Scientific Information publisher engaged in breach of contract and trade secret misappropriation in its software licensing agreement with Pagetec. According to the suit, the institute provided Ralph Garner Associates, a New York typesetting firm, with an unauthorized copy of the $4,800 data base publishing program licensed by Pagetec. Named as defendants in the suit were the institute and its president, Eugene Garfield, and Ralph Garner Associates and its president, Ralph Garner.

Meanwhile, the FBI said its investigations of the institute and Ralph Garner Associates produced "positive results." Industry sources said they believe these are the first formal federal probes of a software piracy case. FBI agents, after having searched data processing and management information systems departments at both locations, reportedly uncovered an unauthorized copy of Pagetec's Versacomp at Garner's New York office as well as an undisclosed number of allegedly pirated copies of Micropro International Corp.'s Wordstar programs.

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TOP OF THE NEWS

An Intel Corp. news conference this Wednesday is expected to host the unveiling of the prototype of the Intel 80386 chip, the Santa Clara, Calif., vendor's 32-bit, 16-MHz offering. With the 80386 here, can a new IBM Personal Computer line be too far behind?

■

Things may still be blue at IBM with third-quarter financial results — expected after press time — predicted to be slightly below last year's levels. Among leading IBM analysts, Morgan Stanley's Ulric Weil expected the firm to earn $2.45 per share in the quarter ended Sept. 30, as did Frederic Cohen of L. F. Rothschild, Unterberg Towbin. Prudential-Bache's Carol Muratore was slightly more optimistic, with a $2.55

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Users tie snags to Ideal, DBMS

By Charles Babcock

NEW YORK — Idiosyncracies in the Ideal fourth-generation language can significantly impact performance when applications built with the language are employed with a relational data base management system, several commercial users of the product said last week. Ideal was used to build a controversial New Jersey Department of Motor Vehicles system that has created a widely reported bureaucratic snafu [CW, Sept. 30].

But other users interviewed by *Computerworld* said Ideal, a product of Applied Data Research, Inc. in Princeton, N.J., per-

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AT&T adds hybrid unit, supermicro

By Eric Bender

NEW YORK — Marching further into the small systems arena, AT&T Information Systems last week unveiled a number of microcomputer-related products. Among them was a desktop unit, called the PC 6300 Plus, offering the unique ability to run applications concurrently, on one microprocessor, under both MS-DOS and AT&T's own Unix operating systems.

From AT&T's point of view, according to industry analyst George Colony, the unit "will give users what they want today — Microsoft Corp.'s MS-DOS — and the ability to experiment with the operating system of the future."

Colony and other observers, however, questioned user demand for Unix capability in a desktop.

Also announcing MS-DOS desktops last week was Honeywell, Inc., which announced two units said to be compatible with IBM's Personal Computer XT and AT (see story page 12).

Other products released by AT&T included a mid-range supermicro, a more powerful Unix PC, a nonproprietary version of its Personal Terminal voice/data device, the first printers it has manufactured internally, a host of software and other options.

It was the PC 6300 Plus, however, that grabbed the spotlight at concurrent news conferences in San Francisco and New York. AT&T claimed it produced a unique machine, and specifications indicate it is somewhat of a hybrid of the IBM Personal Computer AT and Personal Computer XT. Using the Intel Corp. 80286 processor, the $5,095 machine runs MS-DOS applications.

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FYI

'USA Today': Satellite network delivers daily

By Paul Korzeniowski

ARLINGTON, Va. — William O. Hider knew that communications technology would play a critical role in the publication of *USA Today* when Gannett Co. made him the publication's 12th employee during the paper's formative period in 1981. Since that time, as vice-president of telecommunications, Hider has transformed a blueprint for production of a national, four-color, graphics-oriented newspaper into one of the world's largest and most sophisticated facsimile and satellite networks.

Hider was hired by Gannett from the ranks of American Satellite Co. in Rockville, Md., which builds the transmission equipment and maintains the satellite network for *USA Today*. At American Satellite, he proposed the network eventually chosen to transmit the newspaper.

"Gannett's thinking was that the person who designed the network was the best person to implement it," Hider said. "So the company made me an offer I couldn't refuse."

The heart of the *USA Today* system is an American Satellite dish antenna, 7 meters in diameter, that sits on top of the passageway between two high-rise Gannett office buildings in a suburb of the nation's capital. The dish, with a bandwidth of 300K bit/sec., divided into two 150K bit/sec. channels, sends data to an orbiting Western Union Corp. Westar III satellite. The satellite, in turn, relays the data to 31 print locations scattered across the U.S., each equipped with a 5-meter receive-only satellite dish.

The system can transmit a black-and-white page in three minutes and a color page in six minutes. The receiving print locations — a mix of printing companies, Gannett and non-Gannett daily newspapers — transfer the transmitted data to printing plates, print the day's edition and distribute the paper throughout the region. "Without our satellite system, it would be impossible to produce the newspaper," Hider stated.

■

The 1.2 million copies of *USA Today* that are distributed to airports, hotels, street corners and households each

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NEWSPAPER

Intel to exit dynamic RAM chip mart

Company posts $3.6 million loss in third-quarter 1985

By Clinton Wilder

SANTA CLARA, Calif. — Intel Corp. last week announced that it lost $3.6 million in the third quarter ended Sept. 28 and that it will exit the hard-hit dynamic random-access memory (RAM) chip market.

Intel posted an operating loss of $22.9 million for the quarter, which was reduced by interest, sale of assets, other income and tax credits. Revenue dropped 28% compared with last year's third quarter, from $432 million to $312 million. The per-share loss was 3 cents, compared with a profit of 60 cents per share, or $70 million, in the year-earlier quarter.

Adding to the expected dismal news from Intel was the prediction from Gordon E. Moore, Intel's president and chief executive officer, that the fourth quarter will be even worse, despite a slight pickup in orders.

"Our employees are doing an excellent job of cutting costs," Moore said. "But we're finding it impossible to keep up with the decline in revenue brought on by falling prices and weakness in the computer industry demand."

Intel's third-quarter followed previous red-ink reports from fellow West Coast semiconductor leaders National Semiconductor Corp. and Advanced Micro Devices, Inc. The three firms recently joined together to call for import duties on erasable programmable read-only memory chips allegedly being sold below cost in the U.S. by eight Japanese vendors.

The anticipated fourth-quarter loss will cut further into Intel's meager earnings for the fiscal year, which stand at $16.5 million, or 14 cents per share, for the first nine months. In the first three quarters of 1984, Intel earned $175 million, or $1.50 per share. Revenue has slipped from $1.2 billion to $1 billion in the same period.

The company said its deepest losses came in memory chip products, of which dynamic RAM chips have been hardest hit by falling prices and Japanese competition. Dynamic RAM circuits have become a commodity item with little or no differentiation among vendors except in pricing, and Intel said such chips have accounted for less than 5% of the company's revenue this year. Intel currently makes only CMOS dynamic RAM chips, having discontinued earlier dynamic RAM technologies.

A spokeswoman said Intel would stop making dynamic RAM chips at its Oregon production facility by the end of March 1986 and will seek to transfer the 75 affected employees to other jobs in the company. Intel will continue to provide its dynamic RAM customers with products from alternative vendors, possibly including Japanese firms, she said.

"Prices just continue to weaken and weaken, and that has dragged down the prices of our value-added memory chips," she said.

Susan Scibetta, a memory chip market analyst for Dataquest, Inc. in San Jose, Calif., said Intel's departure from the dynamic RAM business was expected. "They have been trying for a while to focus their business much more on microprocessors, which is their forte," she said. "Even in the CMOS dynamic RAM market, pricing has just collapsed. Technically, [Intel is] very good, but it just can't be profitable at current price levels."

Chip maker plans holiday shutdown

By Clinton Wilder

SUNNYVALE, Calif. — Semiconductor manufacturer Advanced Micro Devices, Inc. announced last week that it will shut down nearly all of its U.S. operations for two weeks at the end of the year, requiring employees to take their vacations during that time.

The company, which recently reported its first-ever quarterly operating loss [CW, Sept. 23], said most of its 7,600 domestic employees will be asked to take six paid vacation days in conjunction with official company holidays on Christmas, Dec. 30-31 and New Year's Day. The Advanced Micro Devices facilities will be shut down from Dec. 23 to Jan. 5.

The company also said employees can borrow up to 10 mandatory vacation days against future accumulation of vacation time to lessen the possibility of having to take unpaid vacation time or furlough.

Most of the firm's domestic employees had already taken eight mandatory vacation days when the company shut its plants for two weeks early last summer in conjunction with the July 4 holiday period.

The move was the latest in a series of cost-cutting measures that the semiconductor vendor has taken to avoid personnel layoffs. Advanced Micro Devices reiterated its no-layoff policy in last week's announcement.

Other measures taken by the company have included a 10% pay cut for managers and other professionals, a 15% pay cut for the firm's top 100 executives, a freeze on hiring and wage increases and the elimination of nonessential expenditures.

The firm has dubbed its cost-cutting program Staunch, which stands for "Stress Those Actions Urgently Needed to Check Hemorrhaging."

Burroughs launches mid-range A 10

By Donna Raimondi

A mid-range entry into Burroughs Corp.'s A series of general-purpose mainframes made its debut late last week, along with an upgrade package for the A 9 system.

The newly announced A 10 system, using emitter-coupled logic circuitry, is available in single- and dual-processor models and falls between the A 9 system announced in January 1984 and the A 15 large-scale system released in March.

The A 10 appears to be targeted at the IBM 4381-size user, according to industry analyst Dave Moschella of International Data Corp. The A series has been a good performer for Burroughs, probably contributing to the fact that Burroughs has had a "decent" year in the middle of the computer industry slump, he said, although the company recently released a dismal earnings projection.

The single-processor Model A 10 F is said to offer a 12% performance improvement over the A 9 system, and it is field upgradable to the A 10 H. The unit costs $580,000 for a base system that includes 12M bytes of main memory.

The dual-processor A 10 H is basically two tightly coupled A 10 Fs and can be used as one system or partitioned into two single systems operating as independent A 10 Fs. This unit is available immediately with a price tag of $962,000 for a 24M-byte basic system.

Also released was the A 10 FXH upgrade package that allows A 9 F and A 9 FX users to upgrade their systems to A 10 H dual-processor machines.

News clues?

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From page 1

AT&T's PC 6300 Plus tops microcomputer lineup

up to 25% faster than the Personal Computer AT but uses a bus that is compatible with the XT, according to spokesmen for AT&T.

John Boyd, vice-president for sales of AT&T's Computer Systems division, told *Computerworld* that the system "will reinforce AT&T's position as a bridge within the computer business."

True concurrency is expected to occur during the first quarter of 1986, when AT&T releases software that enables the PC 6300 Plus to support an MS-DOS application as a task under Unix, with tight integration to the host operating system.

Commenting that AT&T must offer an AT-class machine to continue its offense in the personal computer market, industry analysts predicted that the PC 6300 Plus will be competitive but will not necessarily stand out among the flood of 80286-based systems.

Existing PC 6300s can be upgraded to the system, with a kit costing $2,995 available in December, AT&T emphasized. Colony, director of Forrester Research, Inc. in Cambridge, Mass., applauded the move, saying that "large users don't want to swap out their machines."

The PC 6300 Plus features a 6-MHz 80286 chip with zero-wait states and takes a 15-in.-square footprint (as opposed to the AT's 21- by 17-in. design). A base system comes with 512K bytes of internal memory (expandable to 1M byte on the motherboard and 7M bytes using expansion boards), 12-in. monochrome monitor with text and graphics modes, 84-key keyboard, serial and parallel ports, seven expansion slots, one 1.2M-byte floppy disk drive and one 360K-byte disk drive. MS-DOS 3.1 costs $65.

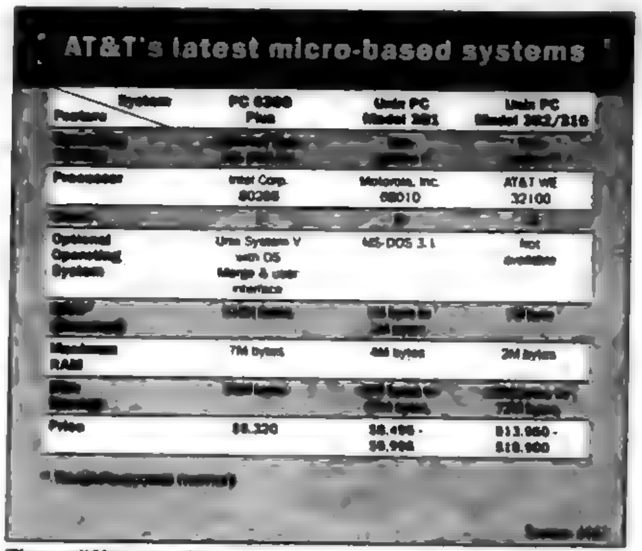
AT&T Unix System V and the OS Merge operating software will carry a $395 price tag. Although the PC 6300 Plus is expected to sell primarily as a single-user system, it will support up to three users under Unix.

An enhanced model that substitutes a 20M-byte hard disk drive for the 360K-byte floppy is priced at $6,320. AT&T does not currently offer options for additional internal storage, although larger disk systems will be introduced next year. Another route is to buy standard IBM-compatible external storage devices, the company noted.

As expected, AT&T last week also introduced another bridge between Unix and MS-DOS in the form of an MS-DOS coprocessor for the Unix PC. Additionally, high-end Unix PC models with additional hard-disk storage and internal memory were unveiled, along with 26 software programs and other options (see story page 5).

AT&T's new 3B2/310 supermicro, supporting up to 14 users, also debuted, as did several enhancements to the 3B2 line (see story page 5). The Personal Terminal 510A is an analog version of the Personal Terminal, which AT&T introduced last March for digital voice/data switches and which has been renamed the 510D. Like the original model, the 510A features a touch-screen two-line telephone, directory dialer for voice and data, a Digital Equipment Corp. VT100-compatible terminal, modem, autodialer, speakerphone, calculator and time manager. The system is available now for $1,545.

Finally, AT&T introduced the first printers that it has built internally for the small systems market. Available immediately, the dot matrix printers were designed for use with the PC 6300 and PC 6300 Plus, Unix PC, 3B2s and the IBM Personal Computer and compatible systems, the vendor said. They operate at 200 char./sec. in draft mode and 50 char./sec. in near-letter-quality mode. The Model 478, with 9½-in. platen, costs $1,095, while the Model 479, with 15-in. platen, is priced at $1,295, AT&T said.



AT&T's latest micro-based systems

System / Feature	PC 6300 Plus	Unix PC Model [illegible]	Unix PC Model [illegible]/310
[illegible]	[illegible]	[illegible]	[illegible]
Processor	Intel Corp. 80286	Motorola, Inc. 68010	AT&T WE 32100
[illegible]	[illegible]	[illegible]	[illegible]
Optional Operating System	Unix System V with OS Merge & user interface	MS-DOS 3.1	Not available
[illegible]	[illegible]	[illegible]	[illegible]
Maximum RAM	7M bytes	4M bytes	2M bytes
[illegible]	[illegible]	[illegible]	[illegible] 720 [illegible]
Price	$6,320	$8,495 - $9,995	$13,950 - $18,900

[illegible]

Source: [illegible]

Three different microprocessors power the microcomputer systems released last week by AT&T, ranging from the 16-bit Intel Corp. 80286 to the 32-bit AT&T WE 32100.

Analysts downplay 6300 Plus' Unix ability

By Eric Bender and Peggy Watt

The ability to blend concurrently Microsoft Corp. MS-DOS and AT&T Unix applications on the AT&T PC 6300 Plus is a significant technical accomplishment, but observers are divided on the value of that ability in the corporate market.

"AT&T is pushing Unix no matter what," said Aaron Goldberg of International Data Corp. in Framingham, Mass. In the marketplace targeted by the machine, though, "Unix is not a factor," he maintained.

At least initially, the system will sell primarily as an IBM Personal Computer AT-compatible product based on its faster speed, analysts pointed out; AT&T said the product actually uses a bus that is compatible with the IBM Personal Computer XT. And while some who had seen the machine generally commented favorably on its performance, they suggested that the PC 6300 Plus lacks features to strongly distinguish it from the many AT-compatibles already introduced.

With a glut of ATs and compatible systems on the market, "there's rough sledding ahead for any AT clones," according to George Colony of Forrester Research, Inc. in Cambridge, Mass. Corporate users are proving unwilling to accept the additional costs for the high-end machines, he said. However, he added, vendors "have to have an AT to be in the market today."

"It makes all the sense in the world" for AT&T to introduce an IBM Personal Computer AT-compatible system," agreed William Ablondi, vice-president for markets at Future Computing, Inc. in Dallas. As did other industry analysts, he noted that AT&T's intentions to become a very broad-scale vendor of computer products required that move.

AT&T keeps "putting solutions out and is going to hit on some success formulas," said analyst Jeffrey Stone of Menlo Park, Calif.

AT&T successfully has established some beachheads in corporate America for its numerous personal computer products, the analysts pointed out. Forrester surveys indicate that AT&T is in fourth place

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Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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Unix PC enhancements include MS-DOS coprocessor

By Eric Bender

NEW YORK — AT&T last week boosted its beleagured Unix PC desktop with a coprocessor running Microsoft Corp.'s MS-DOS, new models offering higher storage and internal memory capabilities, a flurry of software packages and other enhancements.

The coprocessor board for the expanded Unix PC line, the DOS-73, features an 8-MHz Intel Corp. 8086-2 chip with 512K bytes of internal memory, an RS-232 port and a socket for an Intel 8087 numeric coprocessor. The board runs under MS-DOS 3.1 and runs most IBM Personal Computer software in a window that runs concurrently with other applications windows. DOS-73 will be available next month for $995. An 8087 coprocessor also will be offered for $295.

The Unix PC Model 3B1 introduced last week is aimed at multiuser applications. It is based on a 10-MHz Motorola, Inc. 68010 chip and runs Unix System V Version 3. Three configurations were announced, all scheduled for delivery next month and including a 320K-byte floppy disk drive, mouse, 300/1,200 bit/sec. modem, monitor and keyboard. A configuration with 1M byte of random-access memory (RAM) and a 40M-byte hard disk drive costs $8,495, a version with 2M bytes of RAM and 40M bytes of storage is priced at $8,995, and a system with 2M bytes of RAM and 67M bytes of storage costs $9,995.

AT&T also announced upgrades to the existing Unix PC Model 7300. A 20M-byte upgrade kit costs $975 and is available now. A 40M-byte upgrade kit sells for $3,495, and a 67M-byte kit is priced at $3,995. Both will be offered next month.

Among the other options are a $1,995 23M-byte external streaming tape backup unit, available in November, and a 2M-byte RAM expansion board, priced at $1,795 and available now.

An IBM 3270 Systems Network Architecture emulator software package for the PC Unix line will be offered in first-quarter 1986 for $795, AT&T said.

The 26 new Unix PC software packages, most of them shipping now, boosts the total of Unix PC packages to 54 programs available from AT&T and 160 packages overall, the company said. Among the introductions are Ryan-McFarland Corp.'s RM/Fortran and Language Processors, Inc.'s LP1/Fortran, each priced at $795; Micro Focus, Inc.'s Level II Cobol and Cobol Runtime, which cost $1,195 and $295, respectively; Relational Database Systems, Inc.'s Informix and Informix Runtime, which cost $895 and $395; and Micropro International Corp.'s Wordstar 2000, which is priced at $495.

Unix-based 3B2/310 out

AT&T Information Systems repackaged most of its AT&T Unix-based 3B2/400 supermicrocomputer in a smaller box for its introduction of the 3B2/310 last week.

It was an announcement that received a lukewarm response from several analysts, who concluded that it was an average upgrade from the existing 3B2/300. Designed for simultaneous support of six to 14 users, depending upon the application, the 3B2/310 is based on the same 32-bit, 10-MHz microprocessor that is included in the WE32100, AT&T's 25-user 3B2/400.

AT&T claimed that the 3B2/310 offers processing power close to that of the 3B2/400. The 3B2/310 is targeted at scientific, engineering and business graphics applications involving departmental computing where work groups share files. It offers an optional WE32106 math acceleration unit that AT&T said produced a benchmark of more than 200K double-precision C language whetstones per second.

Users with 3B2/300 systems, which support a maximum of 10 users, can migrate to the 3B2/310 with a field-upgrade kit priced at $2,500 including installation. AT&T also said the 3B2/310 is source-code compatible with all computers based on AT&T Unix System V and object-code compatible with the 3B2/300, 3B2/400 and with its 3B5 and 3B15 superminicomputers.

The basic 3B2/310 includes 1M byte of main memory with two expansion slots for expansion to 2M bytes, two RS-232C ports controlled by the system board, four RS-232C ports and one parallel port controlled by an I/O expansion port card and four feature card expansion slots.

The base system with a 30M-byte hard disk and one I/O card costs $13,950 and is available now. The basic system with the math acceleration unit costs $15,550, and the system with a 72M-byte hard disk and math acceleration unit costs $18,900. The field-upgrade kit will be available in November. A 23M-byte cartridge tape unit for hard disk backup will be available in December for $2,595.

— James Connolly

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From page 1

'USA Today': Satellite network delivers daily

weekday carry the stamp of a number of Gannett employees. Some stories come from Gannett's news wire, which is fed by the reporting and editing staffs of 85 Gannett newspapers and six television stations. Material not gleaned from the news wire is generated by the 400 editors and reporters who work exclusively for *USA Today*.

These reporters, and their editors, process copy on systems provided by Atex, Inc. of Bedford, Mass., a leading vendor of publication word processing systems. The news staff works with 400 terminals attached to 16 Atex systems, which are based on PDP-11 minicomputers from Digital Equipment Corp.

When editors complete work on a story, the story is transmitted electronically to a typesetting machine. News and advertising copy are then pasted up by designers, proofread and taken to a camera department. There, the pasted-up pages are transformed into black-and-white or color-page prints by cameras the size of compact automobiles, from Chemco of Glen Cove, N.Y.

Next, the prints are placed on Ricoh Corp. K660 facsimile scanners, which digitize the images. A Ricoh data compression device transforms the images that would normally require a 1.54M bit/sec. T1 line, so they only need one 150K bit/sec. channel. The compressors are connected to the 7-meter rooftop dish. From the Arlington headquarters, 48 pages of news and feature material are sent to 31 printing locations and, ultimately, to readers throughout the country.

■

Not that the *USA Today* transmission system is bulletproof. Because its function is so critical, the system includes a number of backup features. Along with each page shipped, for example, a one-way voice message informs the various printing locations of what is coming. A multidrop private line network from AT&T equipped with Codex Corp. modems allows one or more of the sites to contact Arlington in case of a failure. "If one site is having problems, we can take it off the network, troubleshoot the line and later retransmit the data," Hider said.

Another emergency concern, breakdown of the transmitting satellite dish, is addressed through the presence of a T1 line connecting the central site with a backup satellite broadcasting facility approximately 10 miles away in Springfield, Va. Should lightning or worse strike the central sending satellite, the backup unit could transmit pages to the Westar III satellite.

> *'Without our satellite system, it would be impossible to produce the newspaper.'*
>
> — **William O. Hider**
> *USA Today*

■

Transmission of a given day's worth of *USA Today* news and advertising materials is virtually a round-the-clock affair. From 6 a.m. to noon EST, technicians send test pages to a receiving dish at the Arlington headquarters. The tests ensure that the central site's scanner equipment is calibrated.

Following calibration of the central site equipment, receiving site equipment has to be set. Test pages are broadcast from Arlington to the various printing sites between 1 p.m. and 2 p.m. EST. To ensure that a certain red tint in the Los Angeles edition mirrors that in the New York edition, individual technicians set their plants' receiving equipment so that the red tints at the 31 plants fall within a 4% range.

Once testing is completed, Arlington begins sending the day's material. Each of the paper's four sections is transmitted so that the first U.S. edition is completed by midnight EST, the second by 1:30 a.m. and the third by 3:30 a.m. Also during the day, a European and Middle East edition, consisting of two rather than four sections, is sent to a printing plant in Western New York, from which it is flown to JFK International Airport for a trip to London for overseas distribution.

When the *USA Today* system was designed in 1981, the required technologies were relatively new. In the bidding among prospective vendors, American Satellite beat out RCA American Communications, Inc. and Western Union largely because American Satellite had supplied Dow Jones & Co. with a similar net for printing *The Wall Street Journal*.

Now, Hider claimed in a recent interview, the *USA Today* process has surpassed that of the *Journal*'s 20-site network. However, the *USA Today* system may be eclipsed next year when Federal Express Corp. is set to complete a proposed 25,000-site satellite system.

Even with the cost of traditional communications systems falling, Hider maintains that *USA Today*'s satellite system is more cost-effective than terrestrial systems. He estimated that a terrestrial system would cost the newspaper $700,000 per month compared with its current $300,000 monthly outlay. He added that the satellite system error rates are twice as low as comparable terrestrial services. "When fiber-optic lines are installed, terrestrial transmission will become cheaper and more reliable; then we may look at it," he said.

Right-of-ways often complicate implementation of a satellite network. "Most companies do not know who to contact for right-of-way approval," he said. "We became very good at identifying the proper municipal department to contact."

■

Savings are a critical factor at *USA Today*, as the newspaper has run at a deficit since its inception and no profits are expected until 1987. Meanwhile, daily page totals have risen from 40 to a current average of 48, with an increase to 56 planned by the end of this year.

To keep up with this growth, Hider plans to add telecommunications staff and printing plants. Currently, Hider stated, 70% of the country receives the paper on the day that it is printed; the addition of other printing locations should bring this figure close to the 100% mark.

Future plans also call for a weekend edition and for a European edition. Earlier this month, an Asian edition was launched. R&R Donnelley & Sons Co. is overseeing the edition's transmission. The Asian edition is sent from Arlington to New York by a land line. Then, it is relayed by international satellites first to London, then over the Indian Ocean. A receive station in Singapore is the final destination for the data. When readers in the Far East sit down to breakfast with a fresh, multicolored edition of *USA Today* before them, they can whisper a quiet thanks to William O. Hider.

From page 4

Analysts downplay 6300 Plus' Unix ability

among micro suppliers in the Fortune 1,000 market, Colony said. He and Goldberg both estimated that AT&T will ship 110,000 personal computers overall this year. However, very few of those will be Unix PCs, analysts said, with estimates ranging downward from 15,000.

Some analysts saw the systems as a boost for Unix and the software developer who hopes AT&T's implementation is just one of many.

Locus Computing Corp. of Santa Monica, Calif., developed the OS Merge system to enable AT&T's PC 6300 to run MS-DOS and Unix concurrently and retained rights to the technology to market it to other manufacturers. The company declined to name any potential customers but said several are in the offing, both for new machines and as upgrades to models already on the market.

Dave Butterfield, Locus systems development manager, said the plug-in card that converts the AT&T Unix PC into a Unix/MS-DOS combination machine works with most systems with Intel Corp. processors. He said Locus is also looking to install OS Merge on a machine with an Intel coprocessor. He calls OS Merge an "operating environment."

Minderaft, Inc. analyst Bruce Weinger, from Palo Alto, Calif., said he would like to get an IBM AT running Unix on his own desk.

"[AT&T has] positioned the 6300 as a single-user machine. I think people will buy it as a powerful [MS-DOS] machine, and Unix will get in the back way," Weinger said.

"Any good operating system is one you aren't aware of," said Brian Boyle, director of research for Novon Research Corp. of San Francisco, pointing to the "hidden" Unix in the PC 6300 Plus. He named networking capabilities as its most attractive potential.

"There are those who say they don't want Unix. [AT&T] put this together so [it] can say, 'What do you want? [MS-DOS?] Fine, now you've got it — in the same box with Unix,' " Boyle said.

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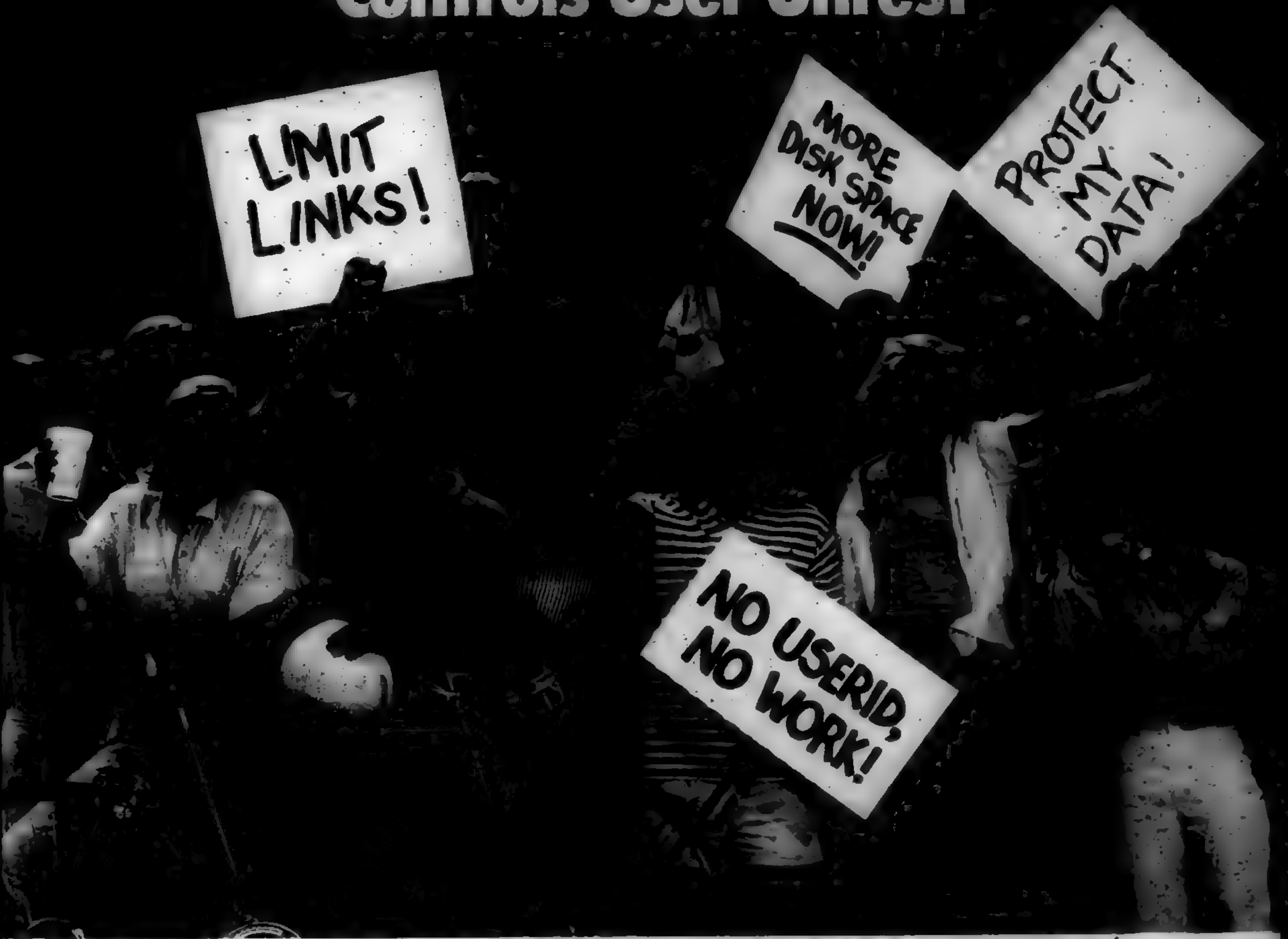
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From page 1

Users tie snags to Ideal, DBMS

formed as expected in a production environment and suggested that any performance problems they encountered were the result of predictable processing bottlenecks in working with the indirect access methods of relational DBMS.

Comments from the commercial users ranged from, "Ideal did everything ADR said it would [do]," to, "We're getting close to turning the power on, and we're running into all kinds of performance problems." Some glitches appeared to be limited to a particular site, but several were common to a sample group of nine users contacted by *Computerworld*. All were users of Ideal and Datacom/DB, the ADR relational DBMS.

From the outset of the New Jersey Department of Motor Vehicles' controversy, ADR officials have maintained that they lack sufficient knowledge of that particular system's design to comment on the specific problems. They are cooperating with the state to resolve the matter.

The accounting firm of Price Waterhouse & Co., awarded the contract on a noncompetitive basis in November 1983, turned to Ideal and Datacom/DB last year to develop a new system for the New Jersey Department of Motor Vehicles. When the full system was implemented in July, operating on a National Advanced Systems Corp. 8083, it ran too slowly to make the required updates. A backlog of 1.4 million registration renewals built up, and, as a result, police departments around the state were ordered to stop citing motorists for expired registrations.

Price Waterhouse, on the advice of its attorneys, refused to appear at a hearing before a state Assembly committee Oct. 3 to explore the causes of the backlog. The firm is subject to extensive contract penalties amounting to $50,000 a month beginning in October for late delivery of the completed system.

Price Waterhouse spokesmen did appear at a New Jersey Assembly hearing last Tuesday, Oct. 8, to which they had been subpoenaed, and acknowledged buying $15,000 in tickets to a fund-raising dinner for New Jersey Gov. Thomas Kean in September 1983. The contribution was made shortly after the state exempted the firm in July 1983 from competitive bidding for the $6.5 million Department of Motor Vehicles contract. They did not address the specifics of the department's backlog problems, however.

Although declining to comment on the specific performance problems at the New Jersey Department of Motor Vehicles, Joseph W. Farrelly, vice-president for research and development with ADR, said Price Waterhouse used Ideal to develop the state system because Price Waterhouse "faced time constraints" and wanted to avoid paying contract penalties. Farrelly said the high-volume processing requirements should have been written in Cobol, although last December, ADR told *Computerworld* that Ideal is a functional replacement for Cobol.

> ***"Comments from users ranged from, 'Ideal did everything ADR said it would [do],' to, 'We're running into all kinds of performance problems.'***

Commercial users, however, were able to point to several features of the fourth-generation language and Datacom/DB that could have led to the severe performance problems in a multiuser production environment.

Ideal shields the user from knowing whether a query to the relational DBMS is using established keys or if the query is forcing the system to determine its own access path, according to Jo Ruspici, systems analyst at Columbia Pictures in Burbank, Calif., which uses Ideal and Datacom/DB to keep track of its motion picture and television show inventory.

If multiple users ask the system to derive its own access method, "they could be doing flat file searches without knowing it," agreed ADR's Richard Kauffman, vice-president of the applications development product group.

A flat file search, or population count, forces the computer to go through all indexes to the data base and build a new one containing the locations of the searched-for elements. Control of this procedure is passed from Ideal and Datacom/DB to what the users referred to as "the black box," the DBMS' Compound Boolean Selection facility, which determines the statistically most efficient method of retrieving the data, the users said.

If someone was looking for Texas males in a data base, for example, Compound Boolean Selection would conduct a population count and determine that there was data on 100,000 males but only 50,000 Texans, so the quickest way to retrieve the information is to begin indexing Texans, said Byron L. Griffin, manager of the information center at Diamond Shamrock Refining and Marketing Co. in San Antonio.

This procedure is time consuming, however. "It takes 3¼ hours to read all the indexes in our data base. I stay away from it," said Columbia's Ruspici, whose data base contains 7 million records.

This feature was the one area where ADR officials said they knew of a connection between their products and the Department of Motor Vehicles' slowdown. When questioned on the point, Kauffman said, "Yes, I think that is the case, but I'm not so sure we want to comment further on the point."

Ruspici and other users also warned about creating too many keys for access to data in Datacom/DB. Columbia Pictures has limited itself to 14 keys after a trial-and-error method of encountering slowdowns when it tried to use more. It takes two hours to update 2,500 records a day in the 7-million-record data base, she said.

ADR's Kauffman also urged users to limit the creation of keys. "If you define everything in the data base as a key, your index is going to be larger than your data base," he said.

But other users said they had yet to reach the slowdown stage with as many as 32 keys. Israel E. Gotay, data base administrator for the U.S. Federal Energy Commission in Washington, D.C., said its Datacom/DB data base of 40,000 records of 4,000 bytes each was running smoothly on its IBM 4341 processor. It handles up to 10,000 transactions a day.

Spencer Dockins of Northern Telecom, Inc. said Ideal has a subprogram calling feature that introduces an element of unpredictability in how subprograms run after their first call.

The feature was designed to free CICS resources periodically by storing called subprograms after they have been run, although on some calls the subprogram may still be resident in the computer memory. If the initials or data values in the subprogram were changed by the run, and the subprogram had not been stored, a subsequent call would employ the changed values rather than use a fresh version, he said.

ADR's Kauffman said multiple users of Version 1.1 of Ideal, released 15 months ago, ran the risk of getting a run version of the subprogram before it had been released from memory. Version 1.2, released at the end of August, corrected the problem, and other users have found ways to eliminate the uncertainty in 1.1 through command structures in the subprogram.

Kauffman said he did not believe the release feature had contributed to problems at the Department of Motor Vehicles. At one point a junior technical advisor at ADR had urged Price Waterhouse to employ the feature, but his recommendation was countermanded the same day by ADR product specialists, he said.

The department has been plagued by unpredictable output along with its entry backlog. When municipalities were asked to check on the registration of their vehicles, police cars at scattered locations were registered with the correct license number, department and street address but with the wrong town. The department has also been plagued by automatic registration renewal mailings going to drivers at their home address but at the wrong time of year.

Kauffman said he did not know enough about Price Waterhouse's implementation to say what caused the problems. The department has re[illegible] Version 1.2 for development [illegible] but is still using Version 1.1 for production purposes, he said.

Diamond Shamrock's Griffin said subprograms are automatically paged out to storage if they are not automatically released by Ideal at his installation. He has also taught his programming staff to avoid Compound Boolean Selection and said his firm's sophistication in using Ideal and Datacom/DB stems from meetings of the Houston Users Group, which has frequently hosted top ADR technical spokesmen.

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All seminars through December 31 are listed below. Call for information on later seminars.

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				Manufacturing	Financial	Human Resources
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Montgomery	12-4-85	●	●			
CALIFORNIA						
Los Angeles	11-6-85	●				
San Diego	10-23-85	●	●	●	●	●
San Jose	11-5-85	●	●	●	●	●
COLORADO						
Denver	11-12-85	●	●	●	●	●
CONNECTICUT						
Hartford	11-19-85	●	●	●	●	●
DISTRICT OF COLUMBIA						
Washington D.C.	11-26-85	●	●	●	●	●
FLORIDA						
Jacksonville	11-20-85	●				
Tallahassee	12-5-85	●				
Tampa	11-6-85	●	●	●	●	●
GEORGIA						
Atlanta	12-11-85	●	●	●	●	●
HAWAII						
Honolulu	11-26-85	●				
ILLINOIS						
Chicago	12-4-85	●	●	●	●	●
INDIANA						
Indianapolis	12-11-85	●	●	●	●	●
South Bend	12-3-85	●	●	●	●	●
MAINE						
Portland	10-16-85	●				
MARYLAND						
Baltimore	10-15-85	●	●	●	●	●
MASSACHUSETTS						
Boston	12-12-85	●	●	●	●	
MICHIGAN						
Detroit	11-14-85	●	●	●	●	●
Grand Rapids	10-18-85	●	●			
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Minneapolis	12-12-85	●	●	●		
MISSISSIPPI						
Jackson	11-5-85	●	●	●		
MISSOURI						
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Omaha	12-9-85	●	●	●	●	●
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Princeton	11-15-85	●	●	●	●	●
NEW MEXICO						
Albuquerque	10-15-85	●				
NEW YORK						
Albany	11-7-85	●				
New York	11-7-85	●	●	●	●	●
Rochester	10-24-85	●	●	●	●	●
Syracuse	12-12-85	●				
NORTH CAROLINA						
Charlotte	12-10-85	●	●	●	●	●
OHIO						
Columbus	12-12-85	●	●	●	●	●
OKLAHOMA						
Oklahoma City	12-3-85	●	●	●	●	●
PENNSYLVANIA						
Philadelphia	11-21-85	●	●	●	●	●
Pittsburgh	10-15-85	●	●	●	●	●
RHODE ISLAND						
Providence	11-6-85	●				
SOUTH CAROLINA						
Charleston	11-26-85	●	●	●		
Columbia	11-7-85	●	●	●	●	●
TENNESSEE						
Chattanooga	12-18-85	●	●			
Knoxville	11-20-85	●	●	●		
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Nashville	10-30-85	●	●	●	●	●
TEXAS						
Amarillo	12-4-85	●				
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El Paso	11-6-85	●	●	●	●	●
Lubbock	10-17-85	●				
San Antonio	10-29-85	●	●	●	●	●
Tyler	10-16-85	●				
VIRGINIA						
Lynchburg	12-17-85	●				
Norfolk	11-12-85	●				
Richmond	10-29-85	●				
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CULLINET SEMINARS/CANADA FALL/WINTER 1985

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Nixdorf offers IBM-compatible 8890 version for offices

Beefs up system's multitasking support

By James Connolly

WALTHAM, Mass. — Nixdorf Computer Corp. will announce today that it is moving its IBM-compatible mainframes into the office environment in addition to improving the systems' multitasking support and communications capabilities.

The 8890 Compact series is largely an enhancement of the existing 8890 line that competes with the IBM 4331 class of systems. The product introduction focuses on the size of the three new 8890 models — Models 32C, 52C and 72C — which are said to be 50% smaller than the previously installed Models 32, 52 and 72 while offering the same processing speed, which ranges from .25 to .7 million instructions per second.

Nixdorf officials said the compact series is suitable for the office environment, running on 110V with no need for special environmental conditions. Nixdorf, which has installed 750 8890 series systems, said it is discontinuing one of the two earlier models designed to run in the office — the low-end 8890 Model 12 — but will continue production of the 8890 communications processor, a front-end processor installed in the office. All 8890 deliveries beginning in the first quarter of 1986 will be the compact versions.

Nixdorf enhancements in the 8890 series included improved multitasking and peripheral support capabilities for its Nidos/VSE operating system. The Nidos/VSE enhancements include an Auto Priority Balancing scheme for handling concurrent tasks and improved system file recovery and restore capabilities, Nixdorf said. Also included in the announcement is Version 2 of Nixdorf VSAM, full support of IBM 3370 disk-drive capacities and enhanced locking options for file security.

Communications capabilities announced include the ability of all models in the 8890 system to support the maximum six I/O channels and an increase in the speed of those channels from 1.8M bit/sec. to 2.2M bit/sec. Nixdorf also said all systems, regardless of the model, will be able to support the maximum 256 terminals, four printers, 16 communications lines and 20 tape drives.

The company said an integrated communications adapter provides communications speeds of up to 56K bit/sec., three times the previous 19.2K bit/sec. rate.

Nixdorf's 8330 and 8370 disk-drive lines also are being enhanced with the addition of double-density versions, increasing the capacity of the previous 100M-byte drive to 200M bytes and the 129M-byte drive to 260M bytes.

The 8890 series is targeted at the general-purpose DP market, dedicated single-purpose applications, computer-aided design and manufacturing applications and distributed DP for the office.

A typical configuration for the 8890 Model 32C with 1M byte of memory, a 260M-byte disk drive, a streaming tape drive, a 300 line/min printer, four terminals and a four-line communications adapter costs $91,500.

The typical mid-range Model 52C includes 2M bytes of main memory, 1.2G bytes of disk storage, two high-density tape drives, a 600 line/min printer, 10 terminals and a four-line communications adapter. It costs $150,000.

At the high end, the typical Model 72C includes 4M bytes of memory, 2.5G bytes of disk storage, two high-density tape drives, two 600 line/min printers, 15 terminals and a four-line communications adapter. It costs $250,000.

Nixdorf also is announcing that two value-added resellers will market turnkey systems based on the 8890 using the Pick Systems' Pick operating system. Those resellers are Database Solutions, Inc. of Houston and Tiger Computer Corp. of Costa Mesa, Calif. Nixdorf said it also plans to offer the Pick operating system on its other product lines.

Tandem exec to join Arete

CUPERTINO, Calif. — One of Tandem Computers, Inc.'s most senior executives resigned last week to join Arete Systems Corp., a San Jose, Calif., manufacturer of microprocessor-based departmental systems.

David R. Mackie, vice-president of U.S. marketing for Tandem, resigned effective Oct. 15 to assume a marketing position with Arete. Mackie joined Tandem two months after the company, which manufactures fault-tolerant, transaction processing systems, was founded in November 1974. A company spokesman said Mackie's departure was "cordial on both parts."

Mackie's domestic marketing responsibilities will be assumed by Gerald L. Peterson, Tandem's vice-president for international marketing.

— James Connolly

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Continued from page 1

earnings-per-share estimate for the quarter, but that was still below IBM's $2.65 per-share mark in the same period last year.

"Nothing has happened recently to change what I've said before," Weil said last week. "This is based on everything we've heard from [IBM] about 3090 shipments not making any impact until the fourth quarter."

■

An era is coming to an end. And a new one is about to begin. According to reliable sources, IBM will announce Tuesday at least portions of its fabled local network, bringing to a halt one of the communications industry's favorite pastimes, speculation about Big Blue's local-area network plans. Welcome a new era of interpretation, rumination and probably further speculation about the consequences.

■

Amid the parade of IBM Personal Computer AT look-alikes, Future Computing, Inc. last week said it expects sales of AT compatibles to grow from 94,000 units this year to 342,000 next year. IBM, meanwhile, will sell 292,000 units of the original this year and 568,000 next year. Future Computing stressed, however, that is was only including "operationally compatible" machines. Future Computing said Hewlett-Packard's Vectra is operationally compatible with the AT, but AT&T's PC 6300 Plus (see story page 1) and ITT's Xtra PC are operationally compatible with the Personal Computer XT.

■

Cullinet Software told the estimated 4,000 attendees at its ninth annual User Week in Boston last week that it has completed delivery of its manufacturing information system. The final two modules — purchasing and cost control — of its eight-module integrated manufacturing applications line were released for beta test in September, Cullinet President Robert Goldman said. Goldman also promised that Cullinet would complete its finance product line with a December beta release of an accounts receivable module.

■

At ADAPSO's fall meeting in Washington, D.C., last week, a source within Contel Information Systems, Inc. told *Computerworld* that the subsidiary's parent company, Continental Telecom, Inc., plans to divest itself of two of its other subsidiaries — Austin, Texas-based Execucom Systems Corp. and STSC, Inc. of Rockville, Md. A Continental Telecom spokesman would neither confirm nor deny the allegation. According to the spokesman, the company would reveal its plans for the two software and services holdings when it releases its third-quarter earnings report later this month.

■

An item that would not have made news last year, made headlines last week: Wang Laboratories is making money. The Lowell, Mass., office automation leader said it will show a profit for the first quarter ended Sept. 30 as well as a revenue increase over last year's $553.8 million in the comparable quarter. Wang may not match its first-quarter 1984 profit of $51.2 million, but its in-the-black finish this time is a decisive turnaround from the disastrous $109 million loss it posted in the quarter ended June 30.

From page 1

FBI probes software program piracy claim

The FBI received a tip "within the last 30 days" regarding the alleged Versacomp piracy from a former DP manager at the institute, Joseph Gosseaux, supervisory special agent for the FBI, told *Computerworld* last week; he declined to elaborate.

The Institute of Scientific Information had apparently "provided Garner a copy of the Versacomp program, which Ralph Garner Associates had been using for commercial purposes," according to Gosseaux. He said that Micropro had "apparently authorized five copies [of Wordstar] to the institute, and we determined that far many more copies were made for commercial use outside the agreement with Micropro."

Attempts by *Computerworld* to contact Micropro were unsuccessful.

In its suit, Pagetec requested an injunction to stop the institute and Ralph Garner Associates from continuing to run Versacomp. A preliminary hearing was held in U.S. District Court in Philadelphia last week in which judicial action on the restraining order was postponed until a further hearing scheduled for Nov. 13, according to an attorney who asked not to be identified.

The FBI is continuing its investigation of the institute and Ralph Garner for "violations of copyright statutes under Title 17 of the Federal Rules of Criminal Procedure" and for "interstate transportation of stolen property," Gosseaux said.

Both companies were apparently running the program in an IBM 4331 environment, according to James Hutchison, president of *One For One*, Inc., an Atlanta-based marketing arm of Pagetec. Hutchison said the institute had purchased Versacomp from One For One about four years ago.

Hutchison said he knew of at least one other incident in which Versacomp had been pirated. "It was a company that had two different locations with MIS operations, and the software was copied in order to save them from buying a second program," he added. As a result, Hutchison said, legal action resulted in "the company just getting a slap on the hand." He declined to identify the company.

Attorneys for the Institute of Scientific Information told *Computerworld* the firm would not comment on the pending lawsuits or investigation. Spokesmen for Ralph Garner Associates also declined to comment.

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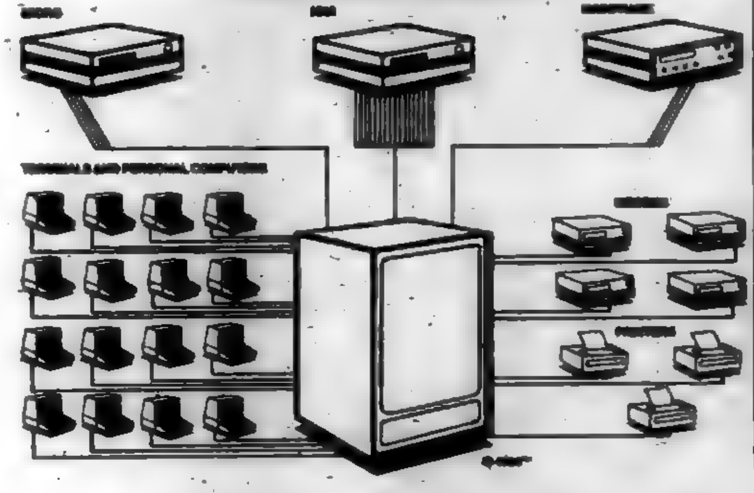


microscience corporation

Honeywell launches DISOSS-compatible software

Debuts point up shift to IBM coexistence

By John Dix

BILLERICA, Mass. — Taking its second step in as many weeks to coexist with IBM, Honeywell, Inc. last week unveiled a software link to IBM's document handling facilities and two IBM-compatible desktop microcomputers.

Included in the second barrel of the company's product blast was a multiuser supermicrocomputer. The announcement came a week after Honeywell revamped its network architecture to provide increased communications options, including terminal links to IBM hosts [CW, Oct. 7].

Following in the footsteps of competitors Digital Equipment Corp. and Data General Corp., Honeywell pledged compatibility to IBM's Distributed Office Support System (DISOSS), the mainframe maker's document management system.

Honeywell's solution is Docu-Link, a software program for its Microsystem 6/10 and DPS 6 minicomputers. Prerequisites for Docu-Link — part of Honeywell's Office Automation System Facility — include Release 1.2 of Honeywell's SNA Transport and Release 1.2 of its interactive terminal facility. Docu-Link must be complemented on the host side by Docupower, a software product from Software Research Corp. in Natick, Mass., that provides the actual DISOSS interface.

Docu-Link enables users to exchange revisable form documents with IBM environments and take advantage of DISOSS library and distribution services, according to Charles Ross, director of Honeywell's office management systems division.

Ross said implementing the DISOSS link through software is less expensive and more flexible than using a dedicated processor as a gateway. Docu-Link enables users to connect directly with IBM Systems Network Architecture (SNA) environments and obviates the need to support Honeywell's network architecture at each node, Ross explained.

Scheduled to be available in December 1986, initial license fees for Docu-Link will cost $525 for Microsystem 6/10 systems and range in price from $2,650 to $4,850 for different models of the DPS 6 product line.

On the hardware side of the house, Honeywell unveiled two members of its new family of personal computers, the Honeywell Extended Processor (XP) and Advanced Processor (AP).

While equivalent to the IBM Personal Computer XT and AT, respectively, Honeywell's XP is said to offer a 67% speed advantage over the Personal Computer XT, while the AP has a 33% advantage over the equivalent IBM machine, Honeywell said.

Increased speed due to microprocessors

The differences in speed are attributed to microprocessor ratings. The XP uses an Intel Corp. 8088-2, a dual-speed microprocessor that operates at the 4.7-MHz level of the Personal Computer XT, but can be switched to run at 8 MHz. Maximum internal memory is 640K bytes and 50M bytes of storage.

The AP uses the same microprocessor as the Personal Computer AT, the Intel 80286, but at 8 MHz instead of the 6 MHz that IBM uses. Unlike the XP, the AP's 8-MHz chip cannot be slowed to match the IBM product. According to David Booth, Honeywell's director of personal computer product line programs, during "extensive testing" of IBM software the only difficulty encountered on the AP was with a single game program. He said a switch to slow the AP to 6 MHz will be included in an upcoming version of the machine. The AP has a maximum internal memory of 4M bytes and up to 80M bytes of disk.

The XT and AP are priced starting at $2,495 and $3,785, respectively, and will be available from the Honeywell direct sales force in November.

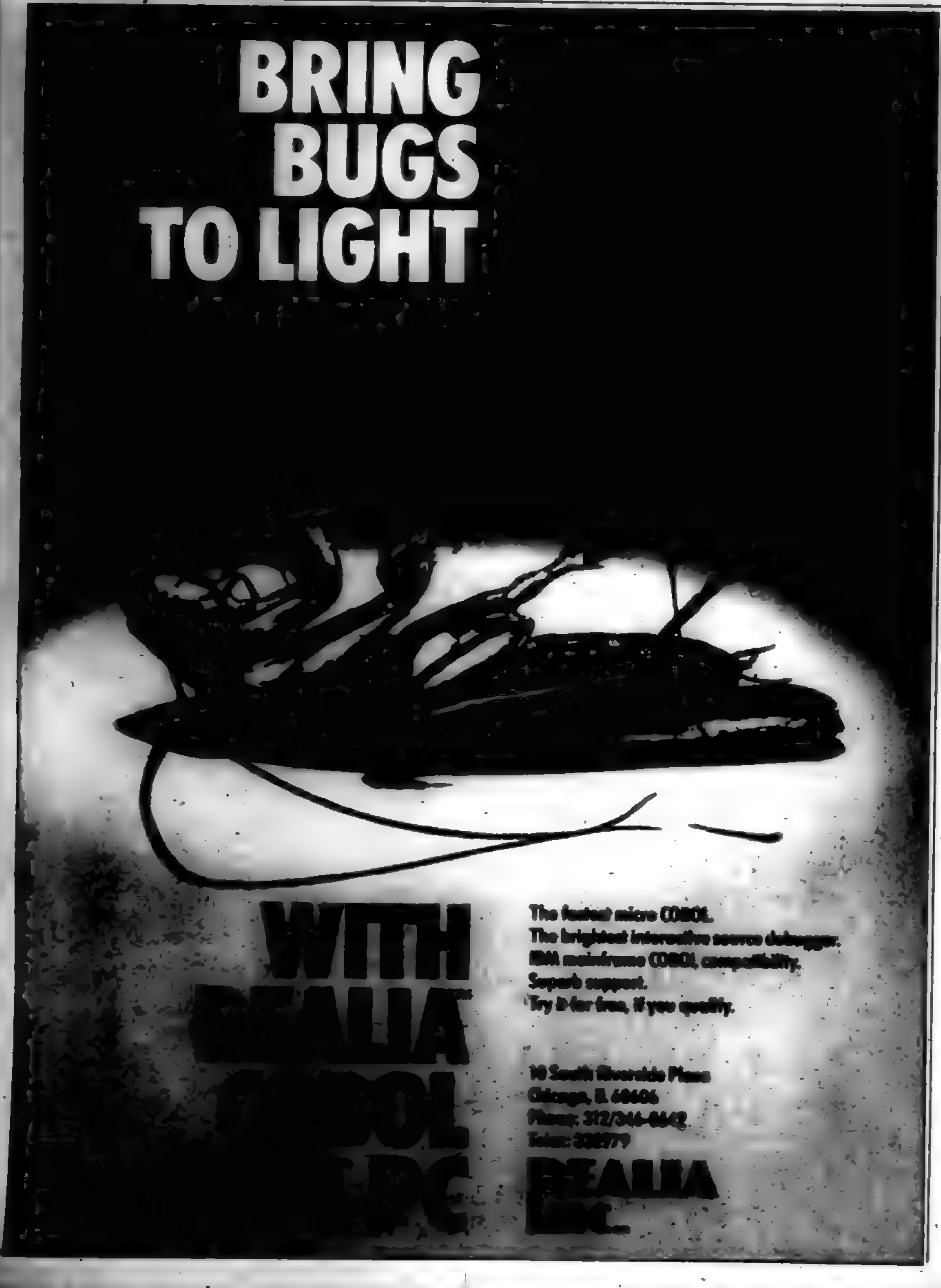
Terminal emulation support added

Honeywell also announced that it has added support of synchronous terminal emulation software to its Microsystem VIP Emulation software. This will enable the XP, AP and IBM XT and AT to emulate Honeywell's family of VIP7300 or VIP7800 terminals when connected to any model of the DPS 6 family. The software and documentation has an initial license fee of $400 and will be available in November.

The OMS 22 supermicrocomputer comes with 1.75M bytes of internal memory, 68M bytes of disk storage, an integral 5¼-in. diskette drive and a 64M-byte cartridge tape backup system. It runs the GCOS 6 Mod 400 operating system and includes software for document transfer, asynchronous communications and word processing. Prices for the OMS 22 start at $24,630.

The Honeywell Time Management Facility software package reportedly provides managers with calendaring functions including a daily "things to do" list. It is priced at $1,650.

Contributing to this report was Computerworld *International Editor Edward Warner.*



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Big Eight MIS services facing congressional scrutiny

By Bryan Wilkins

WASHINGTON, D.C. — The nation's Big Eight accounting firms, which derive, on the average, one-third of their revenues from selling MIS and systems integration services, are facing increasing scrutiny from the U.S. Congress.

The congressional interest has developed in response to recent banking failures that have affected investors across the country. Some of these bank failures have reportedly involved computer systems recommended by the accounting firms that also independently audit those banks' books, as required by law.

The computer services industry has for many years raised its own questions about the fair trade issue involved when a certified public accounting firm sells computer services to a firm that it also is auditing. The industry has warned of potential conflicts of interest in which CPA firms provide both independent audits and computer advisory services.

Last week, at a management conference of the Association of Data Processing Service Organizations, Inc. (ADAPSO), Dave Williams, leader of the association's CPA Relations Committee, reported that the U.S. House of Representatives' Subcommittee on Oversight and Investigations has turned up the heat in the debate. The subcommittee sent detailed requests to the top 16 CPA firms in the U.S. asking for specific information about their nonaudit businesses and for the names of companies that are making use of both computer advisory services and independent auditing services from the same accounting firm.

'No smoking gun uncovered'

"So far, no smoking gun has been uncovered" from the responses received by the subcommittee, Williams said. Those responses were due Sept. 30.

Jack Chesson, counsel for the congressional subcommittee, told the ADAPSO session that subcommittee Chairman Jonathan Dingell (D-Mich.) "is very interested in this issue because he is very concerned about the audit independence of these firms responsible for overseeing the books of companies."

Chesson pointed out the collapse of Drysdale Government Securities, a trading arm of a California bank that used a computerized financial management system recommended by the same Big Eight accounting firm that performed its audit. "Within four months after the system was set up, Drysdale collapsed, and our investigation showed that it was bankrupt from the day it opened," Chesson said.

Chesson also said that the Big Eight accounting firms have not sent in the detailed information requested by the subcommittee. He predicted that Dingell will hold follow-up hearings. The initial hearings were held last March.

SEC not concerned

Chesson said that the Securities & Exchange Commission (SEC) has not indicated that it is concerned with the audit independence of accounting firms that are also performing MIS consulting and management services. The SEC regulates the financial reportings of publicly traded companies that are required to include the independent audit with their annual filings.

"The Big Eight firms and the accounting industry in general are saying that the two businesses are kept separate and ask, 'Why do we have to prove they are independent?' " Chesson said.

The computer services industry has held up as an example of its concern the contract awarded by the SEC to the accounting firm Arthur Andersen & Co. for the installation of an electronic document filing system. Companies regulated by the SEC would be submitting their financial statements directly into the SEC system.

Chesson predicted that Congress will become more involved in the accounting industry's role in MIS and systems integration and said it is likely that some sort of regulation or law will result.

"The issue is not going to go away. It is going forward, and we have the attention of the accounting industry," Chesson said.

Meanwhile, several of the Big Eight accounting firms have made overtures to ADAPSO about joining the association. At the ADAPSO management conference, the prevailing sentiment of the members was to admit accounting firms.

> ”
>
> ***The computer services industry has warned of potential conflicts of interest in which CPA firms provide both independent audits and computer advisory services to a company.***

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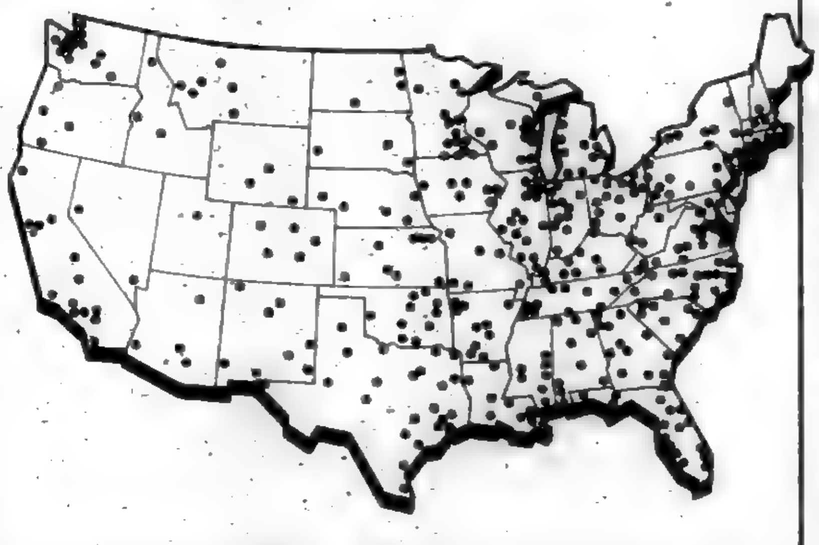

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Microvax users get direct link to IBM SNA environments

DEC unwraps bridge for Ethernet system

By John Dix

MERRIMACK, N.H. — Digital Equipment Corp. released software last week that enables three of its supermicro products to participate directly in IBM network environments.

The VMS/SNA product will provide Microvax products with a direct link into IBM's Systems Network Architecture (SNA) that does not go through Decnet, the traditional method that DEC has used for links to Big Blue. DEC envisions that the product will be used where only occasional SNA links are required.

The minicomputer manufacturer also unveiled LAN Bridge 100, a device that can be used to connect up to eight Ethernet segments to construct a logical net spanning 22,000 feet.

Layered MicroVMS software

VMS/SNA is a layered MicroVMS software product for DEC's Microvax I and II supermicrocomputers and for the engineering configuration of that product line, the Vaxstation II. It enables these DEC devices to emulate a multifunction version of IBM's 3274 cluster controller, a Type 2 physical unit within IBM's SNA.

DEC cautioned that because VMS/SNA requires the Microvax products to perform network processing — as opposed to dedicating a processor to these tasks as DEC does with its other gateway products — performance limitations will restrict VMS/SNA's use to low-volume, single-system SNA links.

Emulating a controller enables the DEC processors to support IBM SNA LU0, LU1, LU2 and LU6.2, according to Dave Korf, marketing manager of DEC's multivendor networking products. Logical unit designations, representing either devices or programs, determine possible networking functions within SNA.

IBM applications accessed

Running under Version 4.2 of MicroVMS, Microvax and Vaxstation II processors with VMS/SNA can, according to DEC, access IBM applications; act as 3270 display stations, RJE stations or 3287 remote printers; and implement distributed application programs running between MicroVMS and IBM systems.

Additionally, DEC processors with VMS/SNA can create and exchange final-form documents and electronic mail with IBM's Distributed Office Systems Support (DISOSS). Users can also search and retrieve documents that are classified as revisable within DISOSS but cannot yet modify these documents under VMS/SNA.

The software is said to use many of the same access routines and user interfaces as DEC's Decnet/SNA Gateway, facilitating migration to this full-function gate when and if needed. VMS/SNA will be available in December for $2,500.

DEC's LAN Bridge 100, also announced last week, will enable users to interconnect up to eight fully configured, 2,800-meter Ethernet segments by installing a bridge between each segment, Korf maintained. Throughput of an extended Ethernet matches that of a single-segment net, according to Korf.

Because the bridge is intelligent, it is capable of localizing traffic, stopping signals destined for a device on the same cable from spilling over into adjoining segments. Korf said the bridges constantly relearn where devices sit on the net, enabling equipment to be moved from one cable segment to another. Any Ethernet/IEEE 802.3 protocol is supported.

Two versions of bridge

There are two versions of the bridge. The first bridges baseband-to-baseband, broadband-to-broadband, or baseband-to-broadband cable segments and sells for $8,000; the other connects baseband or broadband coaxial nets to fiber-optic Ethernet implementations and costs $8,500. Both will be available in January.

Software to manage these bridges was also introduced. The Remote Network Management Bridge Software enables users to monitor the performance of remote bridges, modify bridge parameters and initiate bridge tests.

The management software — capable of supporting all bridges — costs $600 for Microvax I and II systems; $1,000 for VAX-11/730, 750, 780 and 785 systems; and $1,500 for VAX 8600 systems. All versions will be available in March. In other news, DEC announced a new version of WPS-Plus text processing software. Version 2 of WPS-Plus has been enhanced for use on DEC systems and extended for use with IBM's Personal Computer and Personal Computer XTs.

WPS-Plus enhancements include a spelling checker option, a usage alert (a linguistic feature said to help identify the misuse of such words as effect and affect) and an electronic thesaurus. The version ranges in price from $5,700 for the Microvax II to $14,200 for the VAX 8600. An optional American Legal Words Lexicon of 25,000 words, based on Houghton Mifflin Co.'s *The Legal Word Book*, ranges in price from $600 for the Microvax II to $1,500 for the VAX 8600. Both will be available in November.

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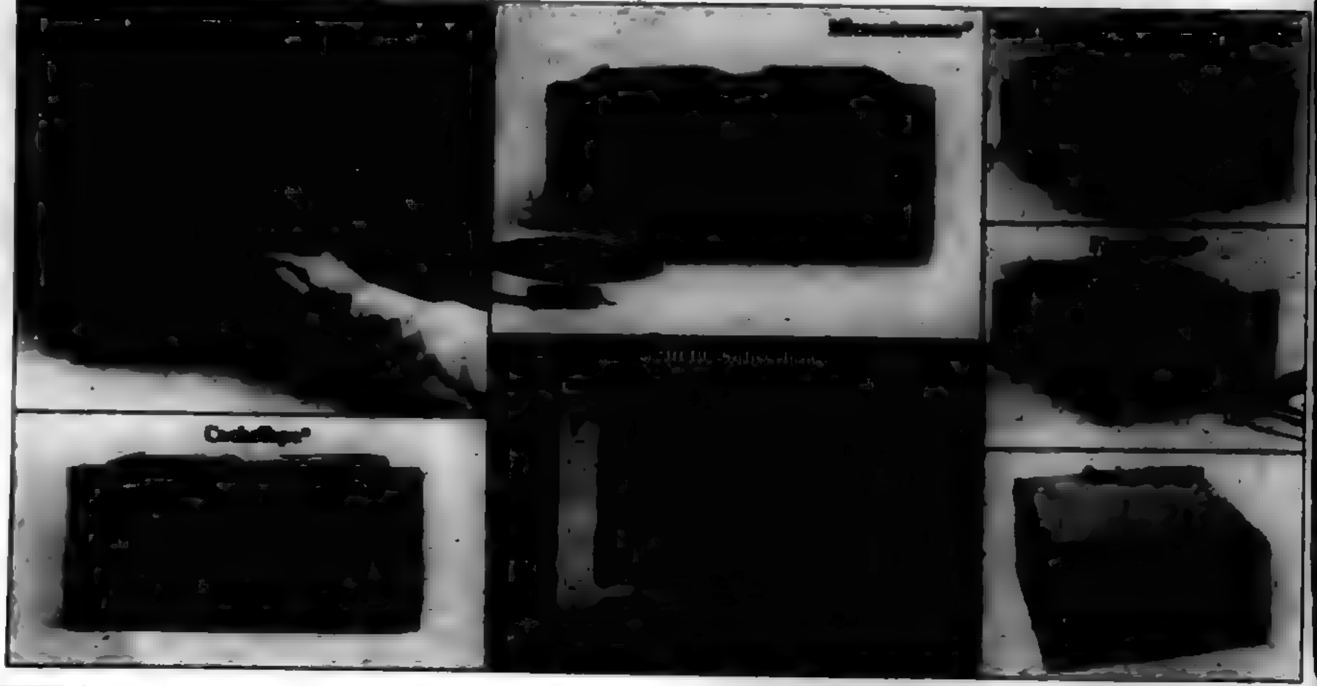

For a copy of Cipher's annual report, call 1-800-4-CIPHER, ext. 9.

DEC to announce four-pronged CD-ROM campaign

By Eric Bender

MAYNARD, Mass. — Digital Equipment Corp. will thrust further into the emerging compact disk read-only memory (CD-ROM) market this week with a four-pronged announcement that may represent a major boost for commercial applications of the optical storage technology.

Hoping to lead the way to commercial acceptance of CD-ROM technology that can store 600M bytes on read-only optical disks, DEC will announce the following:

- The first commercially available data bases on CD-ROM disks from leading data base publishers in chemistry and engineering.
- Endorsement of the DEC-developed Uni-File standard file format by Lotus Development Corp., 3M Corp. and Tecmar, Inc.
- Uni-File-compatible CD-ROM units for IBM and DEC micros.
- Expansion of application development services for information distributors.

DEC will offer five data base titles, covering publications from Engineering Information, Inc., the National Technical Information Service and Chemical Abstracts Service.

The titles will be sold as yearly subscriptions with quarterly updates and will be priced between $1,150 and $1,195. The disks include DEC's Microbasis search and retrieval software for either MicroVMS or MS-DOS operating systems.

The lack of standard file formats has been "one of the issues constraining a full-fledged leap into CD-ROM technology," said Ed Schmid, compact-disk market development manager. "But DEC is the only one delivering systems products in volume," which will help to solidify the Uni-File standard, he said. Documentation on the file format is available from DEC at cost and carries no licensing requirements, he said.

CD-ROM drives for the IBM Personal Computer and DEC Rainbow 100 lines will be available in December for less than $2,300, Schmid said. Jointly developed with Tecmar, the DEC model will be sold by the Solon, Ohio, firm, while the IBM version will be offered by DEC. Both offerings are complete subsystems configured to work with Uni-File disks so that no additional software or other equipment is needed for customers to install and use them, DEC said.

DEC also will broaden its application development services offerings for CD-ROM to handle a complete set of data base preparation tasks, Schmid said. "We will take magnetic tape from customers, and we will hand back CD-ROM disks with fully usable data bases for MS-DOS or MicroVMS, all done in the Uni-File format structure." Prices for the full service are expected to range from $15,000 to $75,000.

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AT&T seeks rate increase

By Bryan Wilkins

WASHINGTON, D.C. — AT&T Communications recently filed for a rate increase in its Accunet family of packet-switching services for data communications to meet Federal Communications Commission concerns that existing tariffs were subsidized and that the service was tailored for AT&T Communications and not for other users.

AT&T said it would increase its charge for entering the Accunet data communications network by 5% for 4.8K- and 9.6K bit/sec. service and by 15% for its 56K bit/sec. service. The proposed tariff would also establish a flat business day usage rate of 75 cents per kilopacket transmitted instead of its current tariff, where kilopacket rates start at 82 cents and drop to 67 cents based on volume transmitted. Other charges associated with installation and maintenance would rise by 10%, AT&T said.

AT&T said that Accunet would be available in 100 U.S. cities by the end of 1985. The proposed tariff changes would go into effect if approved by the FCC on Nov. 18.

In another significant action, the FCC on Oct. 4 established new guidelines that will permit AT&T Communications to introduce "optional calling plans," such as bulk calling at discounted rates or distance-insensitive calling, under pricing mechanisms that do not require that the service pay for itself. Instead, the service must show a net contribution to the total revenues of all AT&T long-distance-service categories. Specifically, the optional calling plan or package must show a three-year net contribution to the service revenues of the carrier offering the service.

AT&T Communications has asked the FCC for permission to introduce long-distance services to meet competitive pressures of other carriers. The FCC recently denied it permission to offer a service, Pro America, after determining that the costs of offering the service and the demand stimulated for it were not adequately forcast by AT&T. Presumably, AT&T will reintroduce its Pro America tariff, which would offer users a flat 15% discount on the purchase of a block of calling time.

VIEWPOINT

EDITORIAL

Everything's relational

In a perfect world, all computer sales would be conducted one on one between a sales representative with a keen sense of product accountability and a user with an inexhaustible knowledge of technology. Questions would be asked and answered, claims challenged and defended, tests run and simulations performed.

Ah, sweet utopia. Although such sales reps and users no doubt exist, all too often the welter of products and features induce even the most reputable of vendors to fall inevitably into the trap of resorting to buzzwords, catchphrases and other linguistic shortcuts to make their marketing pitches. Matchless technical constructs are thereby reduced to barker's patter.

Nowhere has this more been the case than with software features. Think of "integrated" software and "multitasking" software or the many ways that we have heard used such terms as on-line processing, artificial intelligence or relational data base management system. These are not marginal features as in the claims for paper towels that are 20% more absorbent. They bear upon functions critical to the operation of large organizations, affecting untold numbers of people and vital operations. Yet today there is often no effective way to ask questions or challenge claims.

In the matter of one of these software feature claims, *relational* data base management, author E. F. Codd — who, not coincidentally, developed the concept — uses the pages of this week's *Computerworld* to survey the terrain and report his disdain of what he sees.

"It is hard to find a vendor who does not claim his DBMS is relational," Codd assays. "Some vendors of nonrelational DMBS have quickly (and recently) added a few relational features — in some cases very few features — to be able to claim that their systems are relational, even though they may not meet the simple requirements for being rated minimally relational."

Although we urge every DBMS customer to read Codd's article (Part Two will run next week), the regrettable truth is that there cannot be an E. F. Codd hovering over every computer software sales transaction. Consultants can be of some use, but what consultant can examine every product's every claim?

Trade journals can be of some use, but — and we speak with some authority on the subject — what trade journal can thoroughly probe every product's every claim? The consequence is that users must too often take enormous risks in accepting vendor claims for product function and hope that the end results justify these discomforting means.

This situation is hardly tolerable. It may also be, momentarily at least, insoluble. The last thing the computer industry needs is some sort of truth-in-packaging legislation that sets up a phalanx of bureaucratic retainers to settle distinctions such as those between relational and hierarchical DBMS.

What will help is for individual users, large business organizations and elements of the industry itself to keep vendors honest by calling into question dubious feature claims and unacceptable resort to cant. We offer the pages of *Computerworld* to such worthy exercises and invite your contributions.

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LETTERS TO THE EDITOR

Track record provides viable gauge of applicant's work performance

In the Reader's Platform "DP employers on the wrong track with job histories" [CW, July 22], the author claimed that applicants' job histories are inappropriate as a major tool in the selection of employees. I contend that for experienced candidates no voice speaks more clearly for their qualifications and abilities than job histories.

Although to some the expression "track record" connotes a race, to me it carries a somewhat less cynical meaning — performance. That people accomplished an assignment or demonstrated dedication to an employer or were recognized for contributions by promotions and raises leads me to expect that they might perform for me.

As to the achievement of job levels within prescribed time frames, there are many excellent technicians in the profession whose assignment as project leaders or managers would toll a death knell for their careers. Given the correct environment, these individuals can be real heroes. Spending 20 years, however, becoming the best table coder in the country does cast doubt on an individual's drive and creativity.

U.S. business is being run on an infrastructure of billions of lines of code, many of which were designed and written by people who lacked demonstrable qualifications. To whatever degree the DP profession is responsible for the problems of the economy, it is more because of the lack of track records than of dependence on them as tools for selecting employees.

In fact, I submit the following:

■ Top performers are rarely unemployed for extended periods except in geographically isolated markets.

■ Top performers are the last to go when economic conditions decline and are the first to find work or to be recalled.

■ Most candidates for higher level DP jobs are recruited rather than search for jobs.

■ The best performers will be strongly self-motivated, and a good manager will help them develop that trait.

■ A well-written resume could convey to a prospective employers any pertinent information about a candidate's goals and preferences, as well as the dreaded "job history."

Robert A. Roy
Chatsworth, Calif

Too much emphasis placed on systems when considering programmers for jobs

In programmer "help wanted" advertisements, too much importance is usually placed on hardware and systems, and not enough emphasis is placed on people.

If the advertisement calls for someone who has programmed on such and such a computer in such and such a system, applicants must have programmed on that computer in that system; otherwise, no matter how talented they are, they won't be considered.

Such rigidity enables the company that ran the ad to single out eight applicants from 80. It enables the company that ran the ad to hire a programmer who will get up to speed in a matter of days, if not hours.

But such rigidity ignores the desirability of choosing the applicant whose aptitude best meshes with the long-range requirements of the job. Moreover, it ignores the desirability of picking the applicant who is the best fit in terms of personality, character and goals.

David Canfield
Los Gatos, Calif.

Foreign students with computer access pose danger to U.S. national security

I disagree strongly with Charles P. Lecht's column "On students, computers and the Soviets," which talks about possible dangers of giving foreigners access to very large computers in the U.S. [CW, Sept. 9].

Would Lecht advocate having a company teach sales representatives from competing companies how to be better sales representatives so that they could take away its customers? Would Lecht advocate having a company teach the engineers of its competitors to make products equal to or better than his own so his firm would lose business to its competitors? Of course not.

Then why does he advocate bringing students into the U.S. and giving them access to our best technology so that they can go home and use it against the U.S.? It does not make any sense to me at all.

Truman Hunter
Oxford, Ohio

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VIEWPOINT

The IBM-NTT connection

LECHT ON SCIENCE
Charles P. Lecht

On Sept. 25, the morning edition of the *Yomiuri Shimbun*, one of Japan's leading newspapers, carried a front-page story saying that it believed IBM and Nippon Telegraph and Telephone Public Corp. (NTT) would enter into a 50-50 joint venture to create and operate a gigantic international data processing and communications enterprise. On the same day, 4 p.m. Tokyo time, NTT and IBM Japan held a news conference to announce the venture.

On Sept. 26, *The Japan Times* carried the story under the headline, "NTT, IBM to establish joint communications company." No name has been assigned to the new joint venture, but let us call it INS using the first letters of IBM, NTT and the word "system."

The announcement said that NTT's president, Hisashi Shinto, and IBM Japan Ltd.'s president, Takeo Shiina, had reached an agreement to establish INS. Spokesmen for both companies said that the INS joint venture was capitalized at 600 million yen and that it was slated to begin operations by the end of this year. Shiro Matsuo, an NTT executive, said that INS would use IBM products, hardware and software.

Although the announcement was made in Japan, it did not specify that INS services would be limited to the Japanese marketplace — in fact, there was no reference made to marketplace locale. This, of course, suggests that the companies intend that it will ultimately become global. However, at the onset, it is hard to envision INS extending much beyond the geographical territories where the U.S. and Japan control the computer and communications markets.

That the two companies intend that their INS venture extend outside of Japan is clear, since IBM has already established a joint venture with the Mitsubishi Corp. to provide value-added network services within Japan. That joint venture company operates under the name of Advanced Systems Technology, Inc.

At the onset of its operations, INS will offer somewhat classic communications services, including those needed to interconnect value-added networks. It will ultimately evolve to be a mammoth international value-added network. Thus all we may want to do in information processing will be available within it. Businesses will become free from the tyrannical and costly national boundary problems that impede the flow of data and information. Educational institutions will be able to access each other's libraries. Other barriers that once served to limit the news services between countries will eventually crumble.

> ”
>
> ***The venture will ultimately evolve to be a mammoth international value-added network. Businesses will become free from the tyrannical and costly national boundary problems that impede the flow of data and information.***

No doubt IBM and NTT executives will have to overcome many problems to make INS a truly international and workable system. For example, IBM and NTT communications protocols are different. Apparently anticipating their eventual plan, the two companies launched a joint research project two years ago to overcome this incompatibility.

The project was successful; in December, INS will announce a software product that allows IBM customers whose systems support Systems Network Architecture protocols to communicate with systems supporting NTT's Data Communications Network Architecture protocols and vice versa. Then there are both human and machine language difficulties, cost and competition problems and so on to overcome.

Those problems that originate solely by virtue of the size of the parties involved will offer IBM and NTT a great challenge. The joint venture is, after all, between the largest company in Japan and one of the largest in the U.S., an organization that is approximately $20 billion per year larger than NTT.

The headquarters of INS will be in Tokyo, but it is hard to imagine that IBM will leave it up to its Japanese subsidiary to control fully its NTT relationship. Armonk, N.Y., will have a lot to say about the future of INS. Why else was Shinto traveling to Armonk on Sept. 27 to confer with IBM's John Opel and John Akers when Shinto was stopped by a hurricane?

As Opel wasn't in need of a speaking engagement when he attended NTT's International Symposium '85 in May — he went there to speak anyway — Shinto isn't in need of a trip to Armonk. Whatever decisions may come out of Shinto's visit to Armonk, we can and must admire the IBM and NTT management for their daring and imagination in making the INS joint venture possible.

The joining of significant parts of the communications and computer systems of the U.S. and Japan must be viewed as an event of great significance in creating greater international cooperation and as an important step toward world peace.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

What's right about Unix

READER'S PLATFORM
Ernest Wyle Harkins

Although Unix seems to have become the latest buzzword in computer circles, many opinions about it voiced in the press seem ill founded at best and downright wrong at worst. Not surprisingly, some of the harshest criticism comes from "experts" who have a vested interest in competing solutions.

Some negative points that are repeated often date back to vintage 1979 versions; most if not all of those old chestnuts have been dealt with in the modern AT&T Unix System V incarnations.

Industry pundits cite a lack of applications software, but that seems more an indication that they are not looking than a real reflection of 1985's Unix marketplace. Hundreds, if not thousands, of applications exist in diverse areas, from finance to geophysics. How many general ledger packages do you need anyway?

The alleged unfriendliness of Unix, which true believers would claim is mere unfamiliarity bordering on unreasoning hostility, has been successfully hidden by the now traditional menu systems that look much like those of other approaches. Unix has become such a ubiquitous development environment that it is buried in all sorts of products and virtually all computer-aided design and manufacturing systems.

Rather than laboring through a point-by-point refutation of negative comments, it seems more pertinent to focus on what's right about Unix.

Why does Unix make more sense than one or more personal computers? The primary dividing line is one of multiuser vs. single-user organization. Because a Unix system is built around a relatively large hard disk, all programs are simultaneously available to all users. Likewise, all users can copy data easily to or from each other and can share easily the keywork on a large document. Because there is only one copy of each utility program, updates are simple and global.

A Unix system imposes a simple, predictable hierarchy on the physical resources — for example, disks,

Continued on page 22

Harkins is senior consultant and data center manager for DHR, Inc. in Boulder, Colo.

Using plans as yardsticks

READER'S PLATFORM
David A. Binius

Information systems department projects are typically late and overbudget.

This has, unfortunately, come to be an accepted fact — a self-fulfilling prophecy — and will remain so unless professionals act to change this totally unnecessary belief.

There are two quotes that I would like to see hanging in the office of every data processing professional who has responsibility for project development and management.

"If you can't plan it, you can't do it."

"If you can't measure it, you can't manage it."

If we live by these two simple ideas, our task becomes simpler and ultimately more professional. When we properly formulate a plan for a project or a task, we have the capability of measuring it; therefore, we can effectively manage it.

Management success often is determined on the basis of whether or not projects are completed within the agreed-upon schedule and budget. The trap that we fall into is allowing ourselves to be forced into giving estimated completion dates before we have a good project plan.

Off-the-cuff completion dates

As data processing professionals, we cannot give off-the-cuff completion dates because we believe we know what the user wants, and we know how long it will take to accomplish it.

Data processing professionals should at the very least have a solid system definition with a statement of achievable objectives, agreed-upon input and output, data base requirements and system processing schedules prior to setting project completion dates.

Like an architect's blueprints, the system definition will be the basis for the detailed plan from which manageable milestones, and finally, completion dates are set.

The project plan is a ruler to measure and manage the project. Of course, regardless of how comprehensive the original system defini-

Continued on page 22

Binius is director of data processing for Wick Building Systems, a Madison, Wis. manufacturing company.

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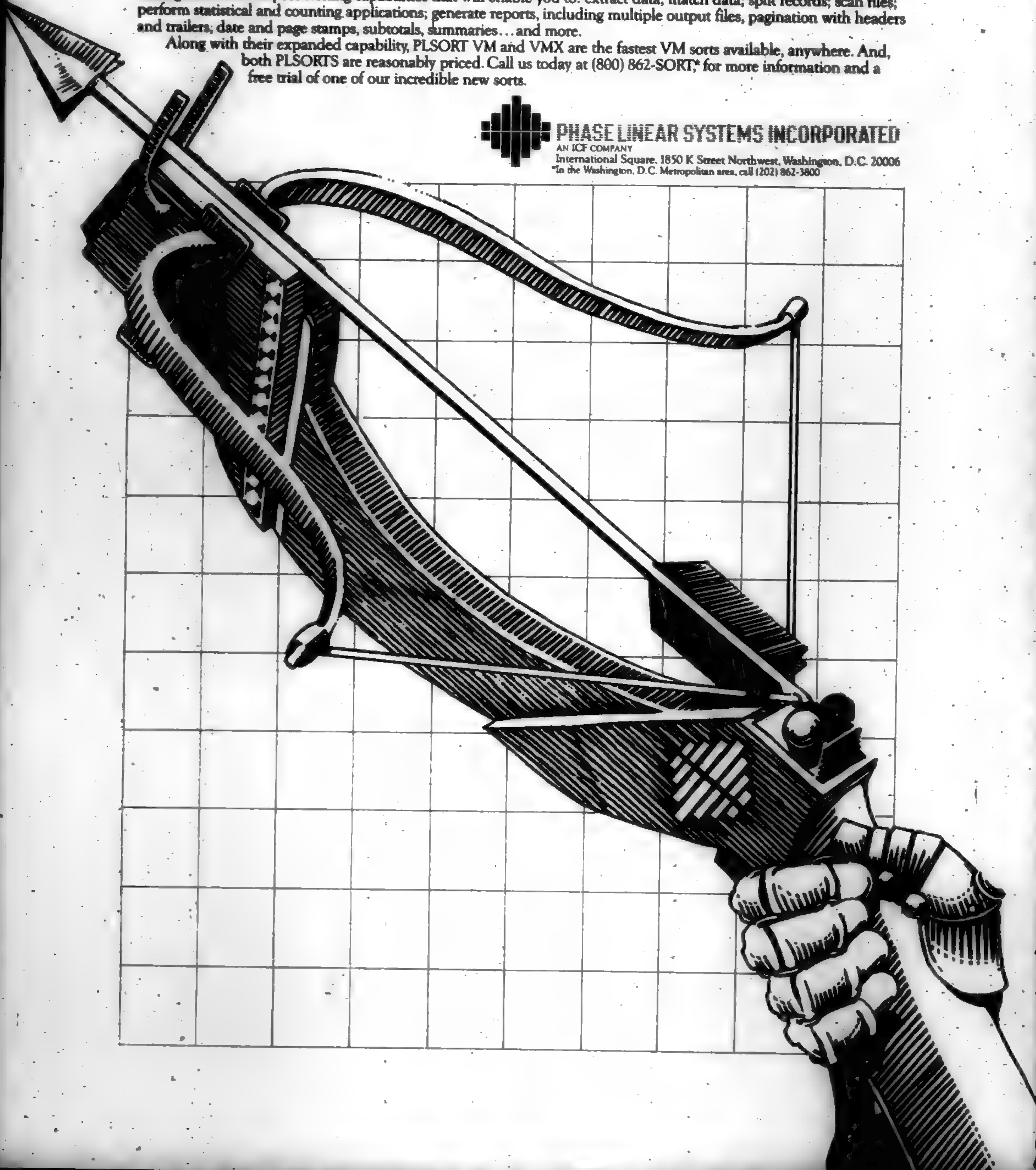


Cobol tug-of-war leading to language's evolution

READER'S PLATFORM
Jerome Garfunkel

The public has for some time heard many claims from the critics of Cobol 85. Two completely opposing points of view have emerged. Some say the language is obsolete and no revision, however significant, could make it relevant to today's application development needs. For them, it's like dressing a dinosaur in Calvin Klein jeans hoping to make it attractive.

At the other end of the spectrum, others argue that Cobol needs to be absolutely stable. Just keep it as it is, or as it was in 1968, in spite of its flaws and its ambiguities. So what if it is not as common as the drafters of this "Common Business-Oriented Language" would like.

For these critics, the cost to change to modern-day application development tools is not justified. Perhaps they believe that fourth-generation application development tools and debugging/testing aids are just passing fads. To this group I offer some recent words from Grace Hopper: "Continually look ahead to absorb the new concepts and implement the new things. Don't ever say, 'Well, we have always done it that way.' That is the deadly thing that kills systems and managers."

Two extreme viewpoints

When one steps back for a moment, one sees clearly that these two extreme viewpoints need to be rejected by practical people. However, the tug-of-war that has resulted from this ongoing data processing debate has benefited the Cobol language. Immensely.

Those who claim that no revision of Cobol, however radical, could be significant, have caused the Cobol 85 language to be much more than just a cosmetic overhaul of the old Cobol.

The substantial additions and improvements in Cobol 85 will make it easier to use with current software development methodologies and will ultimately ease the growing problem of systems maintenance. Nothing short of that would have been acceptable.

Those critics of Cobol 85 who demanded absolute compatibility with older versions of Cobol have caused the computing public and, perhaps more important, the Cobol language developers to be very sensitive to the impact of an evolving Cobol language on the data processing community.

We learned this lesson the hard way and caused a four-year delay in the new Cobol 85, but we did take heed. As a result, procedures now exist to assess the impact of future Cobol revisions before they are made.

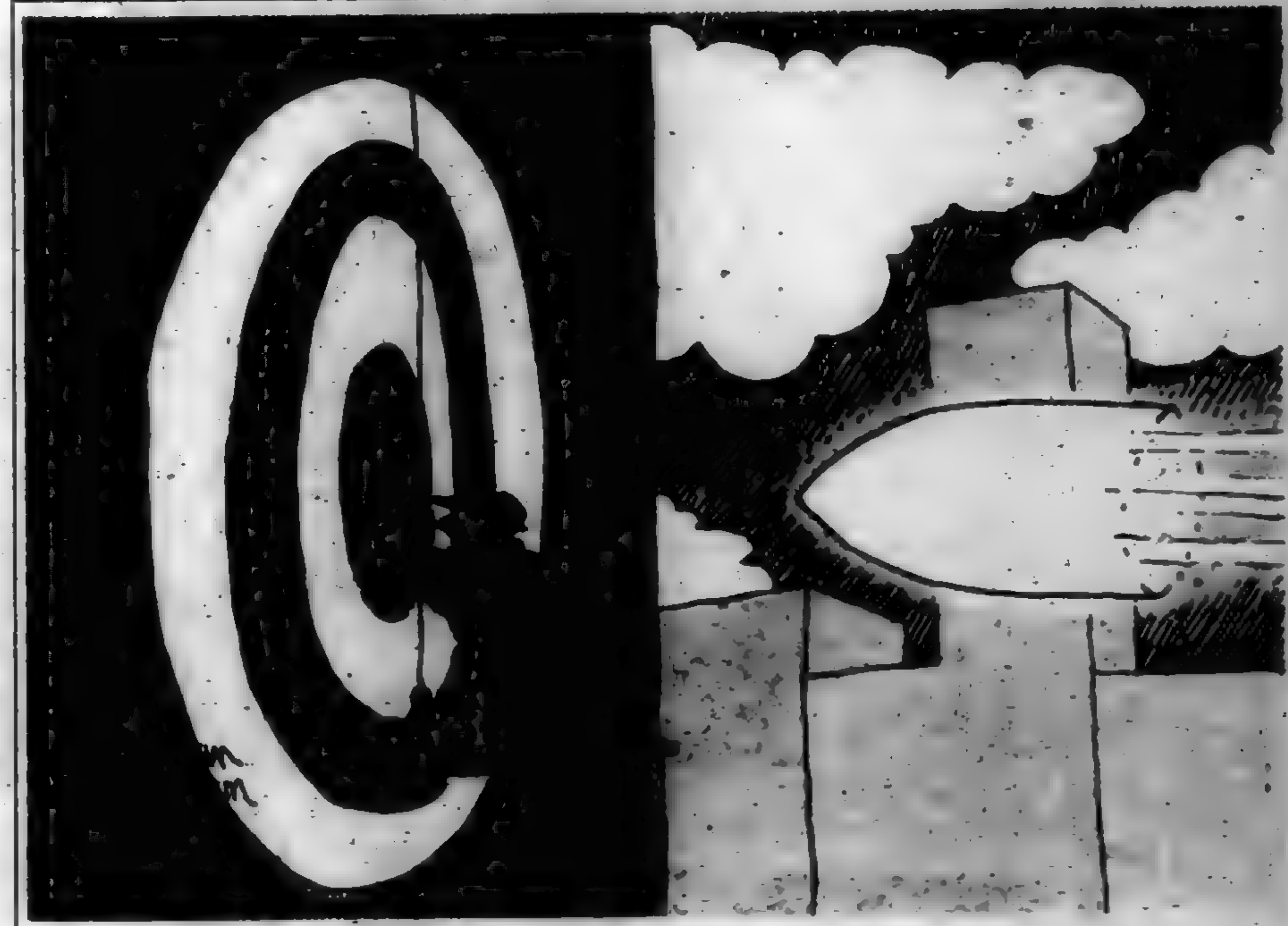
Updating Cobol

The continuing task of updating the Cobol language must not slow down now, any more than that of other application development tools. If we learned one thing about software systems during the last two decades, it was that change is a natural process affecting every system, and we must design these systems with anticipated changes in mind.

The same must be said about software tools like Cobol. Cobol must be responsive to new techniques and methodologies that evolve, and it must do so in a careful, minimally disruptive fashion.

Experimenting with new approaches to old problems — productivity aids, systems debuggers, program testers, automatic documentors and code generators — many data processing managers forget that perhaps the one application development tool that is most important in the life of a system is the programming language itself.

Garfunkel is a Cobol 85 consultant based in Litchfield, Conn., who was a member of the American National Standards Institute X3J4 Cobol Committee.



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VIEWPOINT

From page 17

What's right about Unix

terminals and users — from the outset. A network of linked personal computers must impose these relationships from the network point of view after the fact [*Computerworld Extra*, Sept. 25].

Communications between one Unix system and another are accomplished easily using standard utilities, allowing remote execution, file transfers and electronic mail.

Personal computers can be used as smart terminals with a Unix host, and with some vendor's software, notably AT&T's, the Unix system can serve as a logical hard disk for the personal computer.

Because Unix is multiuser, the incremental cost — assuming there are available ports on the host machine — of adding new terminals is low, on the order of $500.

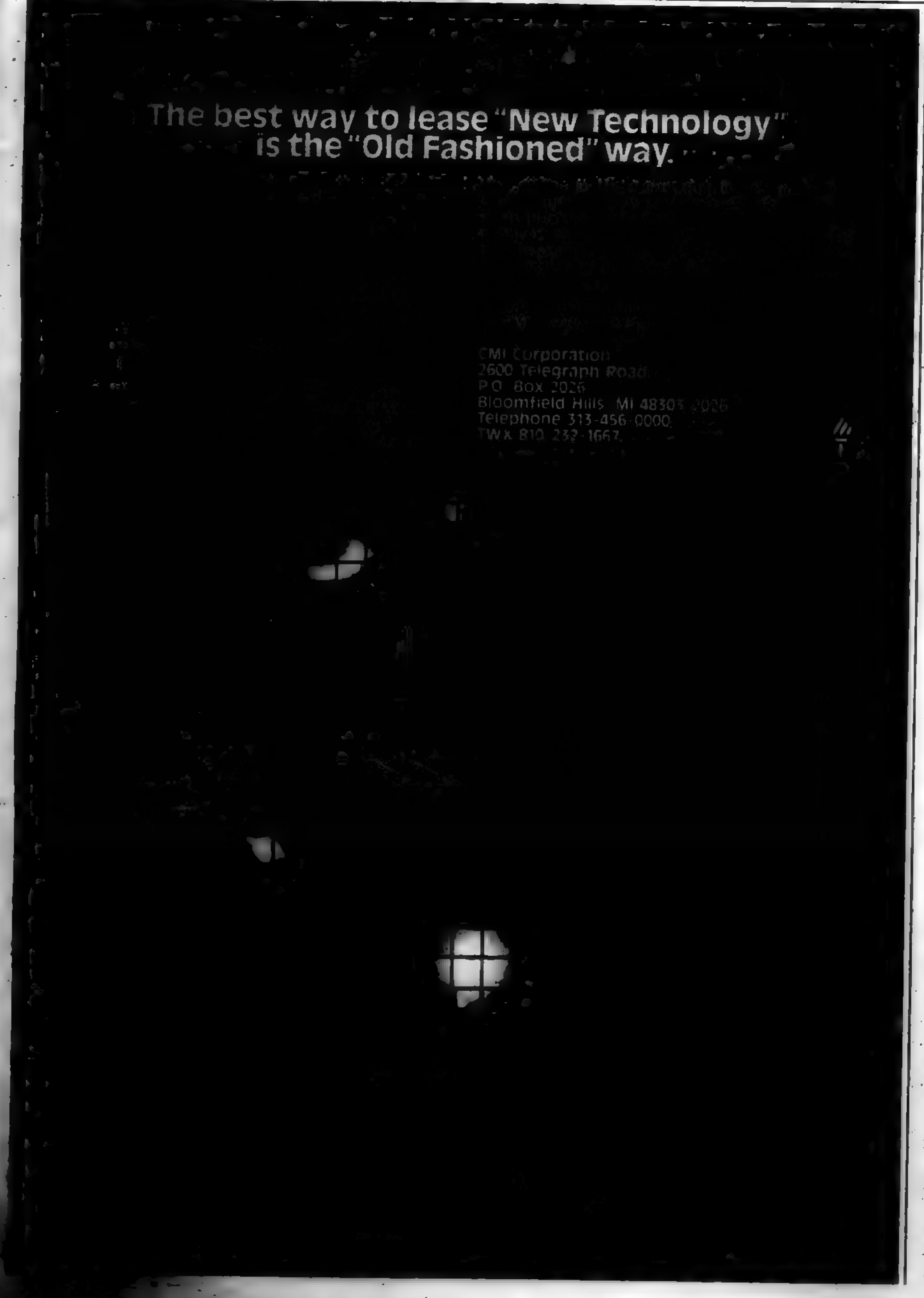
Varying user space requirements are more easily accommodated since there are no hard boundaries imposed by individually managed floppies or hard disks; if one user needs lots of space, it is taken away effectively from the pool available to all users, but nothing special needs to be done.

From a computing strategy viewpoint, Unix makes sense in several ways: As users' needs grow, more memory, disks or other peripherals can be added, or the entire Unix environment can be carried over to a larger Unix machine, perhaps one of a different manufacturer. Unix boxes now range from the one- to four-user IBM Personal Computer AT or AT&T Unix PC all the way up to the 200- to 300-user Amdahl Corp. or Sperry Corp. machines.

For the hard-core number cruncher there is the new Cray Research, Inc. Cray-2 at $17.6 million also running System V. Virtually all significant manufacturers have joined the Unix parade.

Never before have DP managers been able to contemplate a major conversion to a new machine with such equanimity. Local applications software can simply be carried over to the new machine and recompiled; the advent of System V as a de facto standard has mooted the minimal difficulty of making code developed under one version of Unix run correctly under a different version.

For the user, an upgrade to a new Unix system would mean minimal downtime and nothing new to learn. The major difference would probably be that "it seems faster now."



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From page 17

Using plans as yardsticks

tion and plan are, there will often be some necessity for revision.

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NEWS

The Japanese connection: National Semi's bifocal view

By Jeffry Beeler

National Advanced Systems Corp. (NAS) of Mountain View, Calif., recently found itself in the unusual position of seeing its Japanese business partner accused of violating American trade law by NAS' own U.S.-based parent company.

NAS is wholly owned by National Semiconductor Corp., one of three U.S. chip manufacturers that on Sept. 30 accused Japan of dumping erasable programmable read-only memory (EPROM) chips into the American market.

But in a strange twist of fate, the National Semiconductor subsidiary also happens to be the exclusive U.S. outlet for Hitachi Ltd.'s medium- and large-scale line of IBM-compatible mainframes.

Hitachi figures prominently in a Sept. 30 petition that NAS' parent company and two other U.S. semiconductor firms — Advanced Micro Devices, Inc. and Intel Corp. — filed with the U.S. Department of Commerce and the International Trade Commission. The joint petition accuses Hitachi and seven other Japanese chip makers of selling EPROMs to American buyers below cost.

But despite the legal dispute between National Semiconductor and Hitachi, NAS expects its business relationship with the Japanese company to remain fundamentally unchanged, according to a spokesman for the mainframe vendor.

A source with NAS' parent firm agreed. "Mainframes and semiconductors are two entirely separate lines of business," he said. "We have to pursue the EPROM issue because of its extreme importance to the semiconductor industry. But at the same time, we feel we can keep the matter totally apart from our NAS-Hitachi relationship, which we still value highly."

■

California state legislators have deferred action on a proposed constitutional amendment that would strengthen the legal safeguards governing the privacy of personal computer-stored information.

Earlier in the year, the amendment breezed through two committees of the California Assembly but then recently hit at least a temporary legislative snag on the full assembly floor.

Thurman White, consultant to Assemblywoman Gwen Moore (D-Los Angeles), partly attributed the delay to the proposed amendment's legislative novelty. "It's new in the sense that we're trying to make some explicit constitutional provisions apply to electronic information," White said. "But our efforts have inevitably resulted in some confusion over what we're trying to accomplish and what the long-term constitutional implications would be."

WEST COAST UPDATE

White also blamed the delay on the assembly's natural reluctance to act on a proposal to change the state's constitution.

The amendment's supporters had originally expected their recommendation to complete its journey through the legislative mill by the end of the summer. But before the assembly could finish debating the amendment's legal ramifications, the latest session of the California legislature adjourned.

The assembly is expected to resume consideration of the amendment when the legislature reconvenes after the first of the year, White said.

Introduced by Moore last January, the proposed amendment would extend to personal computer-stored information the same constitutional protections that traditionally have applied to tangible property.

Existing California law explicitly protects items like personal computer hardware against unwarranted search and seizure. But whether the same safeguards also cover a microcomputer's information

Continued on page 28

"Why doesn't somebody make a graphics terminal you can change to fit different jobs?"

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FG 02518

Fire fuels bank's drive to revamp word processing unit

By Donna Raimondi

MINNEAPOLIS — A disastrous fire in Norwest Bank Minneapolis NA's corporate headquarters three years ago led the way to a more efficient word processing system for the company.

In 1982, the word processing functions at Norwest were as much a disaster as the company's gutted corporate headquarters building. The expenses and the need to relocate after the Thanksgiving 1982 fire caused the company to cut back on supervisory staff and increase the number of remote word processing service centers as part of the reorganization efforts.

There is now a main word processing center with 19 operators and four small satellite centers that share the services of two full-time clerks and a part-time employee. The bank will continue to occupy offices in 23 buildings in downtown Minneapolis until its new corporate headquarters building is ready in 1987, said Karen R. Miller, assistant vice-president of the operations group and manager of the word processing division.

Four different vendors' systems and a lack of operating standards gave the more than 900 internal clients of the word processing division mixed signals about policies and about the costs that were charged back to their departments for word processing services. By the end of 1982, the word processing division was in the red, and clients of the service were starting to look at buying their own departmental systems, Miller said.

But by the end of 1984, two years after installing Wang Laboratories, Inc. VS 100 equipment and an in-house-developed Cobol word processing management system, the division had reduced its staff from 39 to 24 people, increased productivity by 6% and increased its hourly average output by 106%, Miller said. Previously, the center was uncertain about costs related to individual documents, but now it has a system of eight weighted charge types based on job difficulty and the time required to perform the job, she said.

The VS 100 has 109 devices attached to it. The 68 terminals, five disk drives, a backup tape drive, four telecommunications devices and 31 printers are spread out over several buildings because of the fire, but they are all cabled directly to the host. The devices can be a maximum of 2,600 feet from the computer, but the bank was able to hook up the devices by laying cable through the city's extensive skyway system, Miller said.

Manual form next target

A manual input document form is used to track each piece of work from start to finish and to compile pertinent information on a particular job. The form is filled out partly by the client and partly by the operator. Miller hopes to put that form — which takes one person nine to 12 hours a week to enter into the system — on-line when her "far-flung" empire consolidates in one building in 1987.

From the information entered from the form and from a data base of pricing information, managers can access data on cost control, operator productivity and profit and loss figures for the word processing division, Miller said. They can sort data by source, document type and site to glean information about how documents were created.

One report generated by the system contains information on operator productivity. Supervisors now sit with each operator once a month to discuss whatever issues the report has raised. "It took two years to overcome operator resistance to this report," Miller said. Each operator is now compared with his own past progress and not to other operators

To establish guidelines for the operators, Miller and her staff reviewed industry standards and an in-house study.

Continued on page 28

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GAO report faults SSA system upgrade

By Mitch Betts

WASHINGTON, D.C. — The $500 million computer modernization program at the Social Security Administration (SSA) so far has not improved the agency's ability to accommodate legislative changes in the Social Security program, according to a new congressional audit.

"Although [the] SSA has succeeded in upgrading its hardware under the capacity upgrade program, it has made little progress in improving its ability to respond to legislative changes that require software modification to existing systems," the General Accounting Office (GAO) report said.

The reason, according to the GAO, is that the SSA has not met the software improvement goals spelled out in its 1982 Software Modernization Plan that include a complete redesign of the software, better software maintenance and proper documentation.

The agency must frequently change its software when the U.S. Congress passes a law changing the regulations of the Social Security program.

For example, 1983 legislation provided for the taxation of Social Security payments to upper income retirees, which required the SSA to create a new data base and write new software.

The GAO noted that the SSA met the deadlines for these changes. But the audit said this was because the agency diverted 40 top programmers to building the programs, taking them away from the software improvement and redesign projects.

The GAO asserted that the agency would still have trouble responding quickly to new legislation in cases where it has to modify older software, much of which is still poorly documented and maintained.

Furthermore, the GAO audit said the agency needs to implement additional security measures to protect its system from fraud. The GAO praised the SSA for implementing a logon/logoff procedure that identifies users who make data entries.

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West Coast Update

depends on "the vagaries of court interpretation," White said.

■

In a related development, the California legislature also has decided to hold in abeyance a proposed law that seeks to merge the state's information systems and telecommunications activities under a single unified organization.

If Assembly Bill 808 is enacted into law, it would reportedly create the first integrated information systems and telecommunications effort in state or federal government history.

The bill has already passed both houses of the state legislature and recently went to a legislative conference committee consisting of three state senators and three assemblymen.

From page 27

Fire fuels bank's drive to revamp WP unit

The findings showed that 20% of an operator's time is spent on things other than word processing activities. Each operator produces an average of seven to 11 pages per hour, and operator standards are strictly enforced by the two supervisors.

The word processing division is now able to enter into formal billing agreements with its clients, in which it promises low-cost services at a fast turnaround time (four hours for a dictation job). Rush jobs are automatically charged an extra 25% to cover the additional costs incurred and to discourage unnecessary priorities. Each quarter, reports show whether or not the division is operating within its guidelines. The automatic billing feature frees up almost half of one supervisor's time each month.

The system flags problems with operators, such as if the operator is doing too little work in a certain time period, or if certain jobs take too long to do because they come in illegible, Miller said.

Not all of the benefits of the system derive directly from the equipment and software. For example, a divisional emphasis on quality at Norwest has cut down on errors. If operators have specific problems, the operators can be trained to eliminate them.

Miller said she has worked to eliminate specialists. All operators receive training in all areas, eliminating the queues that formed because a number of clients in the trust department, for instance, might want the services of an operator who was particularly adept at handling trust documents.

The reporting system's profit and loss analysis helps zero in on costs for each category of work that the division does, Miller said. "We discovered that we were doing a lot of non-word-processing jobs like check printing, so we eliminated lots of extraneous jobs," she added.

After three years of using the word processing information system and without increasing pricing, the company will break even on word processing operations this year. The average turnaround time of a job has improved by 70%, error rates have dropped by 43%, and average unit pricing of a document has decreased by 6%, she said.

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ICL banks on open systems strategy

Exec claims firm has put hard times behind

After weathering hard times in the 1981 recession, International Computers Ltd. (ICL), Britain's sole mainframe computer manufacturer, has seen its revenue stream move steadily back into the black. The renewed profitability — after a 1981 loss of $64 million — was aided by a 33% reduction in the company's work force and infusions of cash from the British government and ICL's new owner, Standard Telephones & Cables, Plc., which purchased ICL last year.

The rejuvenation is also due to the firm's new emphasis on technological partnerships, with firms such as AT&T and Fujitsu Ltd., and the products that are coming out of those joint ventures. Two new ICL mainframes are being made in Britain, using Fujitsu large-scale integration chips, and last month, the British government signed a $100 million contract for 18 of those machines for use in a nationwide data processing and communications network.

New products and a change in corporate culture have rekindled ICL's competitiveness. In a recent exclusive interview with *Computerworld* International Editor Edward Warner, ICL's managing director Peter Bonfield discussed where ICL is going and how it will get there.

In 1981, ICL was $64 million in the red. Are the hard times over for the company?

I think the dramatic changes are over. I don't think that we are now in a situation where we will have to lay off a third of our people. I think from that point of view, they're over. I think the dramatic changes are still going on in the marketplace, and we're still faced with dramatic changes. Considering [that] the industry this year has gone through turmoil, I think that we are [doing] credibly well.

I've heard it said by some people that your company is becoming Americanized, that your people are working longer hours, that ICL has reorganized into strategic business units. Is your corporate culture changing remarkably?

We have absolutely gone out to change the corporate culture, and we have done it several ways, actually. Part of it is bringing in management that is of a different culture. We have tried to get all of the managers that we have brought in [from] similar backgrounds. They have all worked in international companies. They have mostly worked internationally. Most of them are relatively young [and] aggressive, and we have also put in a major program to change the culture of our management team. I don't think that we would say that it has changed to American methods. What we have actually tried to do is tailor American methods, Japanese methods and European methods and try to generate our own culture, [one of] moving fast and working long hours.

Isn't the fact that your mainframe operating system, VME, is non-IBM compatible a problem both in the British market and in your attempts to make an inroad in the U.S. market?

No, we believe that [being incompatible] is actually less of a problem than being IBM compatible. Because IBM owns the operating system, they are obviously [going to] do what they like with it. We own the VME operating system and, therefore, can do what we want to do with it. We know where it is going. It's significantly more advanced than [IBM's] MVS in terms of its ability [regarding] security and data handling because it is basically newer.

The other thing is that [ICL machines] actually coexist in an IBM environment so we can actually put the machines in the network, and the network can coexist with an SNA [Systems Network Architecture] network.

According to your 1983 annual report, all of North and South America generated only 2% of ICL's revenue even though your operating unit in the U.S., ICL, Inc., is 10 years old. Does this mean that your efforts in the U.S. so far have failed?

I would say that we were relatively unsuccessful [in the U.S.] until about [1981] or [1982]. I joined ICL in [1981]. At that stage, I suppose the primary thrust in the U.S. had been a mirror image of the thrust in Europe, which was [to sell] across the range.

Bonfield is managing director of Britain's sole mainframe manufacturer.

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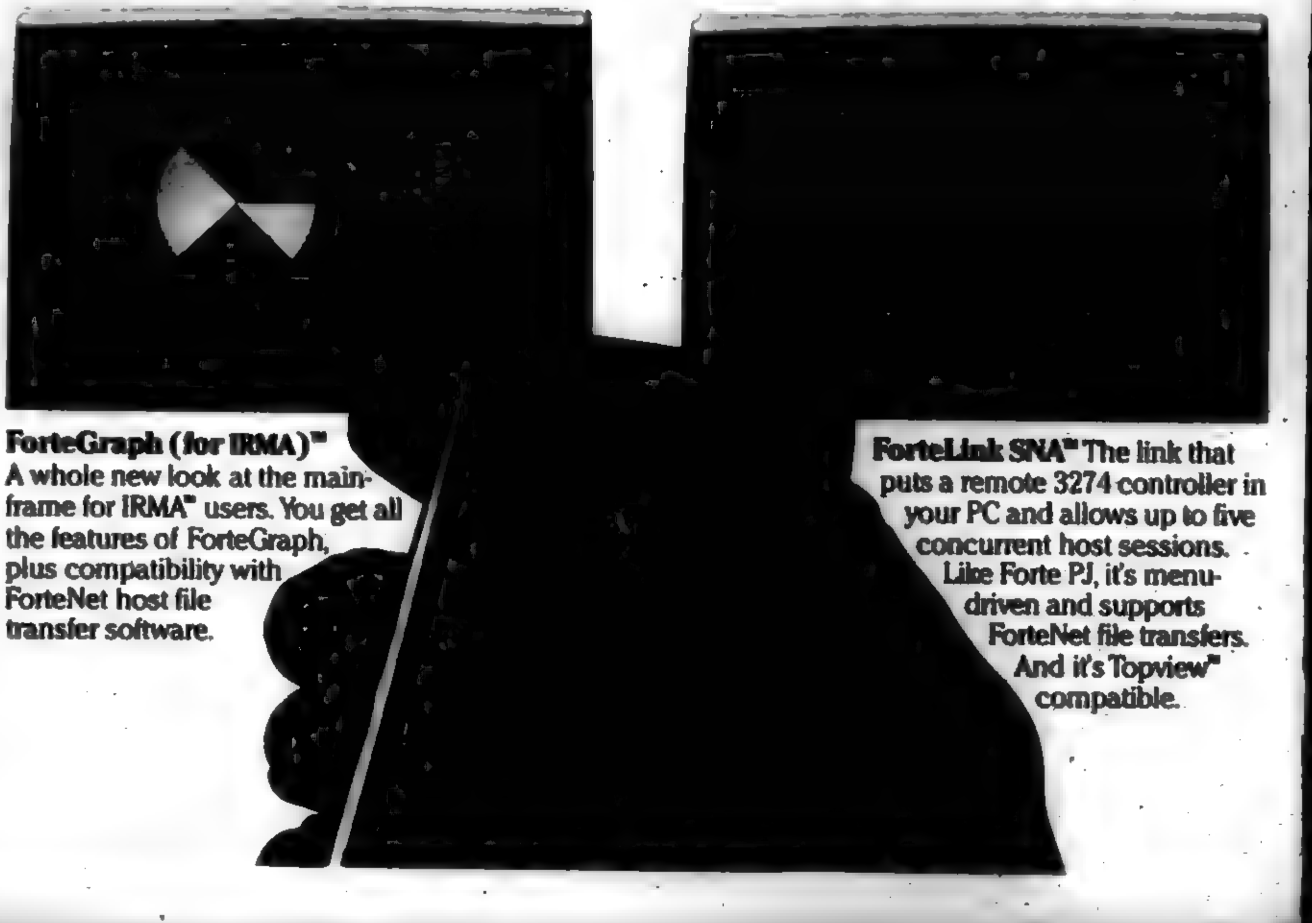

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We have [now] concentrated purely in vertical markets. The primary [vertical market] that we chose was state governments, [such as] New York state [to which we sold] a Social Security system that is similar to some of the systems [in which] we have specialized in Europe.

If one of your larger markets is South Africa, what is ICL's position regarding sales to that nation? Are you considering a ban on sales?

No. I am a businessman, not a politician. I try to remove my personal thoughts on the political situation, and we will just comply with British law. We have been in South Africa a long time. We employ a lot of people there, and we have a lot of customers there. So, at the moment, we are not thinking about it at all. It doesn't mean that we condone apartheid or anything else.

Regarding the Japanese manufacturing of semiconductors for your mainframes, is it possible that further down the road ICL could become like National Advanced Systems, Corp. in the U.S., an OEM for Japanese mainframes?

Well, we are now [an OEM] in printers. We don't design or make our own printers. We source our printers from [Japan] and the U.S. I think that [becoming a mainframe reseller] is a possibility. We will bring in pieces of hardware if they support open systems connectivity to integrate into our solutions. On the mainframe side, another interesting thing has happened over the last four years. In 1981, 76% of our business [in] hardware sales was on mainframes, and the [revenue] was about 700 million pounds. Now the [revenue] is [split] about 50-50 between hardware and smaller systems.

Does ICL's greater emphasis on communications products come from ICL's having been bought by Storage Technology Corp. (STC)?

About half of the 1,000 people or so that we have put into this network systems [development] came from STC companies. They have been moved into this new division ... called STC Network Systems, a management company of ICL. We have brought them in purely as a result of the merger. We definitely got more expertise in communications than we had as a computer company.

How else has the acquisition affected ICL?

To be quite honest, I think that [communications expertise] is the major area [in which] it has affected ICL. ICL is still run as a separate management company. We have our own board of directors [and so forth]. It is run at arm's length from the group, and we have picked up those skills that we needed for network and communications and added them to ICL. Apart from that, which I think is a pretty significant move, actually, there are no other major changes.

ICL is an AT&T Unix booster. Does your support for that operating system mean that we might see Unix-based applications on ICL machines soon?

Yes. We've got some ... Unix machines [now]. We signed two deals recently, one with a company called Data Media, [which] we have a partial stake in, and we have one of their Unix machines. We also did a deal with Computer Consoles, Inc. for [its] Office Power, which is [a] software system for office systems. Again, this runs on a Unix box.

So, you've put Office Power on an ICL machine?

Yes. The other thing that we are going to do is embed Unix in our mainframe operating system so that you will be able to run Office Power in the next year, or 18 months maybe, across the total ICL line.

VME can already host Unix?

Well, it can. We haven't actually released that into the market yet. We won't release that until the middle of next year. But we have told our customers that is the direction in which we are going.

What other new product directions, in the short run, might we see from ICL?

You will see enhancements to our mainframes. You will see larger machines coming out in the range. There has already been announced a Series 39, so there have already been extensions of that. You will see more networking capability on our products. You will see smaller machines that can fit into open systems networks. You will see more Unix boxes and extensions of our voice/data line, and [you] will see more applications in vertical markets.

If the reason for the erosion of your market in Europe is IBM, what steps are you taking to counter that erosion?

I think that to have a company the size of IBM, $50 billion dollars compared with our $1.5 billion, is a serious competitive threat. Our approach is twofold: not to compete head-on with IBM and to try and generate a market which is not capable of being dominated by IBM. This, we believe, [is] the open [systems] market. Now, I am sure that IBM will get into supporting open systems in the open market, but once they do that they won't be able to dominate it as they [do] MVS or SNA.

Doesn't this place a lot of emphasis on the success of open systems, which is still something of a new trend?

Yes it does. [Open systems] is an increasing trend and certainly an increasing trend in Europe. No UK government order can be placed without complying with open systems. I think that you are starting to see this in the U.S., too.

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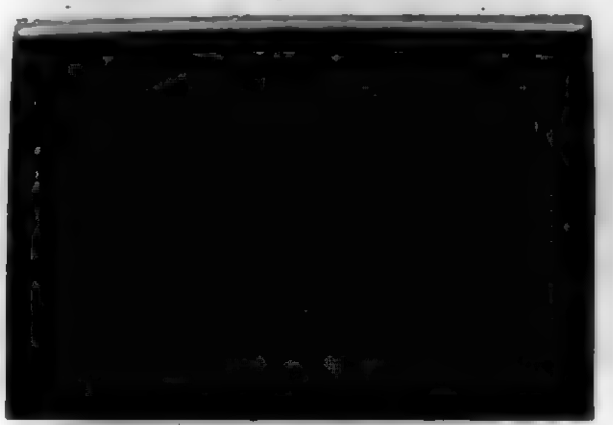

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WORLD DIGEST
CW International
News Network

LONDON — Micropro International Corp. of San Rafael, Calif., this year will introduce an AT&T Unix version of its Wordstar 2000 word processing program.

"It's not announced, but we have been doing a Unix version of 2000," Chairman Seymour Rubinstein said. Rubinstein added that, despite the much-vaunted portability of Unix software, his company has spent most of its development time tailoring the new program for different terminal types. Unix micros are not standardized in screen handling, a problem for programs like Wordstar 2000 that use memory-mapped video.

MEXICO CITY — A week after the largest earthquake in Mexico's history rocked this city, damage to computer and communications equipment alone was estimated at more than $25 million. Many buildings crumbled, including the Telefonos de Mexico S.A. and the Ministry of Communications — which together control all Mexican communications operations. Large telecommunications companies are helping the government to reestablish communications because almost all the equipment was destroyed.

TOKYO — Nippon Telegraph and Telephone Corp. has decided to buy a Cray Research, Inc. supercomputer, the Cray.XMP1, sometime in mid-1986. Details of the purchase, including cost, were not specified.

Nippon already owns one supercomputer, a Cray.XMP22, which it purchased in August 1984 for use at its basic technology lab.

PARIS — Seymour Cray, founder and president of supercomputer manufacturer Cray Research, Inc., said that his company will respond to IBM's announcement of a vector processor with a continuation of its effort to sell to the high end of the scientific market.

Cray Research, a major player in the $1 billion supercomputer market, has several cross-development agreements with IBM but was not involved in development of the new IBM product, Cray said. In all, Cray seemed unperturbed by the IBM announcement.

LONDON — Richard Perle, U.S. undersecretary for defense, acknowledged last week that computer exports from Western nations to China were being delayed by Cocom, an agency that regulates the export of strategic high-technology goods from Western countries. Cocom is made up of representatives of the North Atlantic Treaty Organization countries and Japan.

Computer exports to China could speed up, however, if a U.S. Department of Defense proposal to expand the Cocom staff is approved. "It costs under $1 million a year. We could do that and still not create a significant bureaucracy," said Perle, adding that the large volume of international trade agreements with China hinder European computer companies when they seek export licenses.

LONDON — Integrated Business Communications, a UK-based communications company, said it is holding discussions with the British Defense Ministry regarding Integrated Business' new encryption scheme, which has reportedly been certified by the government's communications headquarters as unbreakable.

The firm is selling the product as an enhancement to its range of plug-in communications boards for the IBM Personal Computer and compatibles. The boards reportedly permit the machines to communicate using a mix of X.25, telex and asynchronous communications interfaces.

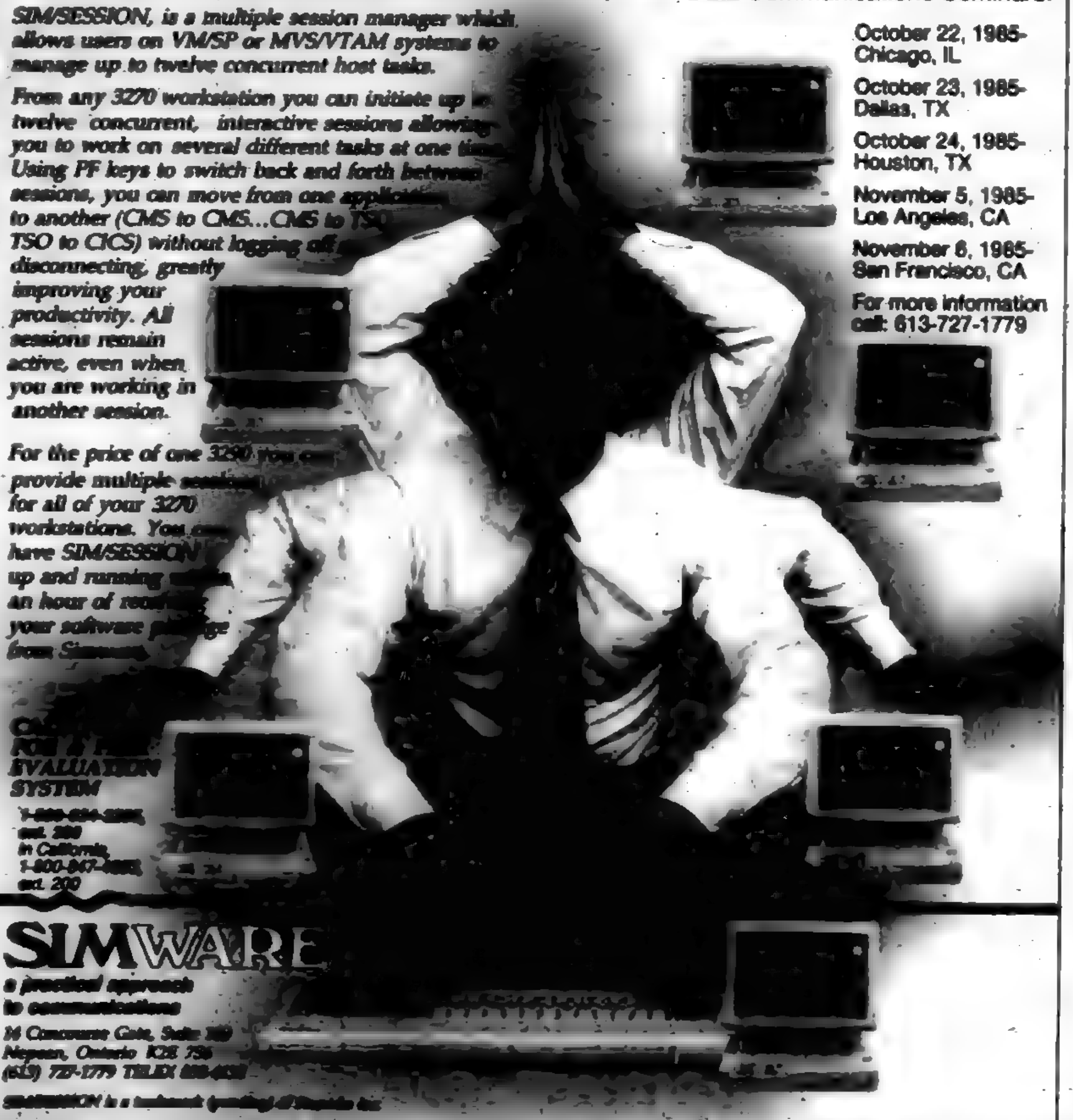
PARIS — The French Telecommunications Association has helped support a new law — and a new sales method — through its Minitel Videotex System. In August, an interactive data base on used cars was added to the nation's government-supported electronic information service.

The round-the-clock listing allows potential car buyers to shop at their convenience and save time. By entering any of six criteria — make, model, year, mileage, region where available and price range — shoppers can find the car they want. The seller's name and address appears automatically with the listing.

There is no fee for accessing the data base, though sellers pay between $7 and $12 to list a car for three weeks. To complement this listing, the addition of credit terms and an auto insurance service is currently being considered. The used car listing was made possible by a new law that requires used cars to pass a government inspection before being sold.

CROWS NEST, Australia — Parts of *Australian Macworld*, a computer magazine, have been made available on a public information network system called Teledata. Included in the information network are complete listings of Apple Computer, Inc. Macintosh hardware and software available in Australia, selected stories and a full listing of the contents from the current issue of *Australian Macworld*, a news summary and previews of forthcoming issues of the magazine.

This service is provided at no extra charge to the existing 3,500 members of Melbourne-based Teledata.



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Papers should be submitted by Dec. 2, 1985, and sent to Dale Rognlie, Mathematics and Computer Science Department, South Dakota School of Mines and Technology, Rapid City, S.D. 57701.

THE 1986 INTERNATIONAL ASSOCIATION FOR SOCIAL SCIENCE INFORMATION SERVICE AND TECHNOLOGY CONFERENCE (IASSIST)
Marina Del Rey, Calif., May 22-25

Authors are invited to submit papers on the following topics: data interchange; computer mapping; graphics; machine compatibility, micro/mainframe; mainframe software; comparability of election studies; relations and rectangular data bases; archive responsibility for public access; standards for thesauri to describe, classify, catalog data files; file transfer, downloading, uploading; funding for data collections and services; and the role of national governments in data collection.

Papers are to be submitted no later than Nov. 15, 1985, and addressed to IASSIST 1986 Program Committee, c/o Jackie McGee, Rand Corp., 1700 Main St., Santa Monica, Calif. 90406.

SEVENTEENTH ANNUAL PITTSBURGH CONFERENCE ON MODELING AND SIMULATION
April 24-25

Authors are now invited to submit papers that have not been previously published. Papers are requested on the following topics: microprocessors; personal computer applications and software; artificial intelligence; expert systems; robotics; social, economic and regional science; global modeling and simulation; and traditional areas of modeling and simulation.

Papers are due by Jan. 31 and should be sent to William G. Vogt or Marlin H. Mickle, Modeling and Simulation Conference, 348 Benedum Engineering Hall, University of Pittsburgh, Pittsburgh, Pa. 15261.

THE VM SOFTWARE ANNUAL USER CONFERENCE
Washington, D.C., April 13-16

Papers for presentation at this first annual users conference are now being sought. Topics include VM Software, Inc.'s products and components, in particular VMcenter.

Abstracts of presentations should be limited to one page and sent to Andrea Merritt, VM Software, Suite 355, 2070 Chain Bridge Road, Vienna, Va. 22180. Abstracts are due no later than Nov. 30, 1985.

TWELFTH INTERNATIONAL CONFERENCE ON VERY LARGE DATA BASES
Kyoto, Japan, Aug. 25-28

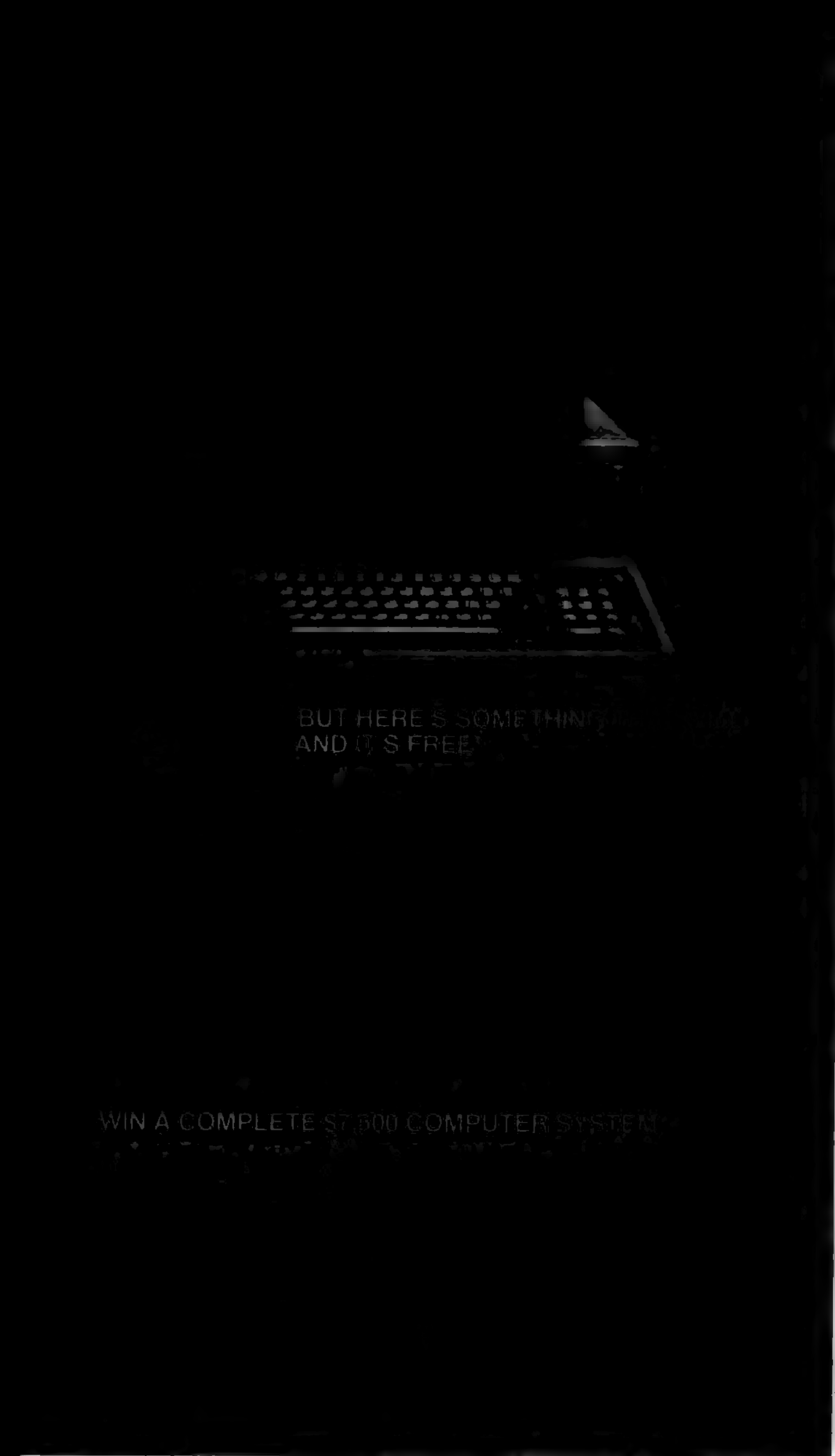
Major topics of interest include but are not limited to the following: data models, data base theory, data base design methodology and tools and distributed data bases.

Papers should be submitted no later than Feb. 15 to one of the following program committee chairmen: Setsuo Ohsuga, University of Tokyo, 4-6-1, Komaba, Meguro-ku, Tokyo 153, Japan; Wesley Chu, Computer Sciences Department, University of California at Los Angeles, Los Angeles, Calif. 90024; or Georges Gardarin, Domaine de Voluceau Rocquencourt, B.P. 105-78153 Le Chesnay Cedex, France.

SYNERGY '86
Universal City, Calif., June 16-18

Synergy '86 is sponsored by the Society of Manufacturing Engineers, its Computer and Automated Systems Association and the American Production and Inventory Control Society. The sponsors are inviting submissions of abstracts of papers that present examples of synergy — the convergence of the planning, processes, controls and tools of manufacturing to attain quality results on the shop floor.

All papers are due no later than Oct. 21, 1985. Further information is available from Cheri Willetts, Technical Activities Department, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.



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BASF

Computer security issues garner industry limelight

By Bryan Wilkins

GAITHERSBURG, Md. — The National Bureau of Standards (NBS), located on a sprawling complex, was host early this month to a huge new growth industry — computer security.

More than 1,000 professionals from government and industry took over the NBS facilities at the eighth National Computer Security Conference to hear the latest theoretical developments and practical steps being taken to secure the integrity of computer data.

Dennis Branstad, head of the NBS' Institute of Computer Sciences and Technology, noted that interest in computer security has mushroomed recently, prompted by incidents of hackers getting into data bases illegally.

Eight years ago, there were only 250 attendees interested in computer security, and Branstad noted that the issues have changed little since then.

> ”
>
> *Interest in computer security has mushroomed recently, prompted by incidents of illegal hacking*

The government is assuming leadership in educating and developing standards in the area of computer security. This leadership role has developed out of necessity, since the government is slated to spend $31 billion in the next five years on general-purpose computers and telecommunications.

Last year, President Reagan established a National Computer Security Center under the control of the National Security Agency and gave it responsibility for "reducing the vulnerabilities" of automated information systems in the federal government.

Col. Joseph Greene Jr., deputy director of the U.S. Department of Defense's Computer Security Center at Ft. Meade, Md., pointed out that access control systems found in commercially available computers are adequate for certain data bases but that generally these systems are not secure enough to protect sensitive information.

According to Greene, there is a need for the development of standards that would be designed into hardware devices.

Greene cited the efforts of the DOD center to build a front-end multilevel encryption device for host-to-host use that will contain features for password keys, key distribution systems and control over access to data bases.

Airline's on-line system grounded

By Maura McEnaney

TULSA, Okla. — A troubled computer system at American Airlines' central data site forced regional reservation offices to do business the old-fashioned way. And for some employees, writing out airline tickets by hand is an ancient and foreign art.

American Airlines' reservations system, which has been automated since the late 1960s, was out of commission for more than seven hours recently after a foul-up occurred during routine file maintenance.

According to an American Airlines spokesman, the problem occurred when the system recoup was not done properly, and new reservation data was written over other current records.

'Caused by human error'

"It was just a one-time mistake caused by human error," American Airlines' Joe Stroop told *Computerworld*.

But that one-time mistake created a bit of chaos at American, forcing thousands of its reservation agents in four centers across the country to handwrite ticket information for more than 30,000 incoming calls.

Reservations were later entered back into American's IBM 3083s after the systems group wrote a software fix to correct the file maintenance problem. A backup system prevented the airline from losing any of its reservations, according to Stroop.

Nine flights delayed

The airline flew 1,300 flights the day of the computer glitch, and nine flights were delayed as a result of the computer problems, he noted.

"It was a frantic time," Stroop said. "When you lose your capacity to work because you lose your automation, No. 1 you are out of practice, and [No. 2], a whole lot of people have to work a lot harder," Stroop said. "We have people here who have never had to write a ticket by hand," he said.

To prevent the problem from happening again, American Airlines now has three operators working on its file maintenance operation and requires each operator to check the work of peers.

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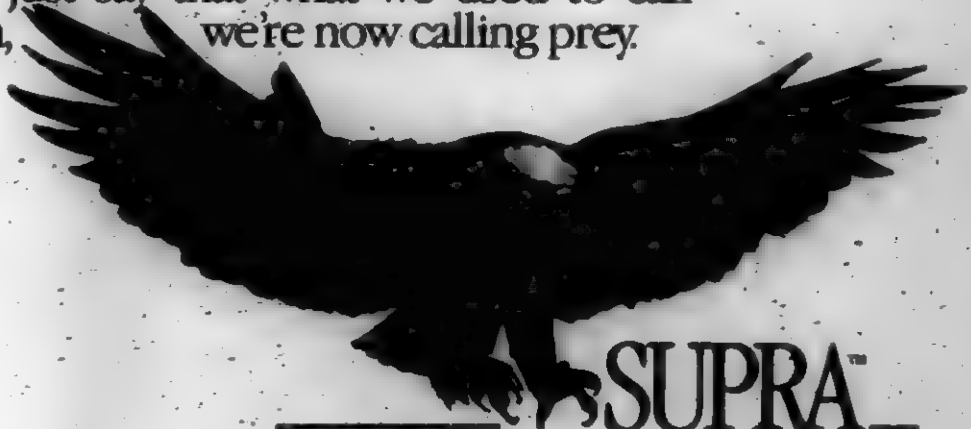

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Airline reduces costs by piloting own maintenance

By Paul Korzeniowski

SAN DIEGO — If you want something done right, do it yourself.

Regional airline carrier PSA, Inc., which has been growing rapidly during the last three years of deregulated competition, has applied that axiom to maintenance of its four Amdahl Corp. V8 mainframes. The results have been a substantial reduction in costs and improved service, according to Arthur Landman, assistant vice-president of computers and telecommunications at PSA, a $700 million airline that primarily serves the Western U.S.

The airline employs an 11-person maintenance staff at an annual cost of $679,000, but Landman figures that the company saves $3.8 million a year in maintenance costs. "Vendors levy as much as a $10,000-a-month maintenance fee for each mainframe," he stated.

In addition to eliminating the monthly fees, other results such as quicker response time and better service have saved PSA money. A vendor's maintenance technician may be responsible for a number of customers' equipment located within an area that may have a 500-mile radius. When a client places a trouble call, 4 to 8 hours may pass before a technician arrives to fix a problem.

In the airline business, an 8-hour delay can be catastrophic. "We have to be up 99.9% of the time at all locations," Landman claimed. "Even if only one of our remote locations goes down, it affects all connecting flights."

Landman claimed that his staff, with technicians in San Francisco and Los Angeles, guarantees 4-hour response time. "In most cases, we arrive within 2 hours," he stated.

Since the staff was put into place in 1981, there has been a 50% reduction in trouble calls. "Most of the calls were repeat calls," the PSA vice-president said. "Vendors had to make three or four trips to a site before a problem was corrected. Our people repair equipment once, and the system stays up and running."

The airline maintains more than just mainframes. Front-end processors, an automatic call distribution system and terminals fall under the aegis of David Allen, manager of field engineering. The responsibility of Allen's group will increase as it takes over maintenance of the company's Memorex Corp. disk drives later this year.

However, there are some items that will remain the responsibility of certain vendors. "We will not take over the maintenance on our [Wang Laboratories, Inc.] equipment," Allen said. "I do not think we would save money because there are too many problems with Wang's printers — they are just not very reliable."

Because PSA services its equipment, purchases are based strictly on cost rather than on cost and service — a practice that often locks an MIS manager into a one-vendor shop. "We spent $85,000 for a used V8 mainframe, and it is a $3 million machine," Landman noted.

Used equipment is one step behind state-of-the-art processors like the recently announced IBM 3090 mainframe. "Newer systems supply nothing other than faster throughput," Landman noted. "If our transactions were straining our processing resources, then we might consider a more powerful system. But that is not the case."

Corporate migraines have also come with maintenance responsibilities. The airline began planning its program in 1980 with the purchase of an Amdahl V6 mainframe. Allen stated that Amdahl had promised to supply traditional support for one year, train PSA technicians and furnish aid to the airline on an as-needed basis after the first year.

Amdahl reneges

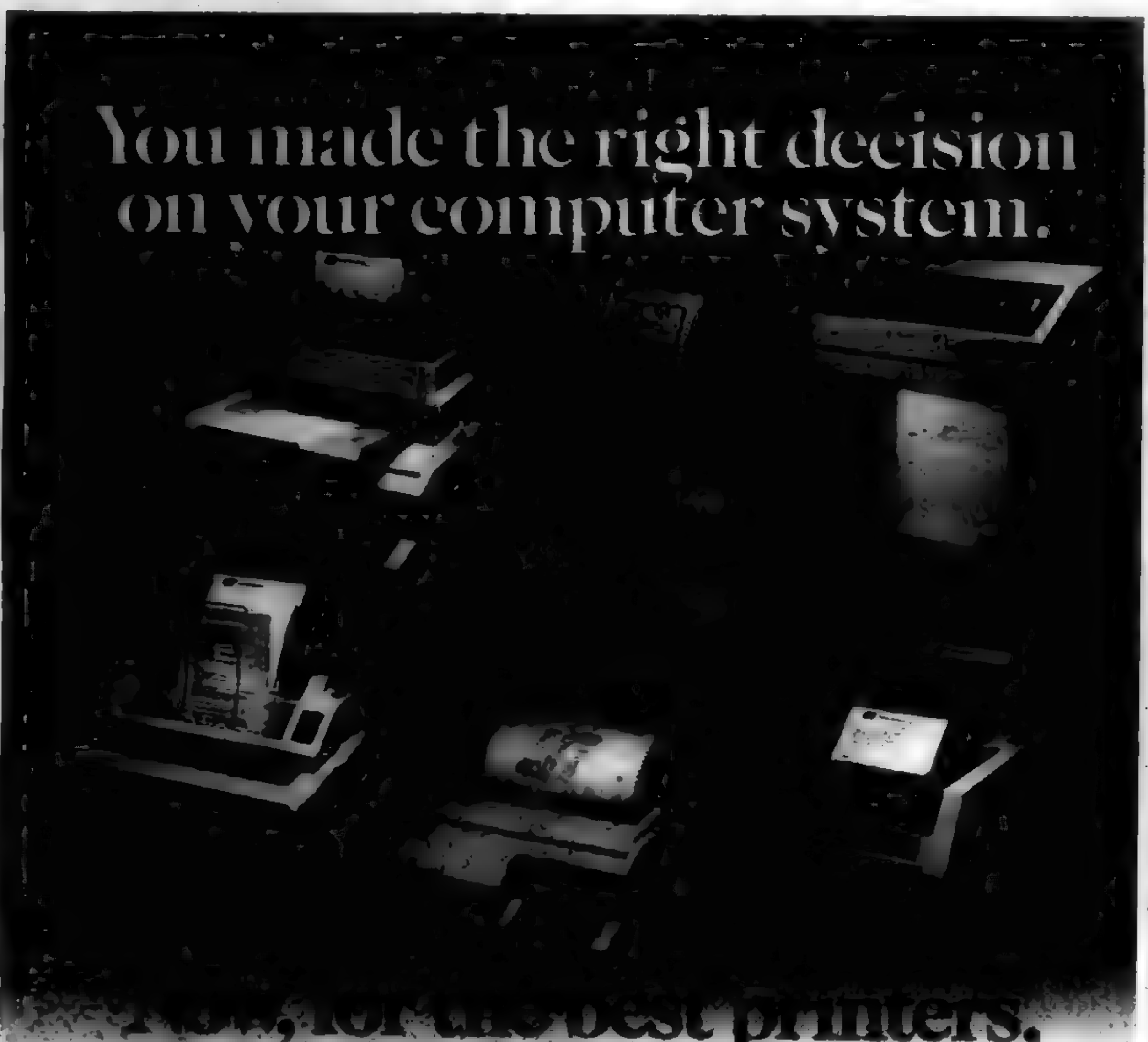
After a year, Amdahl reneged on its promises, Allen said, and the airline was forced to turn to a third-party supplier for additional Amdahl equipment. "Our current arrangement is not perfect, and I do not sleep as well as I would if I knew the people who made the machine were available to back me up," Allen said.

Recruiting personnel has presented other problems. "I have tried to hire people through newspaper ads, with little success," Allen noted. Because he has been in the maintenance field for a number of years, most of his staff came through professional acquaintances.

Once PSA technicians are hired, they are sent to the various vendors' technical training programs. "As part of a purchase agreement, we require that the vendor allow our technicians to take its training classes," Landman said.

When the classes have been taken, documentation often holds the key to how well PSA technicians perform. "Most system documentation is quite thorough," Allen noted. "We had [Raytheon Co.] terminals and turned to an outside firm for documentation because Raytheon's documentation was not very good."

Should a company maintain its equipment itself? "On the one hand, it can be scary because, if we fail, there isn't anyone we can blame but ourselves," Landman noted. "On the other hand, we save money, and today there is no vendor able to supply a company with the help it needs."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The Right Printers for the Right Computer Systems

Many users report service costs more than its worth

By Clinton Wilder

One-third of business minicomputer and mainframe users feel they are receiving less service than they are paying for, according to the recently completed annual survey of user satisfaction by International Data Corp. (IDC) in Framingham, Mass.

Of the 293 users both of hardware vendor and third-party services responding to the survey, 34% said the value of their service was either "somewhat less" or "much less" than its cost. The dissatisfied user figure increased from 30.1% in 1984 and 25.4% in 1983. The percentage of respondents who said their service value was "much less" than its price jumped from 6.6% last year to 11.7%.

"As products show less differentiation in performance levels, service has become a much more important consideration in purchases," said IDC analyst Rebecca Segal, author of the survey. "And value vs. price is our most conclusive measure of customer service satisfaction."

Although the vast majority (88%) of respondents use their vendor's service personnel, the minority — third-party service customers — gave their service companies high marks for value. Seventy percent of third-party customers said their service was much greater, somewhat greater or equal to the price they paid, ranking third-party vendors as a whole behind only Hewlett-Packard Co. (80.7%) and Digital Equipment Corp. (72.7%) in value vs. price ratings.

IBM, however, had the highest percentage, 40%, of responses of "much greater value" or "somewhat greater value" of service in relation to price. "IBM users tend to have the highest expectations and the highest requirements, so that value/price result is encouraging for them," Segal said. But Big Blue also had the most users (20%) who rated its service value "much less" than its price.

Lowest marks

The lowest overall marks for specific vendors went to Prime Computer, Inc. and NCR Corp. Fifty-six percent of Prime users and 51.7% of NCR users rated their vendor's service negatively (less value than cost).

With the exception of HP and Burroughs Corp., most vendors did not fare well in ratings of service response time. Users of IBM, DEC, Prime, Wang Laboratories, Inc. and third-party service staffs said their vendors took longer to respond to normal and emergency service calls in 1985 than in 1984. The response times for Wang service, however, were still considerably below their extremely high 1983 levels (15.9 hours for a normal call and 8.3 hours for an emergency), which Segal said she believes contributed to falling demand for Wang products.

"Now Wang is making some incredible service offers on their VS 300s," she said. "They were significantly hurt by their service rating figures in past years. I think it hurts a vendor more to have a bad service rating than it helps to have a good one."

Burroughs users said they benefited from the industry's shortest average response time — 2.3 hours in normal situations and 1½ hours in emergencies. NCR, despite a lackluster showing in other ratings categories, was rated second with a 2.8-hour normal and 2.1-hour emergency response. Third-party vendors were said to have taken the most time to respond, 16.9 hours on normal calls and 7.3 hours on emergencies. But for third-party users, price was the most important consideration.

One fifth (21.2%) of the users responding to the IDC survey came from manufacturing organizations. Other leading user categories represented were wholesale/retail (12.6%), education (10.9%), government (7.8%), medical (6.8%), banking (6.1%) and data processing services (5.8%).

Software guide out for 1985

The National Technical Information Service in Springfield, Va., has announced that the 1985 edition of the "Directory of Computer Software" is now available.

The directory describes more than 1,300 computer programs developed by 100 federal agencies such as the U.S. Department of Defense, the National Bureau of Standards and the U.S. Department of Transportation. The packages are available to commercial businesses through the National Technical Information Service.

The offerings include an Ada compiler, computer graphics packages, modeling programs and simulation software. The software is divided into 21 categories, including aerodynamics and fluid dynamics, transportation, nuclear science and technology, chemistry, health care, engineering and communications.

The edition lists the hardware and software required to run each program and gives a brief description of its capabilities. The entries are indexed by number, subject, source agency, hardware and language.

The directory costs $40, and there is an additional $3 shipping charge.

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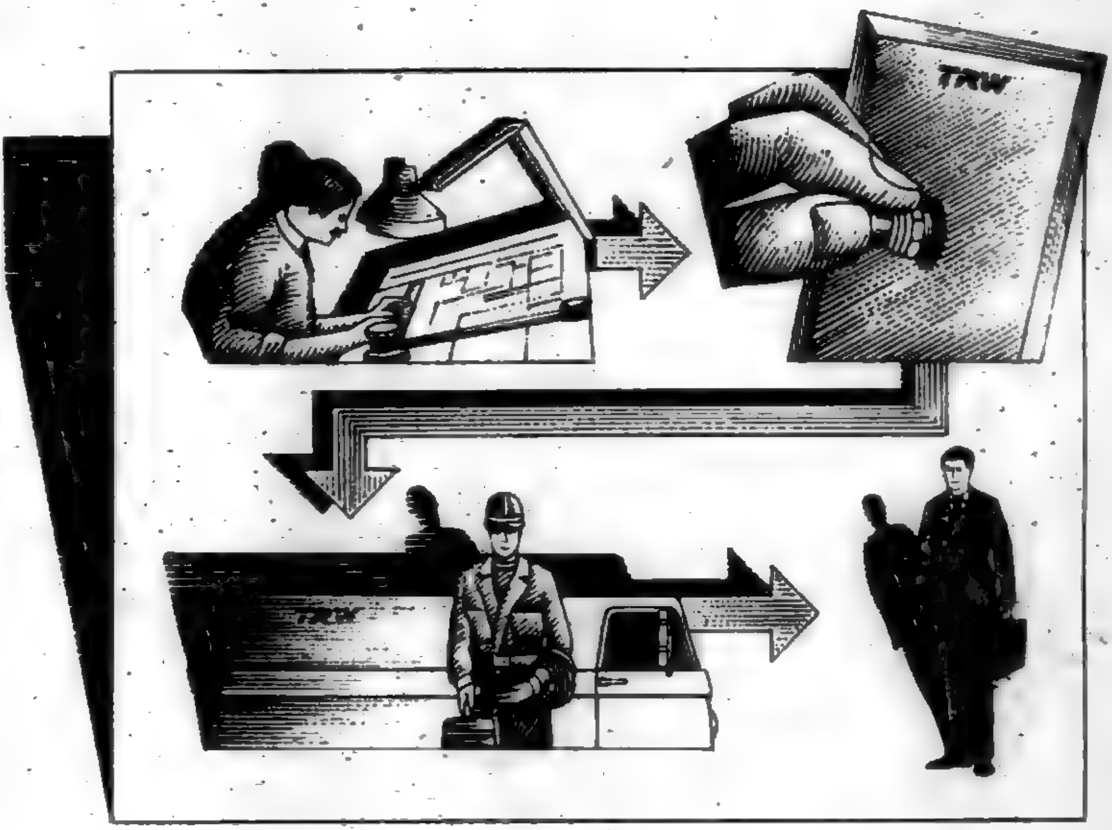

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Distributed system expands with agency's rapid growth

SCOTTSDALE, Ariz. — When the rapid growth of a nationwide agent for vehicle service contracts rendered the agency's computerized record-keeping system obsolete, the firm cured its growing pains by installing a distributed computer-based system.

In February 1984, Western National Warranty Corp., which sells service contracts to buyers of automobiles, motor homes, travel trailers and motorcycles, was growing at a rate of 10% a month. Paul Askos, president and founder of the 3-year-old firm, explained, "Obviously, we had a prior system, but based on our anticipated growth, that system was becoming obsolete. It no longer had the capacity nor the power we needed. We were unable to generate the accurate statistical data needed to manage the company well."

The firm, which had 10 employees at the time, used an Altos Computer Systems, Inc. 585 with three terminals. The system was used primarily to log a file on every customer and policy, including policy number, customer name and address, name and address of the agent who sold the contract, vehicle information and claim history. According to Askos, the old system had a 32,000-record limit, and by mid-1984, "We had reached that limit," he said. The firm currently has 110,000 policyholders, with 10,000 new policies being written each month, he added.

> *'The system has kept in step with our growth and not hindered it.'*
>
> **— Paul Askos**
> **Western National**
> **Warranty Corp.**

The firm tackled the problem in June 1984 by installing a Motorola/Four-Phase Systems, Inc. 6300, which was upgraded to a Four-Phase 6600 in July of that year. The system is composed of a 2.5M-byte applications processor, five 37M-byte Winchester hard disk drives and dot matrix and letter-quality printers. According to Askos, the original setup included four Convergent Technologies, Inc. PT terminals, and the system now supports 16 terminals.

The ability to expand the system was a critical selection factor, Askos said. "One of the intriguing concepts of the Four-Phase 6600 was that it could keep pace with our growth without a huge front-end investment. We have had the system for 18 months and have invested $250,000 in it so far, but our initial bid was less than $100,000. From a financial standpoint, it made sense to buy a system that we could build as we grew," the president of the vehicle service contract firm said.

Western National called in Professional Business Computer Systems, a Scottsdale-based Four-Phase value-added reseller, to assist in the selection, Askos noted. The system, which runs Oracle Corp.'s Oracle data base management software, was installed within five weeks.

The Oracle software is used to handle customer claims that come in over the firm's toll-free WATS line. According to Askos, the process begins when a policyholder takes a covered vehicle to a repair facility where the vehicle is inspected, and an estimate is prepared. The mechanic then calls a Western National adjuster, who brings the customer's contract data up on his terminal.

From there, the Western National adjuster assigns an authorization number if the repair work is covered by the policy. He then gives the mechanic verbal authorization to proceed with the repair, and he later follows this up with a written authorization. When Western National receives the invoice for the repairs, the bill undergoes a complete audit prior to payment.

System cuts WATS bill in half

"The Oracle software is custom-programmed for this application, and it enables us to complete this complicated process in a timely manner," Askos said. The system, he explained, cuts the company's WATS bill in half.

And the system has kept up with the firm's rapid growth. "We handle an average of 200 claims calls per day, using nine full-time adjusters," Western National's president noted. "With that volume, our previous system would have required 14 people to handle the calls effectively."

In addition to the custom-programmed application, the system handles other general business applications, Askos maintained. "We use packaged programs to do standard business tasks, such as word processing and general ledger," he said.

The Oracle software also produces financial status reports in 15 to 20 minutes, Askos noted. Those reports used to take as long as two to three hours to prepare, he explained.

The complete system changeover was not without a few problems, Askos said, but claimed that all of the problems have been solved.

According to Mike Guthrie, software development manager for the value-added reseller Professional Business Computer Systems, one of the problems was a delay in supplying the streaming tape needed to back up the system. This was temporarily solved using 5M-byte Syquest Technology, Inc. cartridges in place of the streaming tape. "This was an inconvenience, but the streaming tape is being installed now," Guthrie explained.

Askos stressed that the system's expandability is critical to his business. "Looking back to when we bought the system, what we saw as our growth potential was a conservative estimate. The system has kept in step with our growth and not hindered it," he said. In 1984, the firm banked $9 million in service contracts, and Askos predicted that it will bring in $15 million in service contracts this year.

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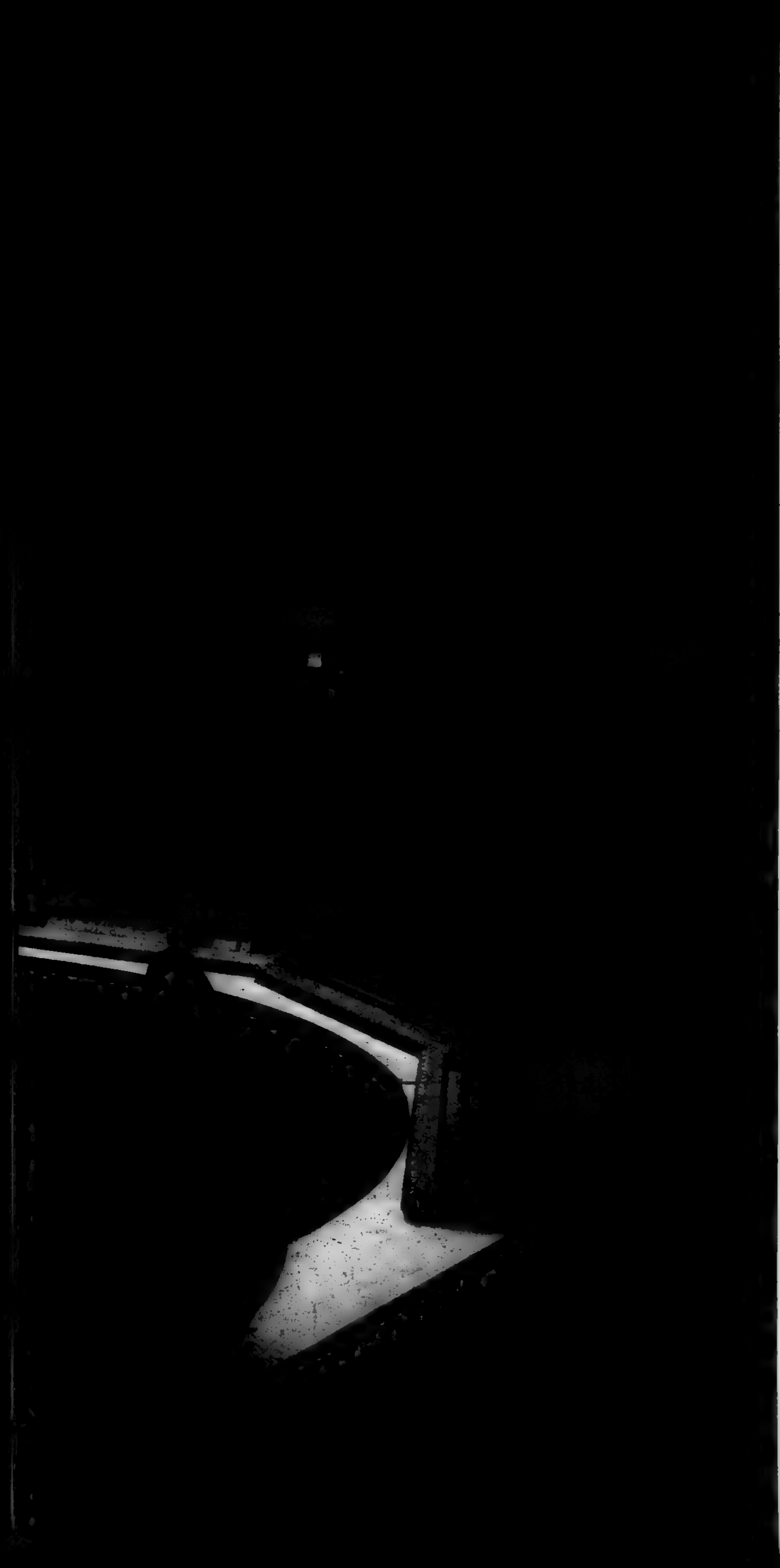

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GE glass division sees clear solution to network problem

CLEVELAND — The mandate was clearcut: A group of engineering, marketing and finance professionals at General Electric Co.'s Glass and Metallurgical Products Department was charged with developing a material to market to the medical equipment industry.

The methodology was less simple: Project members were widely dispersed — located in offices at Cleveland headquarters, a second Cleveland manufacturing site and a third facility in Goldsboro, N.C. — and first had to figure out how to communicate effectively among themselves.

Each project member had access to telephones with automatic dialing, an electronic mail system and IBM Personal Computers or compatibles. But communications processes were fragmented, according to Judy Fowler, a GE marketing manager and project manager for the group. "We needed a system that would link us all together," she recalled in a recent interview, "so that we could send messages and computer files easily and quickly."

Several options considered

Among the options that the group's engineers considered were modems and terminal emulation software, desktop voice/data systems and a companywide IBM mainframe that was soon to be installed.

In researching the options, the group's requirements became more clearly defined. Traditional communications and networking solutions were too complex to install, maintain and use. What the group needed was a system that would allow personal computers to communicate with one another as well as connect to the companywide mainframe; provide electronic mail and extras like mail waiting, speed dialing and communications management; and do all of this without undergoing a lot of systems conversion for installation and diskette shuffling during actual operation.

Following its research, the group decided to install a desktop computer phone system from Cygnet Technologies, Inc., of Sunnyvale, Calif., called the Cosystem, which works in tandem with IBM Personal Computers and compatibles.

"The Cosystem performed as touted," Fowler reported. "In one sweep it filled all of our requirements."

Thirteen Cosystems purchased

The department purchased 13 Cosystem units for installation — 11 for the two Cleveland sites and two for the Goldsboro site. Features included a 400-name directory for calls and electronic mail, automatic redialing of a busy number, a speakerphone, a personal calendar and three-way teleconferencing capacity.

It was so easy to learn the system that users were sending messages, loading directories and executing the speed-dialing feature early on the first day of installation, Fowler said.

One initial problem involved sending Lotus Development Corp. 1-2-3 spreadsheet files from one user to another. Fowler said the file first had to be retrieved from a hard disk on the personal computer, copied into a Cosystem subdirectory and then sent to its destination. A letter would take 30 seconds to send in this manner, while a large worksheet might take two minutes. Cygnet's technical support group revised their software to streamline that routing scheme and cut down on the transmission time, Fowler said.

Cosystem's bookmarking features allow the user to enter and leave an application with no systems exits and no diskette changes, Fowler said. "I might be working on Lotus' 1-2-3 spreadsheet when a question comes up. I can interrupt my work and mark my stopping place with a keystroke. Then I can go into my directory for a number, make a call using my speed dialing or send a message by electronic mail and, again in a keystroke, get back into [1-2-3] at the point where I left off," she explained.

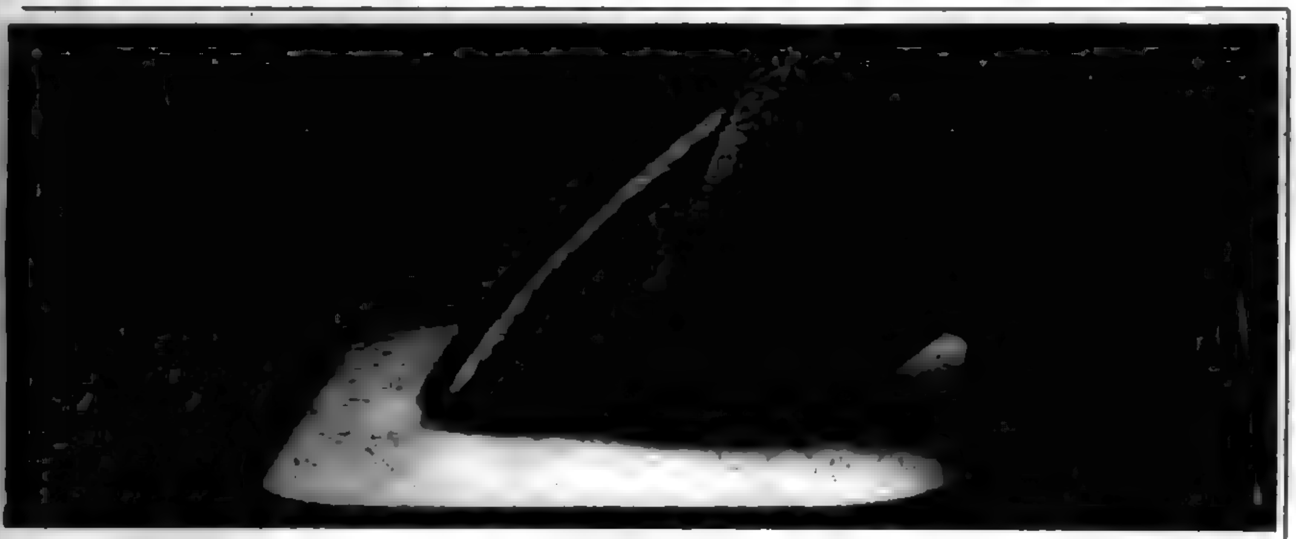
One limitation exists

Cosystem does have one limitation, Fowler said. When a personal computer user on a Lotus spreadsheet wants to make an entry into a calendar, the user must sign off Lotus and sign on to the calendar — a 30-second to 1-minute process. "It didn't take all that long, but it is a nuisance," Fowler said. Simply viewing the calendar requires only one keystroke.

Cosystem can also communicate with GE Lighting Business Group central processors; a Honeywell, Inc. time-share system; and a Digital Equipment Corp. VAX-11/780 supermini running VMS.

The VAX contains engineering data for the design of the new products and requires its own compatible terminals or special emulation software. In a link to the VAX, the Cosystem acts as a smart modem and can be configured to transport data in the required form and speed. In this case, the Cosystems have been configured to communicate with both large computers, eliminating the cost of the special terminals, modems and software normally required for VAX.

"It is clear that we had many varied communications needs," Fowler said. "The Cosystem has addressed them in a cost-effective manner."



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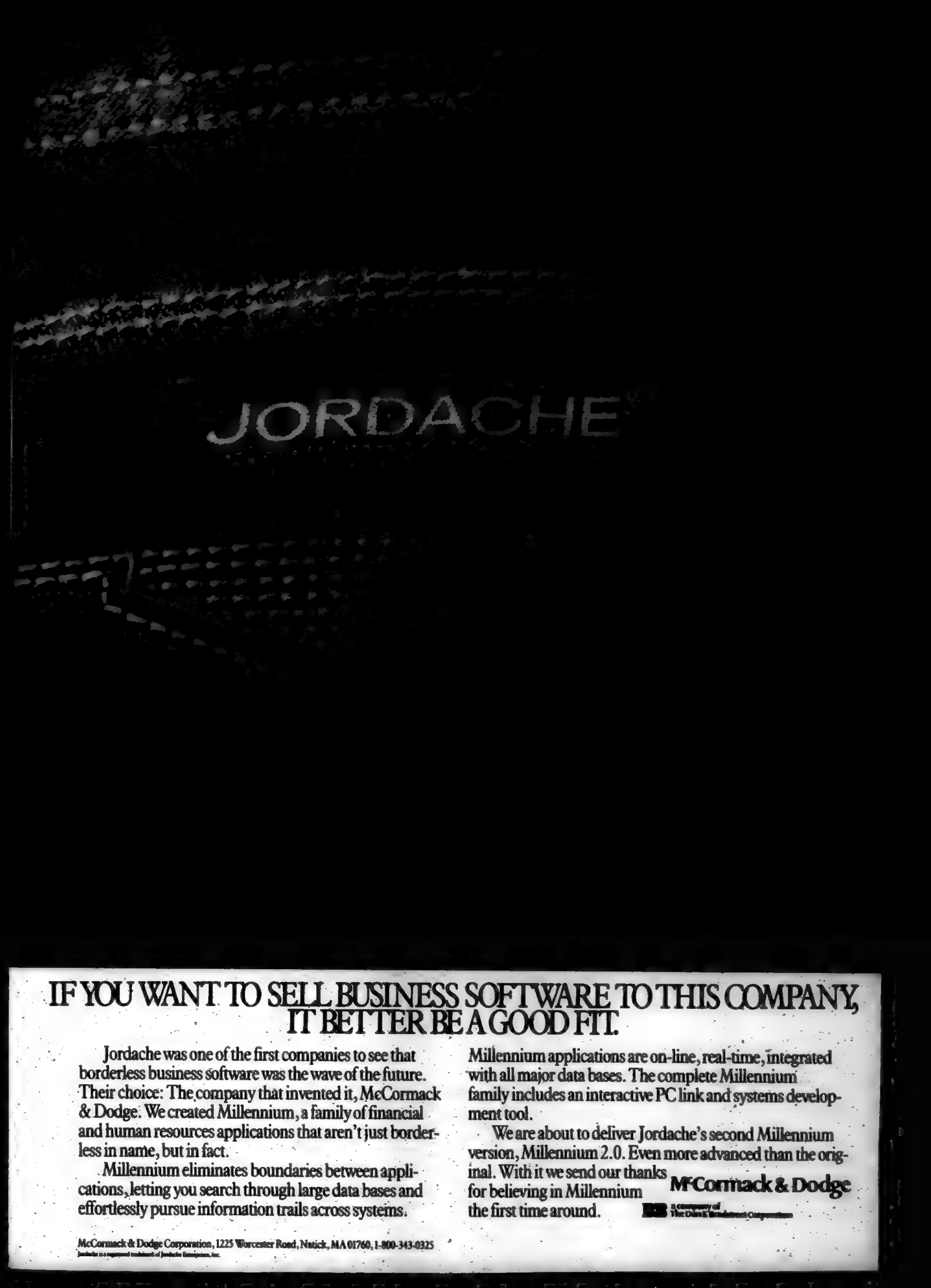

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MANAGERS ON THE MOVE

MEL KESTENBAUM has joined *The Record*, New Jersey's largest evening newspaper, as director of the Information Systems Department.

Kestenbaum comes to *The Record* from McAuto Systems Group, Inc., a division of McDonnell Douglas Corp., where he was general manager/vice-president. He played a major role in the development of the division and its data center.

Prior to that, he managed a corporate data center for Bradford National Corp., acquired by McAuto Systems in 1981.

He holds a bachelor's degree in electrical engineering from City College, New York, and an M.S. in computer science from Pratt Institute, Brooklyn, N.Y.

■

U.S. Department of Transportation (DOT) Secretary Elizabeth Hanford Dole has sworn in JON H. SEYMOUR as the department's assistant secretary for administration.

As assistant secretary for administration, Seymour is responsible for institutional management functions of the department, such as personnel, procurement, data processing, administrative services and management planning.

Seymour served as deputy assistant secretary for administration for approximately two years before his appointment.

He began his government career at the U.S. Department of Justice in 1969, where he held a number of administrative and personnel positions before joining DOT.

A graduate of the University of Virginia with a bachelor of arts degree, he also holds a master of public administration degree from the University of Washington.

■

Grand Union Co. has elected WILLIAM E. KINSLOW as corporate vice-president in charge of management information systems. Kinslow is responsible for the MIS development and the operation of Grand Union's corporate data center in Paramus, N.J.

Prior to joining Grand Union, he was vice-president of corporate and technical services with First National Supermarkets of Windsor Lakes, Conn.

He earned a bachelor's degree in industrial design from the Georgia Institute of Technology in Atlanta.

■

Northrop Corp. has appointed ROBERT W. SLUSSER to the position of vice-president of information resources for the Aircraft Division in Hawthorne, Calif. Slusser will be responsible for automated management systems, data processing, scientific computing systems, enterprise systems and the Advanced Graphite Production Facility.

Slusser joined Northrop Space Laboratories in 1965 as assistant to the director of applications engineering and planning.

He earned his bachelor's degree in mechanical engineering from MIT and a master's degree in business administration from the Wharton School of Business and Finance at the University of Pennsylvania.

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Built-in Telecommunications				✓
Spelling Corrector	✓	✓	✓	✓
Mail List Manager				✓
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This updates and corrects comparisons with MultiMate which appeared previously.
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Spring 1985 exec directory now available

The spring 1985 issue of the Applied Computer Research, Inc. "Directory of Top Computer Executives" is now available, and several features have been added.

The directory is now published in Eastern and Western regional editions.

In addition, middle-level data processing management positions have been added to each individual listing. These include managers of systems and programming, computer operations, communications and other titles.

Also, it is now possible to purchase minidirectories, or special computer-produced listings of selected individuals or sites.

Examples of minidirectories are all DP shops in a specific ZIP code or a nationwide listing of executives holding a particular title. The minidirectories are available in one- or two-column format, either continuous or bound.

The directory format remains the same, listing installations with annual data processing budgets of $250,000 or more and/or annual revenue of more than $50 million. The current issue lists executives in more than 8,250 data processing installations.

In addition to full names and titles, addresses and phone numbers, the directory lists the makes and models of the computer systems installed in each shop.

Also, industry classification codes are used to identify the specific industry type to which each installation belongs.

The directory is organized geographically, city within state, and a cross-reference index by company name is included.

Applied Computer Research's "Directory of Communications Management" has been integrated with the computer executives' data base and will no longer be published.

The executive directory costs $175 for a single copy and $275 for both issues published in a year.

The Eastern and Western regional editions are available singly at $95 for one issue or $150 for the year.

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CALENDAR

WEEK OF NOVEMBER 10

NOVEMBER 10-13, BALTIMORE — **The Ninth Annual Symposium on Computer Applications in Medical Care (SCAMC).** Contact: Gail Mutnik, Symposium Coordinator, SCAMC, Secretariat: Office of Continuing Medical Education, George Washington University Medical Center, 2300 K St. N.W., Washington, D.C. 20037.

NOVEMBER 11-13, WASHINGTON, D.C. — **The Conference on Software Maintenance — 1985 (CSM-85).** Contact: Donald A. Parker, CSM-85 Publicity Chairman, National Aeronautics and Space Administration, Goddard Space Flight Center, Code 820.1, Greenbelt, Md. 20771.

NOVEMBER 11-15, SAN JOSE, CALIF. — **First International Conference on Computer Workstations.** Contact: Institute of Electrical and Electronics Engineers, Inc. Computer Society, 10662 Los Vaqueros Circle, Los Alamitos, Calif. 90720.

NOVEMBER 12, NEW YORK — **T-1 Carrier Strategies.** Contact: DMW Group, Inc., Seminar Division, 2020 Hogback Road, Ann Arbor, Mich. 48104. Also being held Nov. 20 in Boston and Dec. 3 in Los Angeles.

NOVEMBER 12-15, CHICAGO — **CICS Application Design.** Contact: Sys-Ed Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

NOVEMBER 12-15, DALLAS — **CICS Command-Level Programming.** Contact: Sys-Ed Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

NOVEMBER 12-15, DALLAS — **Data Base: A Builder's Guide.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402. Also being held Dec. 3-6 in Washington, D.C.

NOVEMBER 12-15, NEW YORK — **CICS Debugging.** Contact: Sys-Ed Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

NOVEMBER 13-15, NEW YORK — **IMS Utilities.** Contact: Sys-Ed Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

NOVEMBER 13-15, SEATTLE — **Relational Database Management Systems for Commercial Applications.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

NOVEMBER 14-15, MCLEAN, VA. — **Federal ADP and Telecommunications Procurement.** Contact: International Data Corp., Washington Division, Suite 240, 1500 Planning Research Drive, McLean, Va. 22102.

NOVEMBER 14-15, SAN FRANCISCO — **Videotex Delivery of Financial Services: On-Line Banking, Electronic Brokerage and Transactional Services.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

WEEK OF NOVEMBER 17

NOVEMBER 18-19, BOSTON — **Software Tools Conference.** Contact: Suffolk University, Boston, Mass. 02108.

NOVEMBER 18-19, SAN FRANCISCO — **Real Estate Investment Opportunities for Financial Institutions.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 18-19, TORONTO — **End-User Computing: Managing Information Centers.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

NOVEMBER 18-22, ARLINGTON, VA. — **Tutorial Week Washington '85.** Contact: Martez A. Camilleri, Institute of Electrical and Electronics Engineers, Inc. Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

NOVEMBER 18-22, ATLANTA — **The James Martin Seminar.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402. Also being held Dec. 2-6 in Philadelphia.

NOVEMBER 18-22, HOUSTON — **Structured Systems Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop West, Houston, Texas 77092.

NOVEMBER 18-22, NEW YORK — **CICS Internal Architecture.** Contact: Sys-Ed Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

NOVEMBER 18-22, SAN FRANCISCO — **Database Management Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop West, Houston, Texas 77092.

NOVEMBER 20-21, ROSEMONT, ILL. — **Network Management/Technical Control.** Contact: Louise Myerow, Registration Manager, CW/Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

NOVEMBER 20-24, LAS VEGAS — **Comdex/Fall '85.** Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

NOVEMBER 21-22, SAN FRANCISCO — **Import/Export Financing for the Small to Mid-Sized Bank.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 21-22, WASHINGTON, D.C. — **PC as a Programmer/Analyst Workstation.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held Dec. 12-13 in Boston.

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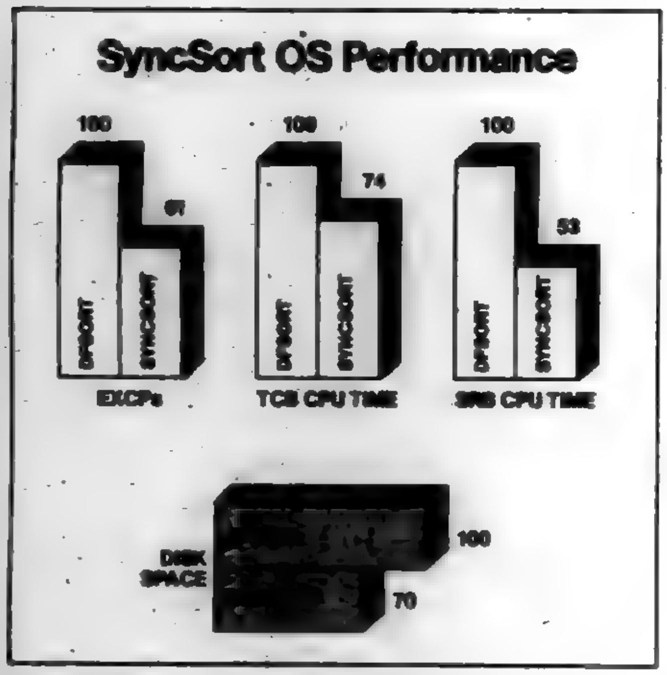

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SOFTWARE & SERVICES

SOFTALK
John Gallant
CW Senior Editor

Productivity key to growth

By John Gallant

"What this country needs is a good five-cent cigar."

— Anonymous

To rephrase an adage — a dangerous practice because it subjects the wisdom of the ages to grave risk — what this computer industry needs is a good, revolutionary productivity tool. Or tools. Or techniques. Or methodologies. Maybe even a magic wand that, once waved, would miraculously increase the productivity of software staffs everywhere.

Faltering productivity is an industrywide problem and one that has received its fair share of national attention. But the productivity problem in the computer sector of U.S. industry is far more critical, and it promises to make its impact felt on other sectors of industry and all of society for many years to come.

For years, pundits have been saying that hardware has become a commodity item. And for years, substantial advances in hardware technology have come along at a fairly predictable clip. Hardware power grows fairly swiftly, and price/performance ratios seem to decline, if not as quickly, at least steadily. Users now buy hardware to fit the software, or at least the potential software applications, they have in mind.

Software has indeed supplanted hardware as the driver of the computer industry. But lately it seems that software's figurative foot is having trouble reaching the industry's gas pedal.

The reason? Designing, developing, testing, implementing and maintaining software are some of the most labor-intensive, time-consuming tasks remaining in the computer age. Users and vendors cannot design software quickly enough. It is as simple and as complex as that. They cannot write it, test it or implement it fast enough. And mainte-

Continued on page 66

When users wed vendors

Groups' independence, equal status key for users

By John Gallant

WASHINGTON, D.C. — The relationship between a software vendor and an independent users group is best described as "like a marriage," according to Richard Accurso.

"There are certain things each party really likes about the other," said Accurso, who is executive chairman of the Software International Corp. (SI) Users Group. "And there are times when you cannot see eye-to-eye. When either party stops listening, the dialogue ends and antagonism begins."

Accurso and his international counterparts, the chairmen of the UK and Australian SI users organizations, spoke about the problems involved in running a users group at the recent 1985 SI Users Group conference. All three agreed that the most important asset a users group can have is independence from the vendor.

"A certain amount of the users group's power is taken away when it is vendor sponsored," Accurso said. "If the group does something that the vendor dislikes, the vendor can use its support as a lever to change things. There are things that occur at our conferences that Software International does not like. But because we are independent, we can continue to do them. The independence puts the dialogue between users and vendor on an equal basis."

"I could not agree more strongly," claimed Laurie West, chairman of the Australian Users of Software International. "The users group should really strive to be

Continued on page 70

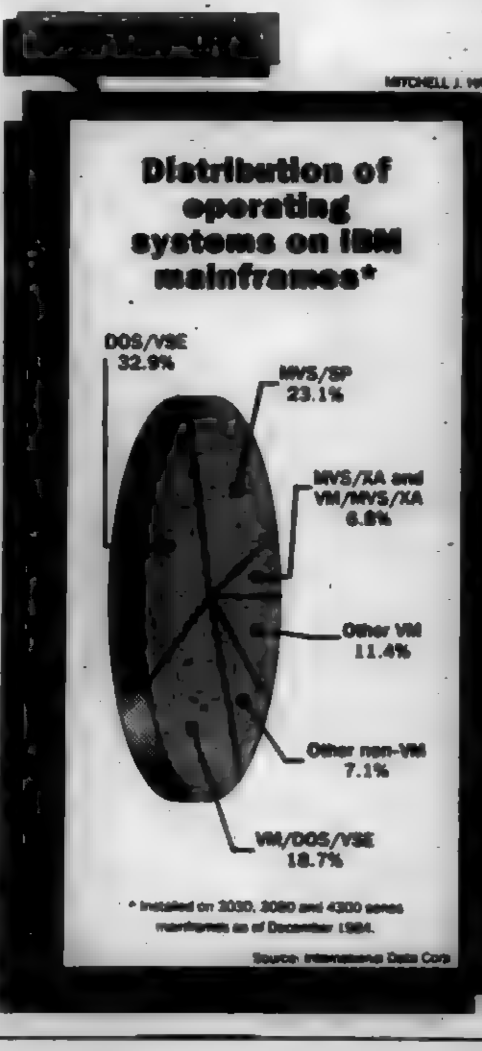
IBM upgrades ISPF for MVS, VM/SP units

Along with IBM's recent announcement of new versions of the Professional Office System (Profs) [CW, Oct. 7] was the introduction of enhanced releases of its Interactive System Productivity Facility (ISPF) dialogue manager that include extended national-language support, double-byte character sets, application control support and preprocessed panels for MVS/370, MVS/XA and VM/SP environments.

ISPF is a tool for improving development productivity by manipulating display features and interactive application features. ISPF Version 2 Release 2 enhancements support translations for Danish, French, German, Italian, Spanish, Japanese (Kanji) and Korean (Hanfeul). The preprocessed panel feature is said to reduce the panel-to-panel transition time by allowing users to prepare panel definitions in a preprocessed internal format. The basic license fee for Version 2 Release 2 is $600 for the MVS environment and $500 for the VM environment.

Continued on page 70

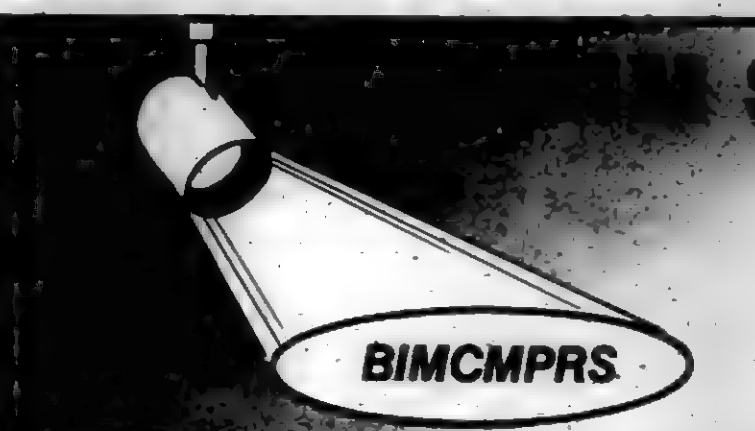
MITCHELL J. HAYES



* Installed on 3030, 3080 and 4300 series mainframes as of December 1984.

Source: International Data Corp

- DEC introduced a service that allows users to run programs written in IBM's RPG-II on its VAX systems/56
- Through a series of agreements with software vendors, Apollo Computer has made 29 manufacturing packages available for its Domain series workstations/58
- Honeywell and Oracle announced that the Oracle relational DBMS is now supported on Honeywell processors/58
- SAS Institute said its SAS System software can now be invoked from DEC's All-In-One office software/62


Spotlight

CICS Response Time Improvement!!!

BIMCMPRS reduces 3270 CRT and printer output data transmission from CICS systems. This improves response time and reduces contention among terminals on the same line. Transmission reduction typically varies between 10 and 60 percent. Response time improvement depends on the reduction amount and the line speed.

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Users can bring any 3270 screen directly into a Symphony application.

There is no retyping involved with data capture. That, of course, translates into the obvious benefit of error-free transfer and data integrity.

As for data transmittal, whatever data is created off-line within Symphony can be sent screen by screen back to the mainframe using a single, simple set of commands. Naturally, this allows the user to make the best use of host processing time.

Symphony Link uses the standard Lotus interface to transfer files to and from the VM/CMS and MVS/TSO operating environments.

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Software available for Apollo's Domain

Apollo Computer, Inc. has announced agreements that will make 29 manufacturing software packages available for the Domain System, its 32-bit graphics workstation and local-area network.

The manufacturing packages are designed for discrete and batch manufacturing operations and address applications such as quality control, group technology, process planning, shop-floor data acquisition and control and electronic device and manufacturing process simulation.

The packages include the Stat80 statistical package from Corporate Computer Systems, Inc.; The Manager shop-floor control and factory data collection package from Industrial Computer Corp.; Multiclass, Multitreeve, Multigroup and Multicapp process planning programs from Organization for Industrial Research; and AC/Plan, AC/Data, AC/Diad and AC/GNC production process packages from American Channels, Inc.

Also available is the Dclass menu-driven language for developing manufacturing systems that was developed by CAM Software Laboratory of Brigham Young University; Cutdata, a computerized version of a machining reference book, from Metcut Research Associates, Inc.; the Pisces, Cande, Gemini, Sedan-2, Topix, Supra and Suprem-3 simulation programs for integrated-circuit process and device design from Technology Modeling Associates, Inc.; Slam II and MAP/1 simulation language and simulator from Pritsker & Associates, Inc.; and Quality 1, Quality Net and Q'script statistical process control packages from Quality Information Systems, Inc.

European versions of the same programs offered by American Channels — dubbed Centre Plan, Centre Data, Diad and GNC — are being offered by Cadcentre Ltd.

All the software is compatible with Apollo's Aegis operating system. Software from Pritsker & Associates and Quality Information Systems is compatible with Aegis and Domain/IX.

Oracle DBMS fit for Gcos

Honeywell, Inc. has announced that Oracle Corp.'s Oracle relational data base management system is now supported under Honeywell's Gcos 6 MOD 400 operating system on the company's 16-bit DPS 6/70 and 6/75 small systems and on its DPS 6/85 and 6/95 32-bit minicomputers.

Dubbed MOD 400 Oracle, the software has been ported by Honeywell and is said to be compatible with Oracle implementations on other vendors' hardware. MOD 400 Oracle is based on Oracle Version 4.1 with an active data dictionary, interactive applications facility, report writer and integrated security and integrity controls.

Optional modules include the MOD 400 program development facility, using embedded IBM SQL statements to enable the Cobol, Fortran and C programming languages to access the Oracle data base. A load facility developed by Honeywell allows interactive data loading of an Oracle data base from a Honeywell DM6 I-D-S/II data base.

MOD 400 Oracle provides a set of utilities and tools to allow users to build their own information systems without traditional programming within the MOD 400 environment. The tools include a user-friendly interface, an Oracle data loader and applications development facilities.

MOD 400 Oracle is available now on DPS 6/70, 6/75, 6/85 and 6/95 minicomputers. Initial licensing fees are $7,975 for the DPS 6/70 and $14,500 for the other systems.

The optional MOD 400 program development facility has initial primary license fees of $5,425 and $9,800 for the DPS 6/70 and the other systems, respectively. The Oracle I-D-S/II load facility carries an initial license fee of $825 on the DPS 6/70 and $1,500 on the other systems.

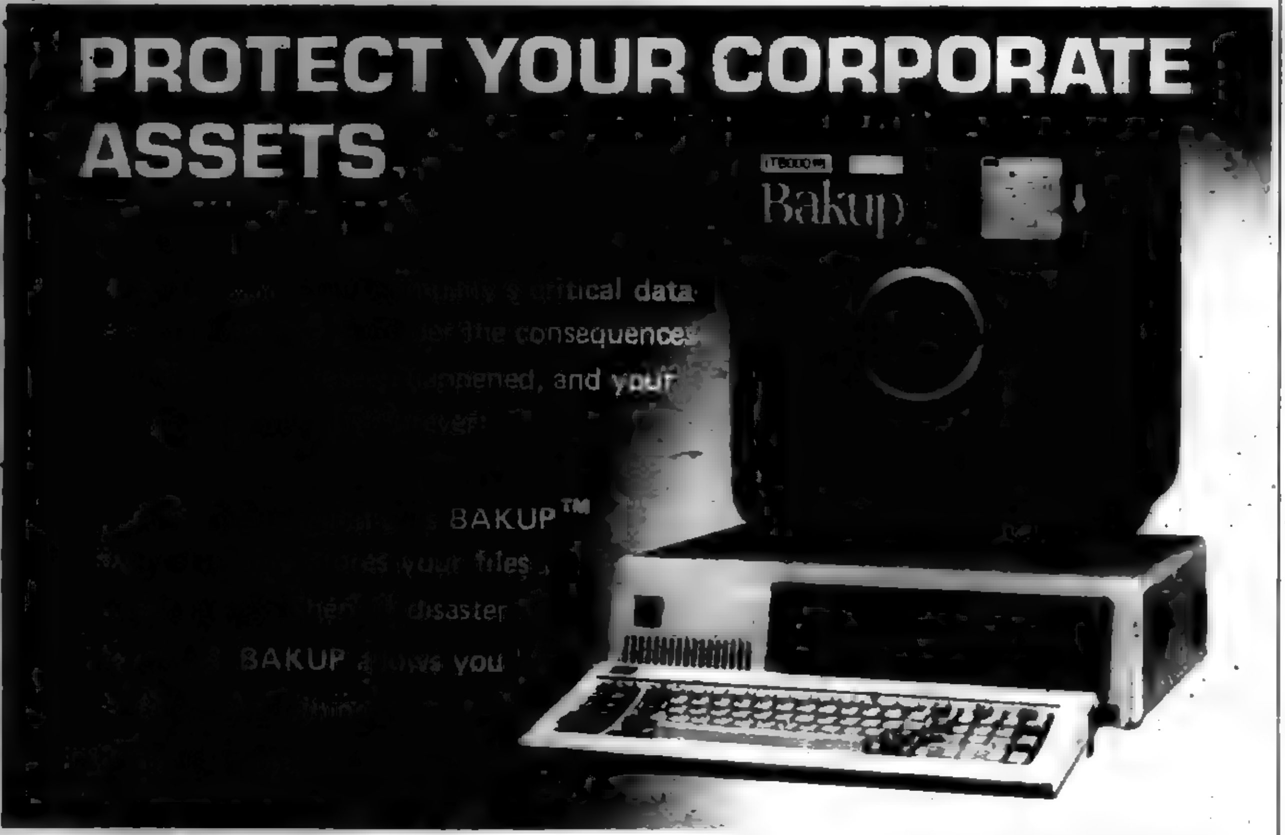
DEC RPG-II service bows

Digital Equipment Corp. has announced a service that allows users of IBM System/3, System/34 and System/36 minicomputers to transfer application programs written in IBM's RPG-II to DEC VAX systems.

The RPG-II Migration Assistance Service is targeted to provide an alternative for IBM users who need to upgrade to a larger system or add networking capabilities to their minicomputers. RPG-II is installed in an estimated 70,000 sites, a spokesman said.

DEC provides one week of on-site planning assistance, conversion software, a manual and one year of telephone assistance. The price of the service is $15,000 for migration to the Microvax II and $20,000 for migration to the mid-range or larger VAX systems.

Converted RPG programs run under the VAX VMS operating system. The converted programs can run on any size VAX processor without modification, according to a spokesman.



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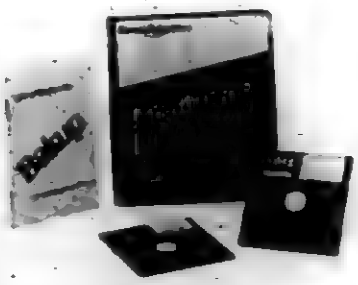

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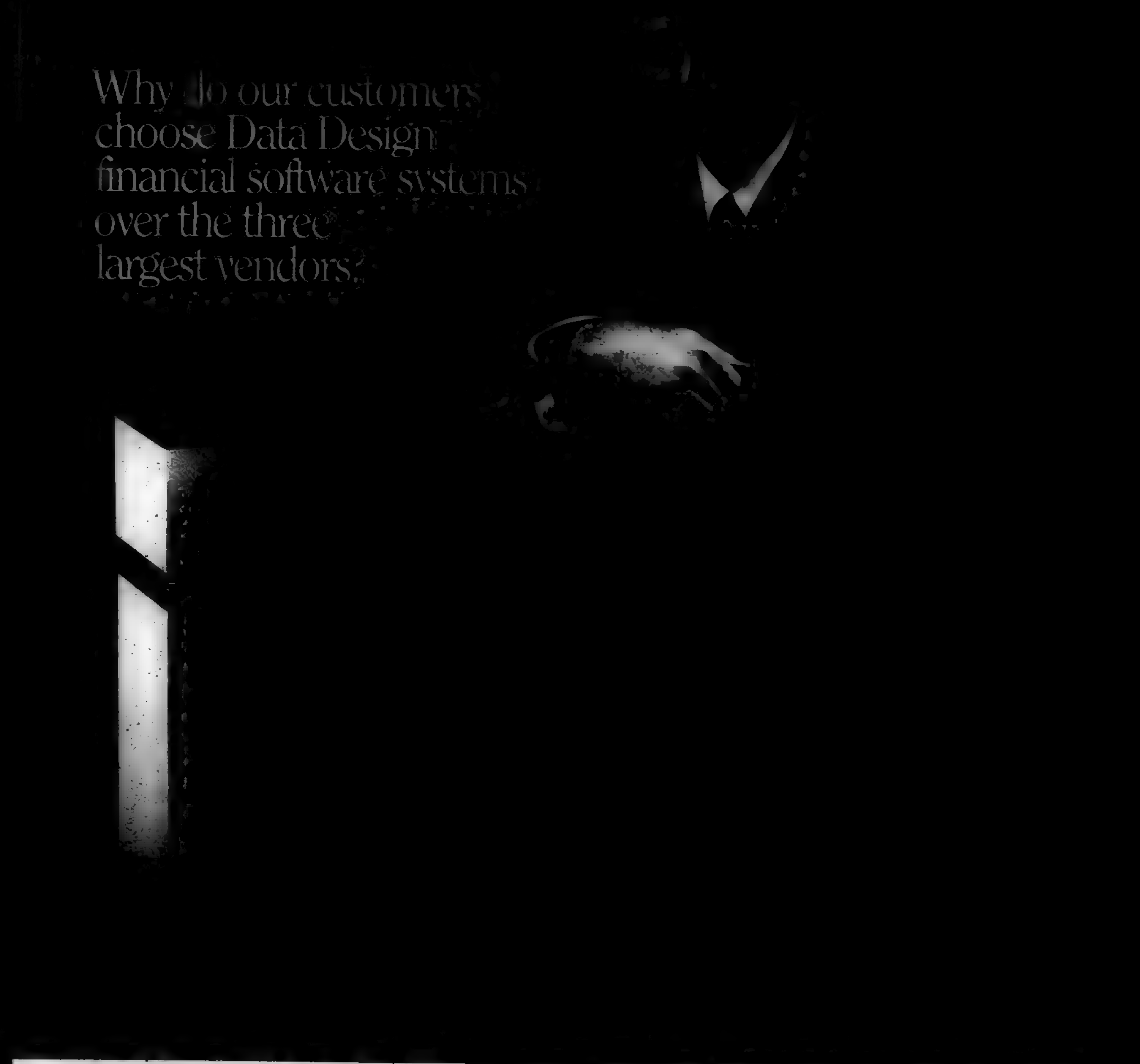

Because they did their homework. They talked to our customers and found out that for over 12 years, hundreds of Fortune 1000 companies have had exceptional results from financial software systems by Data Design.

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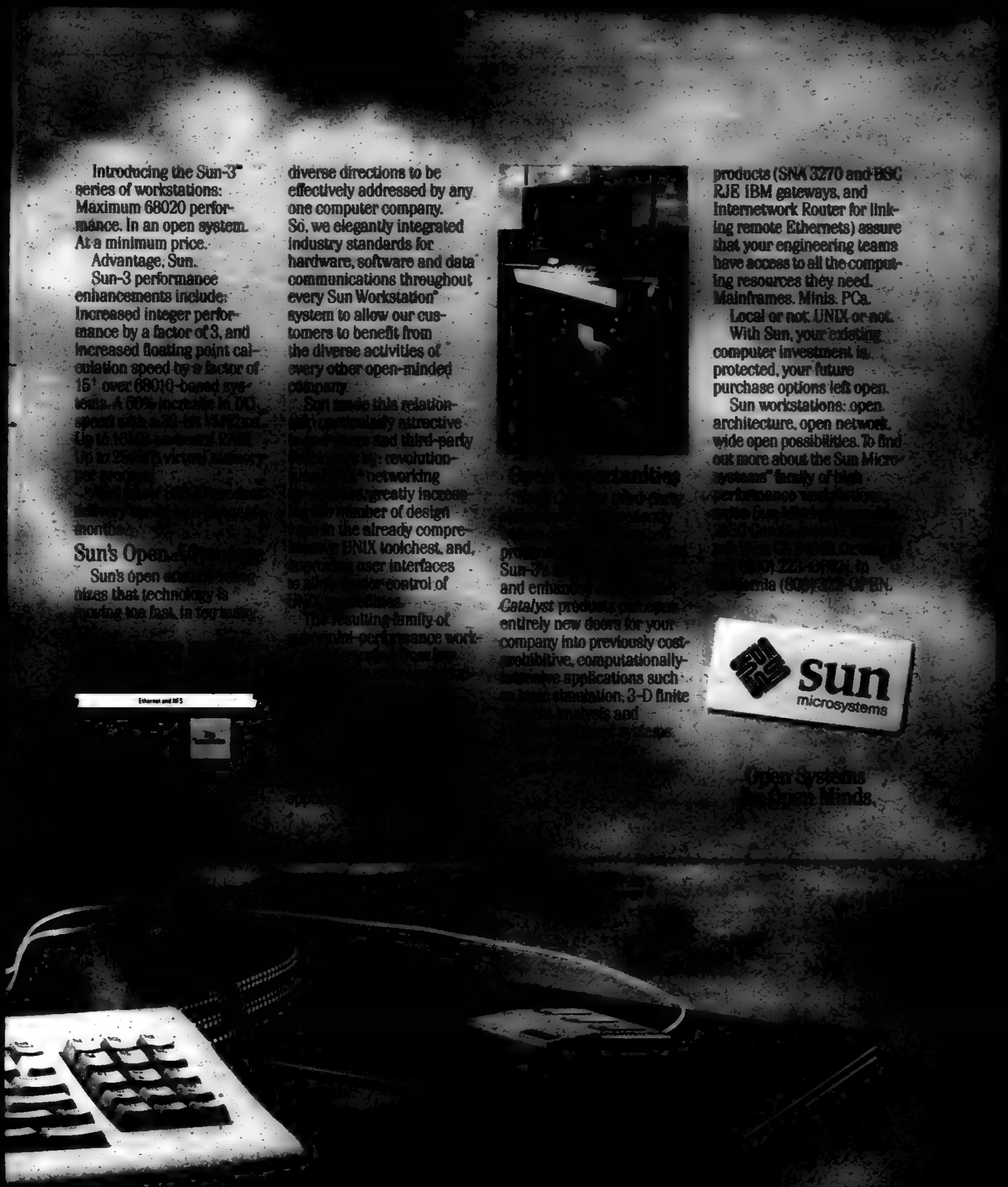

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Open Systems for Open Minds.

Uccel offers management system for Sperry users

Uccel Corp. of Dallas has released the Resource Management System (RMS), a set of five integrated packages for Sperry Corp. 1100 series mainframes that is said to provide management information on data center usage.

The Resource Accounting Module, RMS-1, tracks connect time, storage use and machine cycles. System performance and use statistics are captured by the Workload Capacity Planning Module, RMS-2, according to the vendor.

The Hardware and Equipment Tracking Module, RMS-3, reportedly monitors inventory of data center hardware, remote terminals, personal computers and communications equipment.

Through RMS-4, its Problem Tracking System, the software is said to help managers follow user system or data center problems from initial report through resolution.

The Generalized Graphics System, RMS-5, displays data center information in color charts, the vendor noted.

RMS packages may be purchased separately or together as an integrated system. Individual module prices range from $10,000 to $29,000.

DEC All-in-One users gain access to SAS System tools

SAS Institute, Inc. of Cary, N.C., announced that its SAS System software now executes from Digital Equipment Corp.'s All-In-One office software.

A spokeswoman said that SAS users now have the option of defining the SAS System as a menu option within All-In-One.

The menu-driven interface enables users to access SAS System graphics and analysis capabilities through the same interface used for other office functions.

The All-In-One system works with Version 5 SAS System products including base SAS software for data management, statistical analysis and reporting; SAS/Graph; SAS/AF for interactive applications development; and SAS/FSP for full screen information processing.

The system also works with SAS/OR for project planning and decision support; SAS/ETS for planning, forecasting and financial modeling; and SAS/IML for data analysis and manipulation using an interactive matrix facility.

First-year corporate licenses for base SAS software range from $1,500 to $8,000.

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Micro-based HRMS bows

Control Data Business Centers, Inc. of Greenwich, Conn., has announced a human resources management system (HRMS) that integrates microcomputer-based personnel software with its payroll processing services.

Control Data Business Centers has contracted with Mainframe Micros, Inc. of New York to market and sublicense its HR-1 personnel application system as part of the complete HRMS.

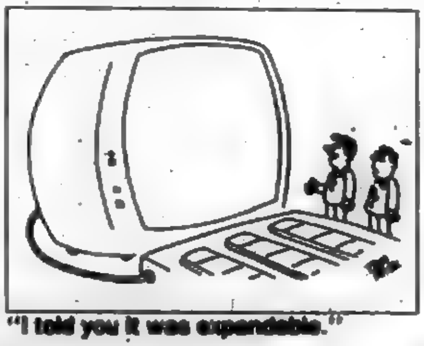
HR-1 uses the Revelation data base manager by Cosmos, Inc. of Seattle. Revelation requires an IBM Personal Computer, Personal Computer XT or AT with a minimum of 512K bytes of memory, a hard disk and an 8087 math coprocessor chip.

HRMS links HR-1 to Control Data Business Centers' Payroll 4, a processing service that runs on IBM 4300 mainframes, using its Orchestrator micro-mainframe link software.

HRMS is said to provide storage of more than 500 data elements on each employee with unlimited historical records, audit record and multilevel security, standard and ad hoc reports and a review allowing retrieval of salary, performance and other information.

There are 35 data elements that will automatically post from HR-1 to the payroll system and 108 user-defined data elements that will flow from the payroll service to the personnel file.

HRMS is available for $18,500, including installation and training. It is also available on a monthly basis for $1,200 plus a monthly maintenance fee based on the number of employees. There are also monthly fees for payroll processing.



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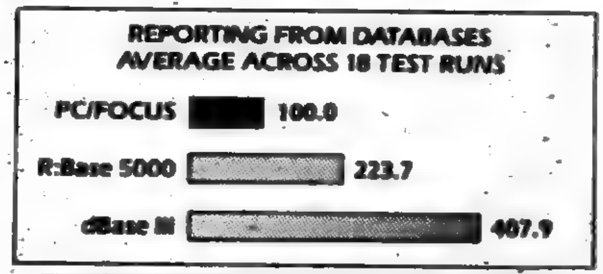
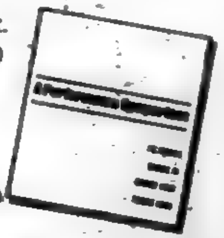


There's more to the study than can be described in this ad. Lots more tests...and much more proof. So, we've reproduced the NSTL Performance Comparison in full. To obtain your free copy, just fill out the coupon and mail it to Donald Wszolek, Dept. R1, Information Builders, Inc. 1250 Broadway, New York, NY 10001.



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Security. With no strings attached. Because ACF2 requires modifications to the operating system, it ties up your technical staff. First they have to install the product. Then they may have to relink ACF2 if those mods are affected by IBM PUT-tapes or your own OS changes.

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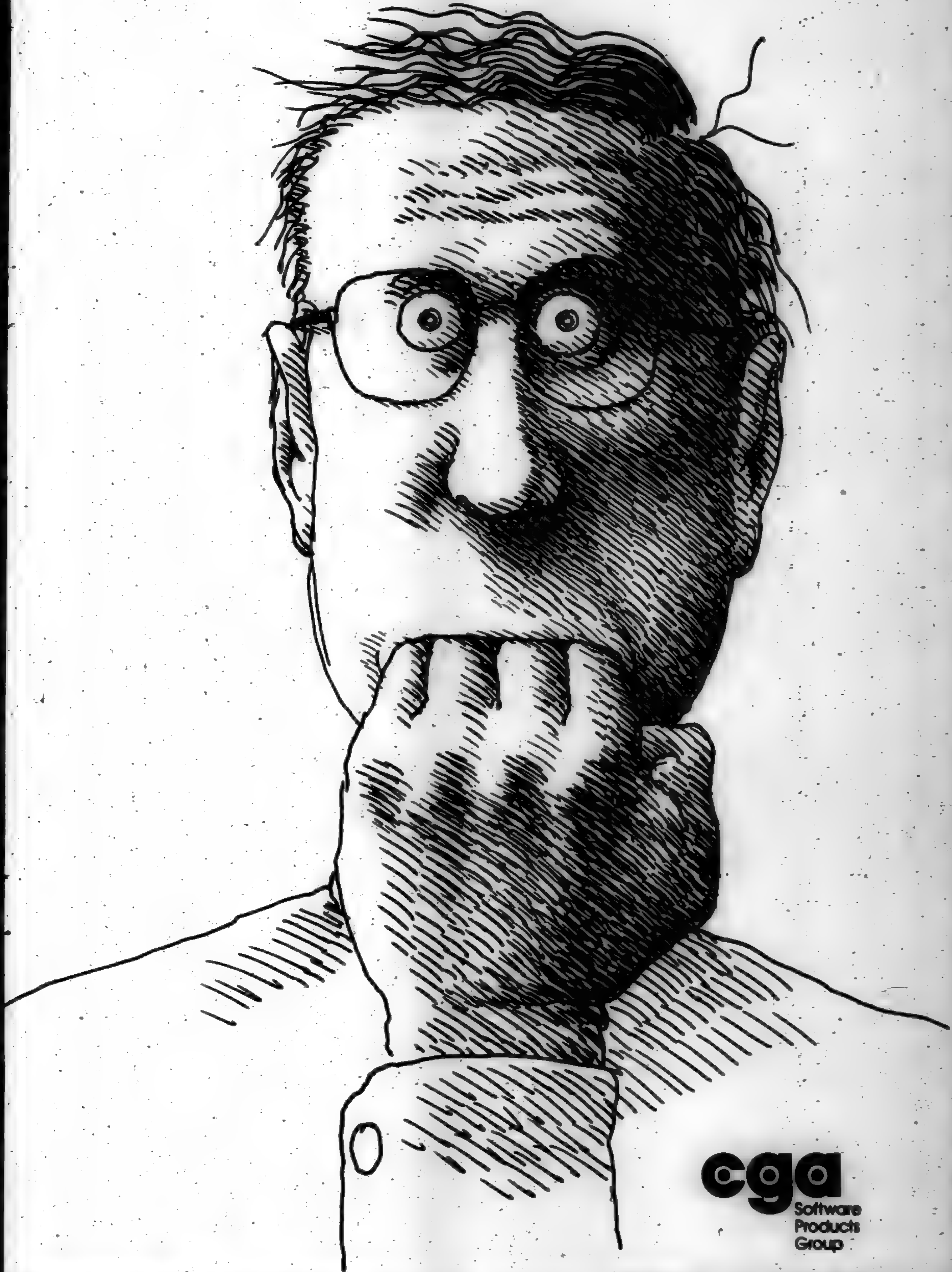

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Stratagem version bows

Boston-based Integrated Planning, Inc. has announced the Screenmaster option in Version 5 of its Stratagem IBM mainframe decision support system.

Screenmaster allows users to gain interactive access to mainframe information through menu-driven commands. More experienced users can bypass the menus to work at command level. Screenmaster also includes a screen painting facility and a full screen data editor.

The screen painter lets users develop custom terminal screens for data entry and executive information systems. Information can be entered anywhere on a blank screen, and programmed function keys let users to add information as a field and to give fields attributes like color, highlighting and security protection.

The full screen editor allows users to manipulate data on the screen while protecting field names. Programmed function keys control scrolling across as well as up and down the screen.

Strategem runs on IBM mainframes under VM/CMS and MVS/TSO. It also works with Digital Equipment Corp. VAX and Prime Computer, Inc. Primos-based processors. Existing users of Stratagem will receive Version 5 at no cost. The Screenmaster option costs $10,000. The IBM version of Stratagem with Screenmaster is priced at $95,000.

From page 55

Productivity key to growth

nance, well, maintenance is a sadder story altogether.

Consider that anywhere from 50% to 75% of the software professionals at work today — valued and scarce employees whose talents could be directed toward producing new systems that address vital business functions — spend their time just keeping old software systems plodding along. And each passing day distorts the ratio of developers to maintainers, and not in a favorable manner.

Not meeting needs

Those systems are already running on computers. They are not meeting new needs, nor are they prompting users to buy any more iron, so to speak. New applications meet new needs and consume new hardware.

But who's going to build them?. And with what? If users continue to rely on the same tools, an ever smaller number of new applications will be built.

But even those few new systems will join the ranks of those that must be maintained, and the ratio described above shifts even more unfavorably.

Deadly cycle?

Sound like a deadly cycle? It is. What's more, it doesn't seem likely to be broken in the near future. It seems that the revolutionary software advance, the one that will provide a feasible method for drastically increasing systems development productivity, is always out of reach.

What about all the so-called productivity tools available today? Good question. While the vendors must be lauded for their efforts, it seems there is no single product that can solve the problem. Each approach has its flaws or limits.

There are no standards among tools such as fourth-generation languages; many productivity products take their toll in machine performance (although, admittedly, that has become less of an issue), and there is little portability among the systems developed with said tools. In terms of maintenance of existing systems, users agree that the products to help with that task just aren't out there.

End-user computing

OK, how about end-user computing? Come on. End users, with the help of some fourth-generation languages, report writers, spreadsheets or query tools, may happily draft a quick report, design a small program or draw together some statistics in a presentable format.

But the average end user cannot and will not in the forseeable future build the sophisticated software systems that U.S. business is going to need to compete and survive in the future.

Well, there is always artificial intelligence. Not so. The promise of AI will be quickly stilled if users and vendors cannot find a rapid way to build the incredibly complex systems that AI proponents envision.

Heart of AI is software

The heart of AI is software, not Lisp machines or parallel processors. And AI software developers will suffer the slings and arrows of outrageous fortune that their earlier systems predecessors suffered.

Perhaps the problem lies in the insistence by users and vendors that all advances in software be evolutionary in nature. Vendors are so concerned with locking down their users and users so concerned with what already exists that revolutionary changes — the kind of changes that must happen if the computer industry is to smash the productivity barrier — are virtually inconceivable.

It seems clear that if users and vendors continue along the same software path they stride today, the near future will see a vast chasm between the potential of hardware and the stunted reality of software. A lot of promising changes will be lost forever in that chasm.

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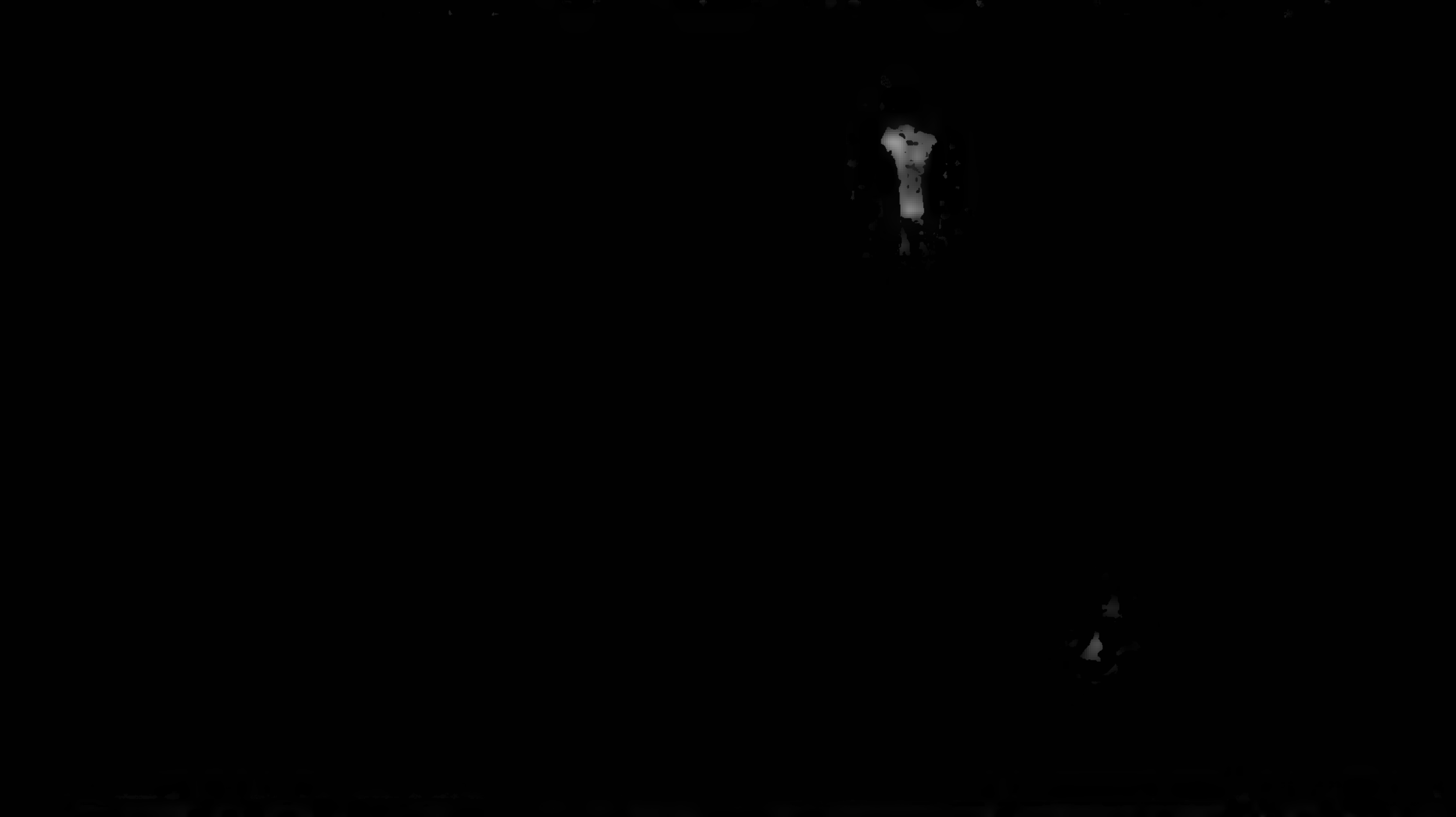

Although we're told that saddlemakers were all for the idea, and submitted some rather startlingly innovative ideas, breeding the perfect family horse just didn't seem right to Mr. Ford. His mind took a different tack, a new line of thought. A line of assembly. A whole new approach to providing people with a way to get from where they were... to where they wanted to go.

A whole new approach. That seemed like an excellent starting point for a relational database. We did not want to simply rewrite an arcane programming language or rework an old mainframe database.

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cutes this program and produces the answer. You don't need to know how the information is organized, how to best approach the problem or how to write a program.

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There's a lot more we'd like to tell you about Paradox (which explains the very last paragraph), but you've really got to see it. All of this may give you that "easier said than done" feeling, when in truth, it's now "easier done… than said." We hope you'll visit your computer retailer and see it all for yourself.

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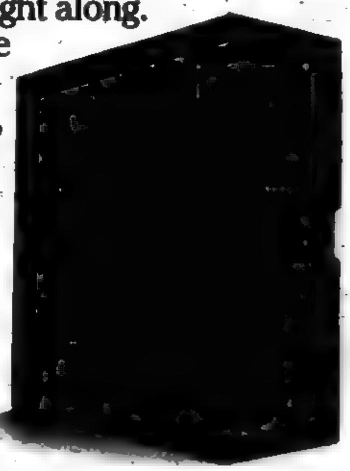

PARADOX.™ THE BASE OF DEPARTURE.™

Relational Database

From page 55

Independence, equal status key for users

on a friendly footing with the vendor, but it has to remain totally independent if it is to have any impact."

D. J. Batts, chairman of the M.M.S. User Group, the UK equivalent of the SI Users Group, said the most difficult problem his group faces is that it deals with an agent of SI and not the vendor itself. "Thus, the things we really push for are not so much enhancements to the products as improvements in the service we receive from the agent," Batts said. "We cannot apply the same pressure on SI that the U.S. group can. But we can influence the distributor to service our products better, to provide additional hardware support and to modify the documentation for UK users."

Accurso said approximately 40% to 50% of the proposed changes his organization's product-specific working groups submit to SI ultimately get incorporated as enhancements to the company's packages. Although satisfied with that level of responsiveness, Accurso said the dialogue between the two parties could improve in the area of enhancements.

"There are steps that could be taken to smooth the process out," he said. "For example, we would like a little more acknowledgement of why certain proposals are not folded into the products as enhancements. We document the reasons for our proposals very carefully, and we think they should document their responses as clearly. That is, after all, the whole basis of our relationship — understanding."

All user-suggested enhancements are forwarded to SI, Accurso said, although committee members prioritize them according to their importance for the vendor. "You have to do that," West said. "A group that is always pushing for changes that are just 'nice to have' rather than important is not going to be effective."

Bylaws should be carefully drafted

When asked what advice they would offer others considering forming a users group, the chairmen agreed that the bylaws governing committee and conference operations should be carefully drafted to ensure a sound structure. They also advised beginners to follow the steps taken by other successful users group founders and, above all, to keep the organization's structure as simple as possible.

West said users should follow the Kiss principle. "Keep it simple, stupid," West said. "You cannot hope to accomplish everything on day one."

But, Accurso cautioned, fledgling users groups should not be afraid to tackle new challenges. "You have to try new ways of doing things. Some of the efforts fail, some succeed beyond what you would have imagined."

At the recent SI Users Group conference in Washington, D.C., Software International officials lauded the group's efforts and said that many of the capabilities of the company's recently unveiled Masterpiece series applications grew out of proposed users group enhancements. Accurso appreciated that recognition.

"We believe that the stronger the vendor, the better off the users will be," Accurso said. "We are trying to help SI become stronger."

From page 55

IBM upgrades ISPF for MVS, VM/SP units

IBM also announced ISPF Program Development Facility Version 2 Release 2 (ISPF/PDF) for MVS/370, MVS/XA and VM/SP environments. The new releases provide the same national-language support and features such as Browse and Edit that are said to simplify frequently performed programming tasks.

ISPF/PDF also includes library support that eases maintenance and tracking of different versions and levels of program segments. Full screen context editing that allows multiple additions and changes to a screen from one transaction with the host system is also included. The basic license charge for ISPF/PDF is $3,500 for MVS and $3,290 for VM. The VM version has an optional one-time charge of $9,500.

IBM also announced the following:

- A redefining of System Modification Program Extended to include the MVS Custom-Built Installation Process Offering and enhanced to include the MVS Custom-Built Product Delivery Offering The enhancements enable users to install function and program temporary fix service on existing MVS systems.
- The Series/1 Event Driven Executive Remote Manager (EDX/RM) to allow Series/1 processors to be managed and controlled by the Communications and Systems Management programs available on IBM hosts. EDX/RM Version 1.1 includes enhancements that provide communications and systems management support for all Series/1 processors in a communications network through a single connection to an IBM host.

EDX/RM features include downstream support, enabling those processors that have one or more Series/1 between them and the IBM host to fully interact with host communications and systems management programs; software alerts, for reporting program checks and system checks to the host; and dynamic data set extents support, for automatically extending the size of a data set as more records are added. The one-time charge of EDX/RM is $2,000.

- EDX Communications Facility Version 2.1, which includes support for the Series/1-PC Channel Attachment feature and Series/1-PC Connect program, software for supporting high-speed communications links for network access to disks and printers. The program costs $2,500.

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IN DEPTH

Is your DBMS really relational?

Rule Zero: For any system that is advertised as, or claimed to be, a relational data base management system, that system must be able to manage data bases entirely through its relational capabilities.

By E. F. Codd

The originator of the relational model for data base management presents basic principles for determining how relational a DBMS product is — a question that faces many buyers today because almost every vendor claims its DBMS is relational. Some vendors may not realize how far from the mark they are.

Part 1

In recent years, the data base management system market has undergone a very rapid swing in favor of products that take the relational approach to data base management. It is hard to find a vendor that does not claim its DBMS is relational. This swing has been so extensive that some vendors of nonrelational DBMS have quickly (and recently) added a few relational features — in some, cases, very few features — in order to be able to claim their systems are relational, even though they may not meet the simple requirements for being rated "minimally relational." We shall refer to this kind of DBMS as "born again."

It is a safe bet that these Johnny-come-lately vendors have not taken the time or manpower to investigate optimization techniques needed in relational DBMS to yield good performance. This is the principal reason they continue to proclaim the "performance myth" — namely, that relational DBMS must perform poorly because they are relational!

One consequence of this rapid swing of the market to the relational approach is that products that are claimed by their vendors to be relational DBMS range from those that support the relational model with substantial fidelity to those that definitely do not deserve the label "relational," because their support is only token.

Some vendors claim that fourth-generation languages will provide all the productivity advantages. This claim conveniently overlooks the fact that most of these languages do little or nothing for shared data (the programming language fraternity

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E. F. Codd is the originator of the relational model for data base management. He was the leader of the team that designed and implemented the first operating system with multiprogramming capability. Currently he is president of The Relational Institute and the Codd & Date Consulting Group, both based in San Jose, Calif.

still does not appear to realize that support for the dynamic sharing of data is an absolute requirement). In addition, there is no accepted theoretical foundation for fourth-generation languages and not even an accepted, precise definition.

This article outlines a technique that should help users determine how relational a DBMS really is. Accordingly, I shall discuss the following:

- The fidelity of DBMS to the relational model.
- The fidelity of the proposed Ansi SQL standard to the relational model.
- Conclusions regarding choosing a DBMS product.

I shall not attempt a complete description of the relational model here — a relatively brief and concise definition appears in the article "RM/T: Extending the Relational Model to Capture More Meaning," (Chapter 2, "The Basic Relational Model") in the Association for Computing Machinery's "Transactions on Data Base Systems" (December 1979). It is, however, vitally important to remember that the relational model includes three major parts: the structural part, the manipulative part and the integrity part — a fact that is frequently and conveniently forgotten.

In this paper, I supply a set of rules with which a DBMS should comply if it is claimed to be fully relational. **No existing DBMS product that I know of can honestly claim to be fully relational,** at this time.

> **"**
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> *The fidelity of the proposed Ansi standard to the relational model is even less than that of some relational DBMS products. However, the standard could be readily modified to be more faithful to the model, and pressure should be brought on Ansi to do so.*

The proposed Ansi standard does not fully comply with the relational model, because it is based heavily on that nucleus of SQL that is supported in common by numerous vendors. Moreover, it takes a static, schema-based approach to data base description — reminiscent of Codasyl — instead of specifying a comprehensive, dual-mode data sublanguage that provides the powerful yet easy access to relational data bases and that is unique to the relational approach. Thus, the fidelity of the proposed Ansi standard to the relational model is even less than that of some relational DBMS products.

However, the standard could be readily modified to be more faithful to the model, and pressure should be brought on Ansi to do so. In fact, vendors are advised to extend their products soon in these respects so that they support customers' DBMS needs more fully and avoid possibly large customer expenses in application program maintenance at the time of the improvement.

The 12 rules

Twelve rules are cited below as part of a test to determine whether a product that is claimed to be fully relational is actually so. Use of the term "fully relational" in this report is slightly more stringent than in my Turing paper (written in 1981). This is partly because vendors in their ads and manuals have translated the term "minimally relational" to "fully relational" and partly because in this report, we are dealing with relational DBMS and not relational systems in general, which would include mere query-reporting systems.

However, the 12 rules tend to explain why full support of the relational model is in the users' interest. No new requirements are added to the relational model. A grading scheme is later defined and used to measure the degree of fidelity to the relational model.

First, I define these rules. Although I have defined each rule in earlier papers, I believe this to be the first occurrence of all 12 of them together.

In rules eight through 11, I specify and require four different types of independence aimed at protecting customers' investments in application programs, terminal activities and training. Rules eight and nine — physical and logical data independence — have been heavily discussed for many years.

Rules 10 and 11 — integrity independence and distribution independence — are aspects of the relational approach that have received inadequate attention to date but are likely to become as important as eight and nine.

These rules are based on a single foundation rule, which I shall call Rule Zero;

For any system that is advertised as, or claimed to be, a relational data base management system, that system must be able to manage data bases entirely through its relational capabilities.

This rule must hold whether or not the system supports any nonrelational capabilities of managing data. Any DBMS that does not satisfy this Rule Zero is not worth rating as a relational DBMS.

One consequence of this rule: Any system claimed to be a relational DBMS must support data base insert, update and delete at the relational

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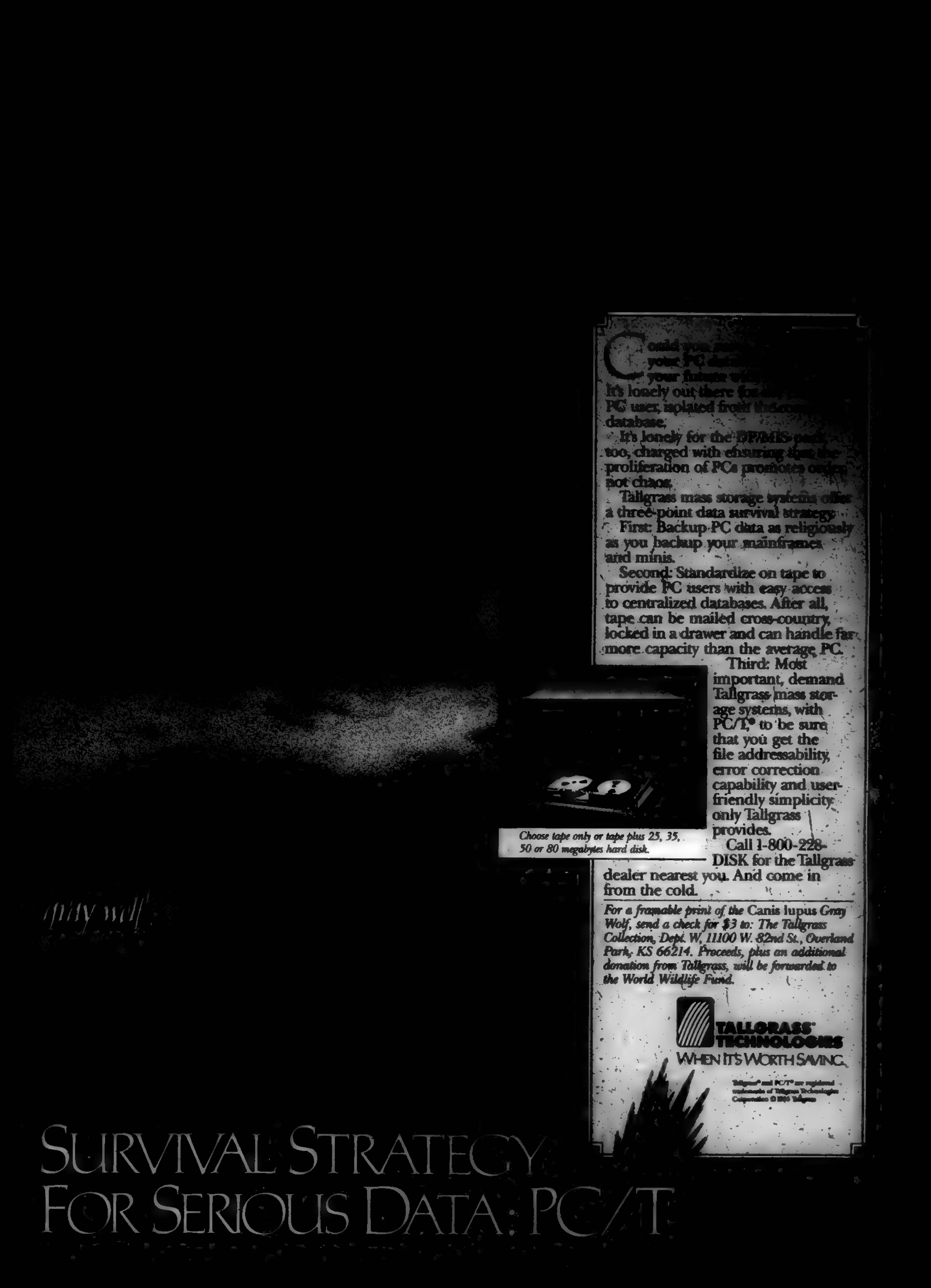

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Tallgrass® and PC/T® are registered trademarks of Tallgrass Technologies Corporation © [illegible] Tallgrass level (multiple-record-at-a-time). Another consequence is the necessity of supporting the information rule and the guaranteed access rule.

"Multiple-record-at-a-time" includes as special cases those situations in which zero or one record is retrieved, inserted, updated or deleted. In other words, a relation (table) may have either zero tuples (rows) or one tuple and still be a valid relation.

Any statement in the manuals of a system claimed to be a relational DBMS that advises users to revert to some nonrelational capabilities "to achieve acceptable performance" — or for any reason other than compatibility with programs written in the past on nonrelational data base systems — should be interpreted as an apology by the vendor. Such a statement indicates the vendor has not done the work necessary for achieving good performance with the relational approach.

What is the danger to buyers and users of a system that is claimed to be a relational DBMS and that fails on Rule Zero? Buyers and users will expect all the advantages of a truly relational DBMS, and they will fail to get these advantages.

Now I shall describe the 12 rules that, together with the nine structural, 18 manipulative and three integrity features of the relational model, determine in specific detail the extent of validity of a vendor's claim to have a "fully relational DBMS."

All 12 rules are motivated by Rule Zero defined above, but a DBMS can be more readily checked for compliance with these 12 than with Rule Zero.

> ”
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> Rule 1: *All information in a relational data base is represented explicitly at the logical level and in exactly one way — by values in tables.*

The information rule.

Rule 1: *All information in a relational data base is represented explicitly at the logical level and in exactly one way — by values in tables.*

Even table names, column names and domain names are represented as character strings in some tables. Tables containing such names are normally part of the built-in system catalog. The catalog is accordingly a relational data base itself — one that is dynamic and active and represents the metadata (data describing the rest of the data in the system).

The information rule is enforced not only for user productivity but also to make it a reasonably simple job for software vendors to define additional software packages (such as application development aids, expert systems and so on) that interface with relational DBMS and, by definition, are well integrated with the DBMS.

That is, these packages retrieve information already existing in the catalog and, as needed, put new information in the catalog by the very act of using the DBMS.

An additional reason to enforce this rule is to make the data base administrator's task of maintaining the data base in a state of overall integrity both simpler and more effective. There is nothing more embarrassing to a data base administrator than being asked if his data base contains certain specific information and his replying after a week's examination of the data base that he does not know.

Guaranteed access rule.

Rule 2: *Each and every datum (atomic value) in a relational data base is guaranteed to be logically accessible by resorting to a combination of table name, primary key value and column name.*

Clearly, each datum in a relational data base can be accessed in a rich variety — possibly thousands — of logically distinct ways. However, it is important to have at least one way, independent of the specific relational data base, that is guaranteed, because most computer-oriented concepts (such as scanning successive addresses) have been deliberately omitted from the relational model.

Note that the guaranteed access rule represents an associative addressing scheme that is unique to the relational model. The rule does not depend at all on the usual computer-oriented addressing. However, the primary key concept is an essential part of it.

Systematic treatment of null values.

Rule 3: *Null values (distinct from the empty character string or a string of blank characters and distinct from zero or any other number) are supported in fully relational DBMS for representing missing information and inapplicable information in a systematic way, independent of data type.*

To support data base integrity, it must be possible to specify "nulls not allowed" for each primary key column and for any other columns where the data base administrator considers it an appropriate integrity constraint (for example, certain foreign key columns).

Past techniques entailed defining a special value (peculiar to each column or field) to represent missing information. This would be most unsystematic in a relational data base because users would have to employ different techniques for each column or domain — a difficult task because of the high level of language in

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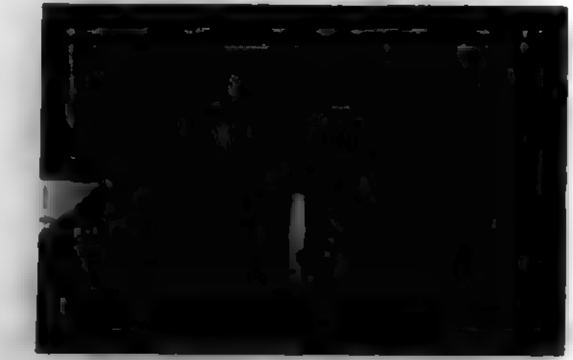

use (and a task that I believe would decrease user productivity).

Dynamic on-line catalog based on the relational model.

Rule 4: *The data base description is represented at the logical level in the same way as ordinary data, so that authorized users can apply the same relational language to its interrogation as they apply to the regular data.*

One consequence of this is that each user (whether an application programmer or end user) needs to learn only one data model — an advantage that nonrelational systems usually do not offer (IBM's IMS, together with its dictionary, requires the user to learn two distinct data models).

Another consequence is that authorized users can easily extend the catalog to become a full-fledged, active relational data dictionary whenever the vendor fails to do so.

Comprehensive data sublanguage rule.

Rule 5: *A relational system may support several languages and various modes of terminal use (for example, the fill-in-the-blanks mode). However, there must be at least one language whose statements are expressible, per some well-defined syntax, as character strings and that is comprehensive in supporting all of the following items:*

- *Data definition.*
- *View definition.*
- *Data manipulation (interactive and by program).*
- *Integrity constraints.*
- *Authorization.*
- *Transaction boundaries (begin, commit and rollback).*

The relational approach is intentionally highly dynamic — that is, it should rarely be necessary to bring the data base activity to a halt (in contrast to nonrelational DBMS). Therefore, it does not make sense to separate the services listed above into distinct languages.

In the mid-'70s, the Ansi Standards Planning and Requirements Committee generated a document advocating 42 distinct interfaces and (potentially) 42 distinct languages for DBMS. Fortunately, that idea has apparently been abandoned.

View updating rule.

Rule 6: *All views that are theoretically updatable are also updatable by the system.*

Note that a view is theoretically updatable if there exists a time-independent algorithm for unambiguously determining a single series of changes to the base relations that will have as their effect precisely the requested changes in the view. In this regard, "update" is intended to include insertion and deletion as well as modification.

High-level insert, update and delete.

Rule 7: *The capability of handling a base relation or a derived relation as a single operand applies not only to the retrieval of data but also to the insertion, update and deletion of data.*

This requirement gives the system much more scope in optimizing the efficiency of its execution-time actions. It allows the system to determine which access paths to exploit to obtain the most efficient code.

It can also be extremely important in obtaining efficient handling of transactions across a distributed data base. In this case, users would prefer that communications costs are saved by avoiding the necessity of transmitting a separate request for each record obtained from remote sites.

> ”
>
> Rule 4: *The data base description is represented at the logical level in the same way as ordinary data, so that authorized users can apply the same relational language to its interrogation as they apply to the regular data.*

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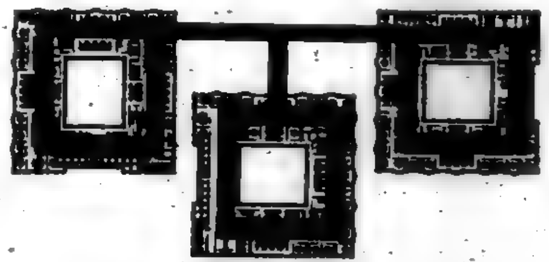

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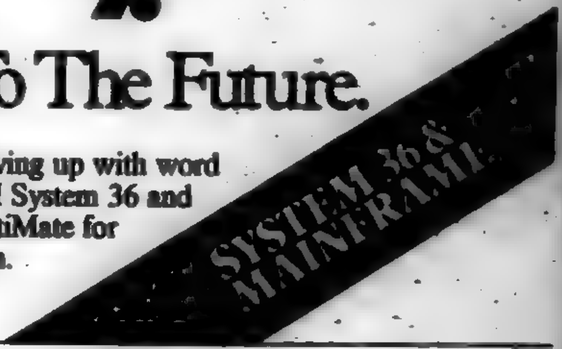

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Physical data independence.

***Rule 8:** Application programs and terminal activities remain logically unimpared whenever any changes are made in either storage representations or access methods.*

To handle this, the DBMS must support a clear, sharp boundary between the logical and semantic aspects on the one hand and the physical and performance aspects of the base tables on the other; application programs must deal with the logical aspects only.

Nonrelational DBMS rarely provide complete support for this rule — in fact, I know of none that do.

Logical data independence.

***Rule 9:** Application programs and terminal activites remain logically unimpared when information-preserving changes of any kind that theoretically permit unimpairment are made to the base tables.*

Take the following two examples: splitting a table into two tables, either by rows using row content or by columns using column names, if primary keys are preserved in each result; or combining two tables into one by means of a nonloss join (Stanford University and MIT authors call these joins "lossless").

To provide this service whenever possible, the DBMS must be capable of handling inserts, updates and deletes on *all views* that are theoretically updatable. This rule permits logical data base design to be changed dynamically if, for example, such a change would improve performance.

The physical and logical data independence rules permit data base designers for relational DBMS to make mistakes in their designs without the heavy penalties levied by nonrelational DBMS. This, in turn, means that it is much easier to get started with a relational DBMS because not nearly as much performance-oriented planning is needed prior to "blast-off."

Integrity independence.

***Rule 10:** Integrity constraints specific to a particular relational data base must be definable in the relational data sublanguage and storable in the catalog, not in the application programs.*

In addition to the two integrity rules (entity integrity and referential integrity) that apply to every relational data base, there is a clear need to be able to specify additional integrity constraints reflecting either business policies or government regulations.

Assume the relational model is faithfully reflected. Then, the additional integrity constraints are defined in terms of the high-level data sublanguage and the definitions stored in the catalog, not in the application programs.

Information about inadequately identified objects is never recorded in a relational data base. To be more specific, the following two integrity rules apply to every relational data base:

Entity integrity. No component of a primary key is allowed to have a null value.

Referential integrity. For each distinct nonnull foreign key value in a relational data base, there must exist a matching primary key value from the same domain.

If, as sometimes happens, either business policies or government regulations change, it will probably become necessary to change the integrity constraints. Normally, this can be accomplished in a fully relational DBMS by changing one or more of the integrity statements that are stored in the catalog.

> ”
>
> Rule 11: *A relational DBMS has distribution independence.*

In many cases, neither the application programs nor the terminal activities are logically impaired.

Nonrelational DBMS rarely support this rule as part of the DBMS engine, where it belongs. Instead, they depend on a dictionary package, which may or may not be present and can readily be bypassed.

Distribution independence.

***Rule 11:** A relational DBMS has distribution independence.*

HOW TO
MAKE A
GREAT
IMPRESSION
AT THE
OFFICE

By distribution independence, I mean that the DBMS has a data sublanguage that enables application programs and terminal activities to remain logically unimpaired:

- when data distribution is first introduced (if the originally installed DBMS manages nondistributed data only);
- when data is redistributed (if the DBMS manages distributed data).

Note that the definition is carefully worded so that both distributed and nondistributed DBMS can fully support Rule 11. IBM's SQL/DS and DB2, Oracle Corp.'s Oracle and Relational Technology, Inc.'s Ingres (all nondistributed in present releases) fully support this rule.

This has been demonstrated as follows: SQL programs have been written to operate on nondistributed data (using System R) run correctly on distributed versions of that data (using System R*, the IBM San Jose Research Laboratory prototype), and the distributed Ingres project at the University of California at Berkeley has shown the same capability for the Quel language of Ingres.

It is important to distinguish distributed processing from distributed data. In the former case, work (for example, programs) is transmitted to the data; in the latter case, data is transmitted to the work. Many nonrelational DBMS support distributed processing but not distributed data. The only systems that support the concept of making all the distributed data *appear* to be local are relational DBMS — these are prototypes right now.

In the case of a distributed relational DBMS, a single transaction may straddle several remote sites. Such straddling is managed entirely under the covers — the system may have to execute recovery at multiple sites. Each program or terminal activity treats the totality of data as if it were all local to the site where the application program or terminal activity is being executed.

A fully relational DBMS that does not support distributed data bases has the capability of being extended to provide that support while leaving application programs and terminal activities logically unimpaired, both at the time of initial distribution and whenever later redistribution is made.

There are four important reasons why relational DBMS enjoy this advantage:

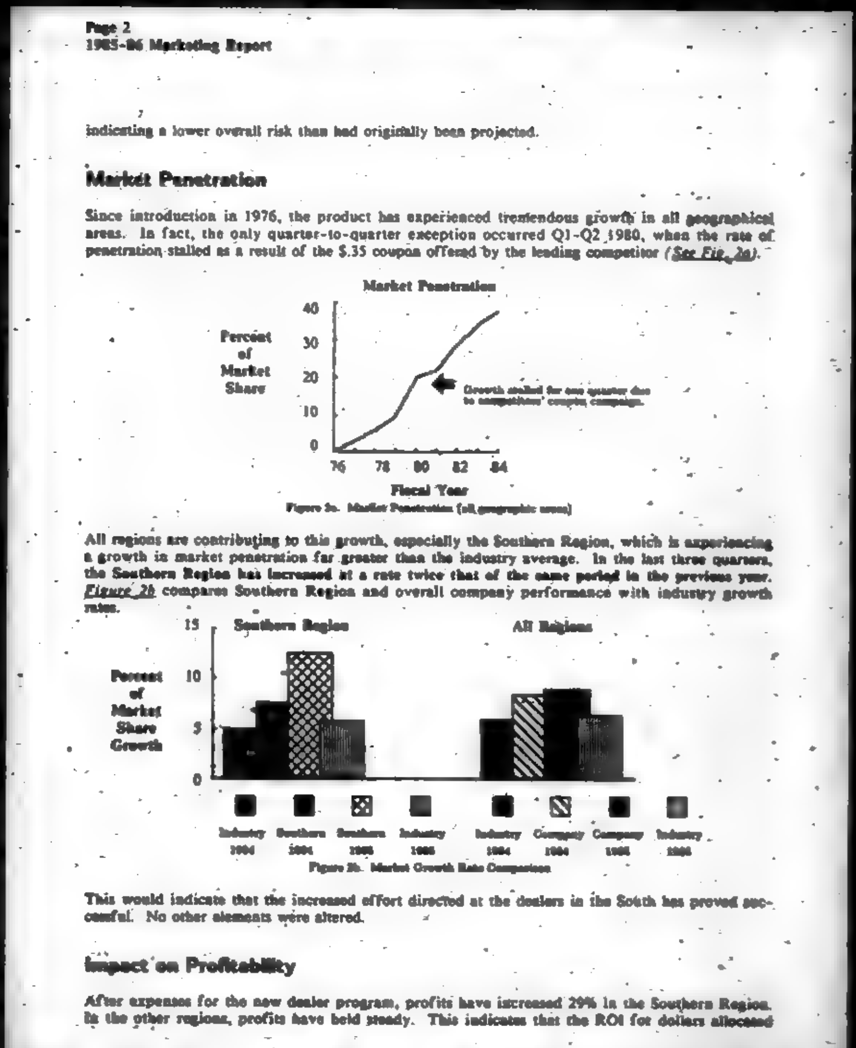
- **Decomposition flexibility** in deciding how to deploy the data.
- **Recomposition power** of the relational operators when combining the results of subtransactions executed at different sites.
- **Economy of transmission** resulting from the fact that there need not be a request message sent for each record to be retrieved from any remote site.
- **Analyzability of intent** (owing to the very high level of relational languages) for vastly improved optimization of execution.

Nonsubversion rule.

***Rule 12:** If a relational system has a low-level (single-record-at-a-time) language, that low level cannot be used to subvert or bypass the integrity rules and constraints expressed in the higher level relational language (multiple-records-at-a-time).*

In the relational approach, preservation of integrity is made independent of logical data structure to achieve integrity independence. This rule is extremely difficult for a "born-again" system to obey because such a system already supports an interface below the relational constraint interface. Vendors of "born-again" systems do not appear to have given this problem adequate attention.

(Part two: the practical consequences of the 12 rules and an evaluation of certain products against the relational model.)



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Page 2
1985-86 Marketing Report

indicating a lower overall risk than had originally been projected.

Market Penetration

Since introduction in 1976, the product has experienced tremendous growth in all geographical areas. In fact, the only quarter-to-quarter exception occurred Q1-Q2 1980, when the rate of penetration stalled as a result of the $.35 coupon offered by the leading competitor (See Fig. 2a).

Figure 2a. Market Penetration (all geographic areas)

All regions are contributing to this growth, especially the Southern Region, which is experiencing a growth in market penetration far greater than the industry average. In the last three quarters, the Southern Region has increased at a rate twice that of the same period in the previous year. Figure 2b compares Southern Region and overall company performance with industry growth rates.

Figure 2b. Market Growth Rate Comparison

This would indicate that the increased effort directed at the dealers in the South has proved successful. No other elements were altered.

Impact on Profitability

After expenses for the new dealer program, profits have increased 29% in the Southern Region. In the other regions, profits have held steady. This indicates that the ROI for dollars allocated

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FUSION.

IN DEPTH

A walk through The Computer Museum with

GORDON BELL

The Computer Museum occupies a spacious converted warehouse on Boston's waterfront, facing a preserved wooden schooner and a series of glass and steel skyscrapers. The blending of old and new in the cityscape serves as a perfect backdrop to the museum, which contains both the relics of a machine age gone by and examples of technologies still under development.

The Computer Museum houses the world's largest collection of computer industry artifacts. C. Gordon Bell helped found The Computer Museum at Digital Equipment Corp., prompted by his deep involvement in the computer industry and a fear that all the interesting artifacts would be destroyed.

Bell earned his B.S. and M.S. degrees from MIT in the 1950s and worked as a DEC engineer from 1960 to 1966, witnessing an "exponential growth" in computer installations. During this time, Bell forecast the impact of home computers and saw his chance to make it happen. Preferring the challenge of larger machines, he instead engineered the PDP-5, -8 and -11 and helped set the standard for interactive computing.

Bell then went to Carnegie-Mellon University from 1966 to 1972, which in his words was "perfect timing — the beginning of the integrated circuit generation when things were moving slowly" in industry. He returned to DEC in 1972 to build the first VAX and bring in a new generation of minicomputers.

After serving four years on the museum's board of directors, Bell has now retired to become a permanent trustee. The museum now flourishes under the directorship of his wife, Gwen, and Bell has begun a new project. In July 1983, Bell founded Encore Computer Corp. with fellow minicomputer giants Kenneth Fisher of Prime Computer, Inc. and Henry Burkhardt of Data General Corp. Encore seeks to challenge the industry with yet another generation of powerful small computers.

Bell gave Associate Features Editor Amy Sommerfeld a guided tour of the museum, giving his own comments on the exhibits along the way.

In a way, The Computer Museum is just like a computer. We had a prototype to test whether it was a good idea and what the clientele would be. Only DEC employees and customers visited the museum when it first opened.

The Museum started up at the DEC facility in Marlboro [Mass.] in September 1979. It was totally DEC-sponsored, not public, although three-quarters of the artifacts were made by other companies. A lot of time was spent debugging what to show about the machines and what to say about them, namely: What's the achievement? Why is it here?

Then we solicited "customers," and in June '82 went public with a board of directors. We solicited members and became, in effect, a production model. The second production model is The Computer Museum here at Museum Wharf.

The Hollerith Tabulator, used in the 1890 US census

> *One hundred years from now I want people to come here and say, "Gosh, I'm glad they saved all that stuff." By then they'll understand that information processing is one of the fundamentals of society.*

The goal of the museum as I saw it was to collect the first object of a given class, the last object of a given class and then the important ones — the classics. The fun is trying to find out: When is something going to be classic? When is something going to be the first one? I always tried to err on the side of collecting more — ones that I thought were really going to be important.

At the entrance to The Computer Museum stands Whirlwind, an experimental computer started in 1945 at MIT that eventually yielded the first core memory. Only one model of this 16-bit computer was ever produced; it operated from 1950 to 1959.

Whirlwind was the first real-time and control machine. It's here in part because it was the origin of the machines that came out of the New England region. It's a classic mini — as big as a house — and it has lots of firsts, including parallelism and real-time, interactive I/O.

Whirlwind was a controversial project because the machine took longer than they thought it was going to take to build, and they spent quite a lot of money doing it. But once it was up and people started using it, then everyone began to see the benefits of having a fast machine like this and what it could do compared with the traditional [John] von Neumann-style calculating machines of the time.

MIT conceived Whirlwind as a simulator for aircraft stability. That was one of the reasons it ended up with a short word length. Machines that were being built around this time tended to have 36- to 40-bit word lengths, according to von Neumann's guidelines. Whirlwind's engineers built a 16-bit computer because that was all the precision they needed. All the other machines were serial and slow, while this one was parallel and very fast.

One feature of experimental machines is that you never know exactly what you're going to get out of them. The MIT/Forrester patent for core memory came out of this project. The standard Williams tube memory in use at the time was so unreliable that the Whirlwind designers said, "We've got to have a new memory." Core memory was first tested on the Memory Test Computer [MTC], which [DEC President] Ken Olsen engineered. The MTC ran for about a month. The memory operated so well that the engineers just took it right out and put it on Whirlwind.

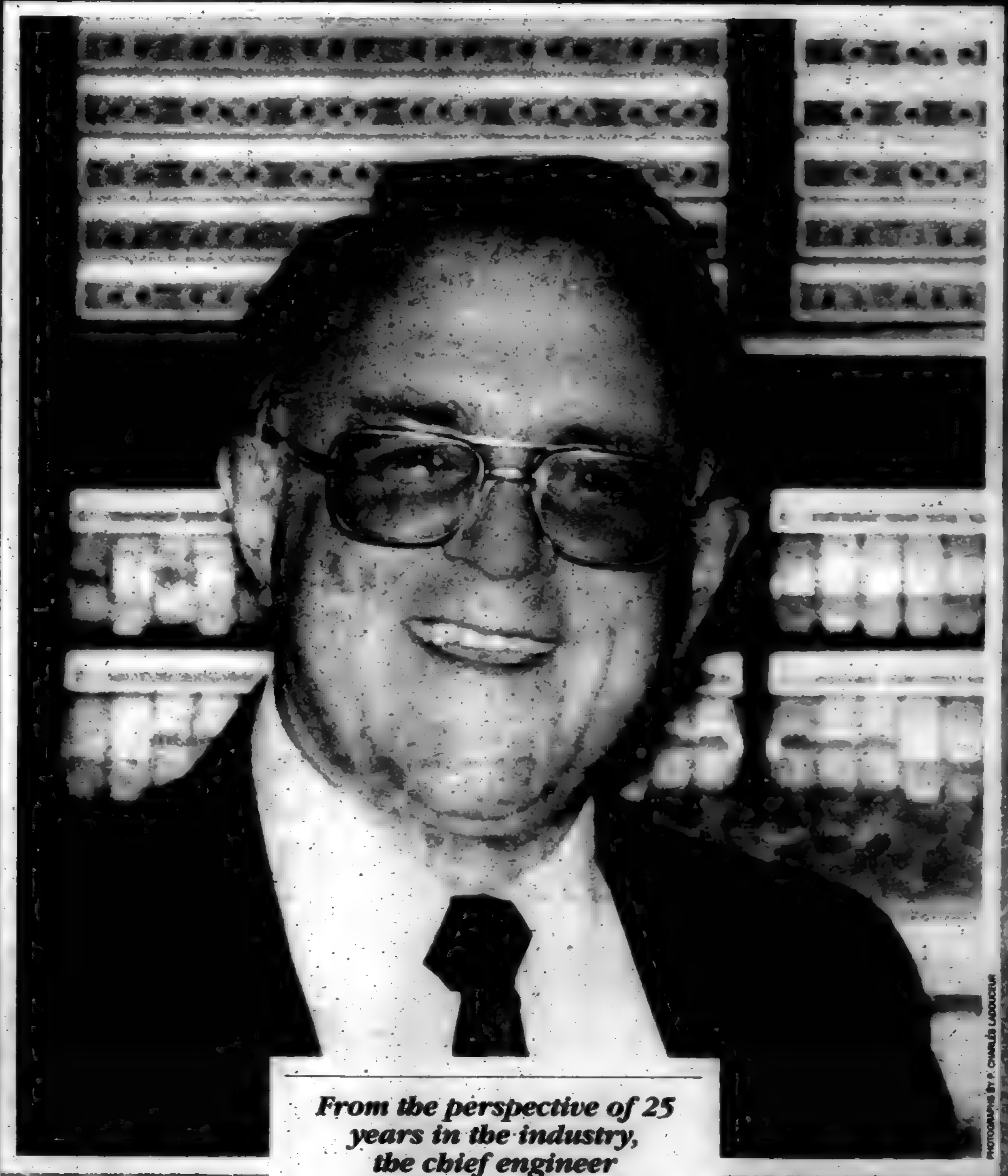
Around the corner sit several large pieces of equipment that together make up the U.S. Air Force's AN/FS Q-7, developed by Jay Forrester and Robert Everett of MIT's Lincoln Laboratory. Installed in 1958 and decommissioned in 1983, the 32-bit Q-7 ran longer than any other computer, and was the first to serve 100 simultaneous users.

Whirlwind also ended up being the prototype for the Semi-Automatic Ground Environmental [Sage] air defense system computer, called Whirlwind 2. Later, IBM built it under the name AN/FS Q-7. MIT helped design the architecture and the circuits, and then IBM built these massive vacuum-tube machines. This was a 32-bit computer, designed to do everything Whirlwind could do and more.

It was a lovely machine because it had two 16-bit words that could be operated on in parallel. Each pair used 55,000 vacuum tubes and took 150,000W of power. The machine you see here in the museum was decommissioned only two years ago, in February 1983, and still ran at a phenomenal 99.95% uptime because of careful design and an absolutely controlled environment.

Notice the way it's built — a constant stream of air blows on each tube. Every tube is running at the same temperature. In addition, the users did something called "marginal checking," which meant they varied the voltages up and down to detect whether a tube was going to fail. By the time this machine was built, its designers really understood how to build very high-reliability computers.

On a museum field trip, we saw the AN/FS Q-7 before it was decommissioned. People operated



From the perspective of 25 years in the industry, the chief engineer of DEC's PDP-11 and cofounder of Encore Computer Corp. points out the winners, the losers and the classics.

PHOTOGRAPHS BY P. CHARLES LADOUCEUR

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the computer from this console of lights and switches. Today you can't see what's happening on a computer, but in the early days of computers there was a light on every bit.

You flipped switches to compute data, and you could see everything that was happening inside the machine. If the machine stopped or you wanted to run it slowly, clock by clock, you could see the whole state exactly.

I have programmed in machine language, bit by bit. In fact, until you get that first level of software on machines, you have to operate all machines bit by bit.

Core Memory Unit 2 from the U.S. Air Force's AN/FS Q-7

Core Memory Unit 2 from the AN/FS Q-7 stands 6 feet tall. It was considered a very fast memory: Any word in the Q-7's core memory could be accessed in 6 msec.

This refrigerator-size cabinet holds half of an arithmetic unit. This memory was one of IBM's contributions to the project. It stored only 4K by 32 bits — 131,000 bits, or one half of today's 256K-byte chip, which as you know is a very small fraction of the size. Later, they had a 64K-byte version, but this was really quite a small memory. That's why they needed all the drum units, which were used to swap programs with core. To show you the scale, each of these large drum units equals roughly one small floppy — about 256K bytes.

Getting rid of all the poor memories and switching over to core was a major transition. It occurred in the late '50s, even though the core was first operational in '53. It took that long to get core into other machines.

Cores hit the market simultaneously with transistor circuits, and that occurred almost precisely in 1960 — the beginning of the second generation of computing.

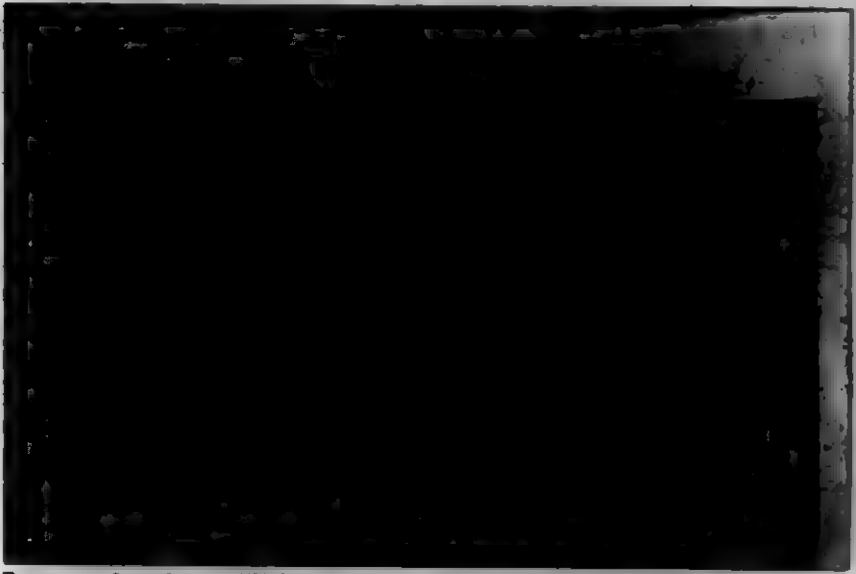
The year 1960 was a wonderful year, when a tremendous number of classic machines came out. Many were transistorized, and they all had core memories. That year was the beginning of serious computing. Reliable machines, relatively inexpensive, fast machines and good memories.

That's what really made computing start to grow exponentially.

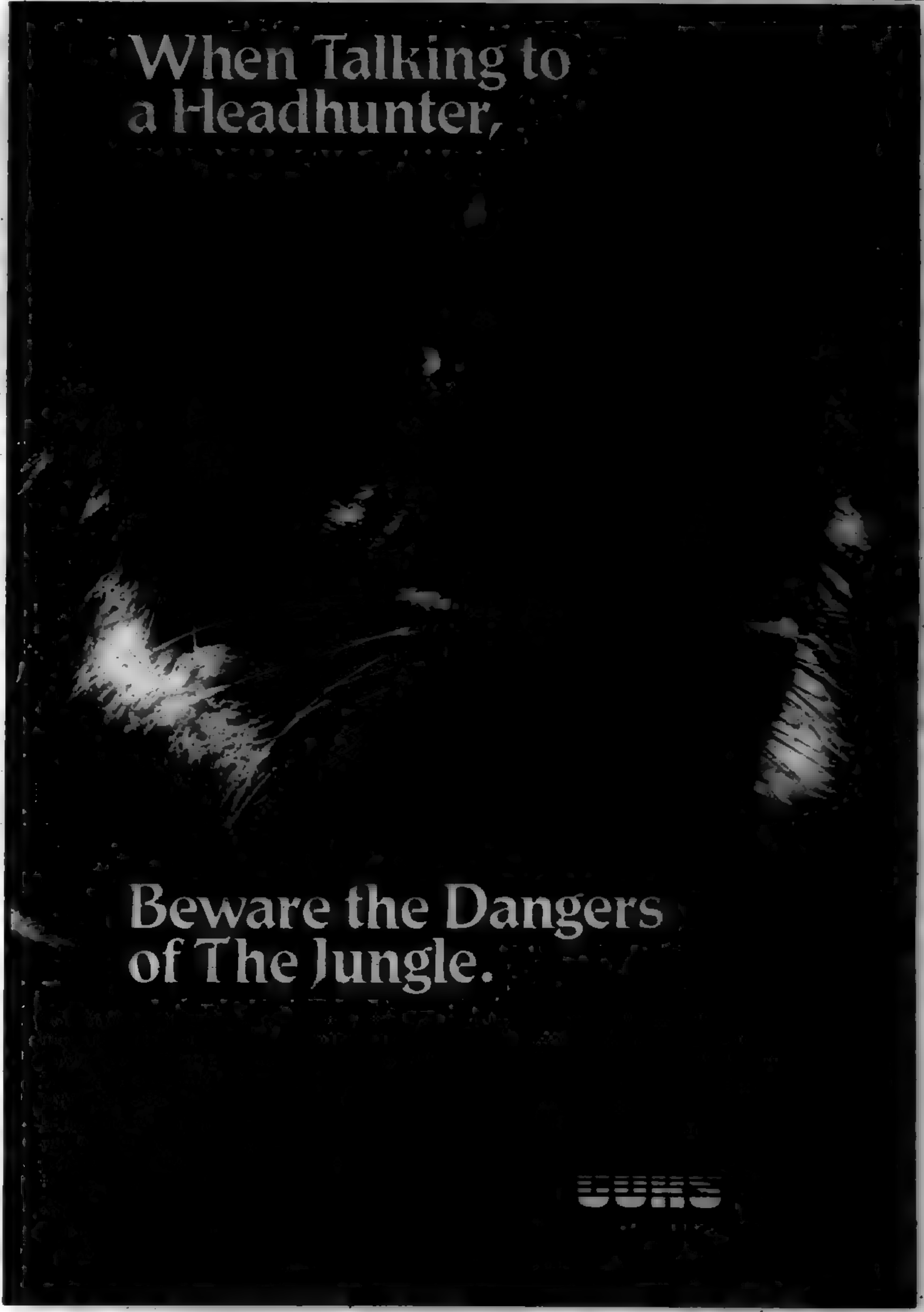
For many Americans, computers in the 1950s were synonymous with Univac. "That marvelous electronic brain" was first introduced to the general public by CBS newscaster Walter Cronkite during the 1952 presidential elections.

This is the Univac I that the Eckert and Mauchly company built. It really was the first commercial computer. When I say "first," I have to be careful, particularly saying the "first commercial." There were a couple of computers already operating in England, such as the Leo computer, but it's very hard right now to pin down when those were actually shipped.

When you say "first" you're asking, "When was it that a customer had it in his site, actually using it?" You have to read all the fine print.



For many Americans, "Univac" was synonymous with "computer."


When Talking to a Headhunter,
Beware the Dangers of The Jungle.

There were 46 of them, which at the time was massive volume! The price was about $930,000 initially, and it declined over time.

The way to really see machines is to see how they were used at that time. The films the museum preserves and shows are really important for just this reason. They show, for example, what key punching was really like or how Eniac was used. Here's the first film on programming, and the first AI film and one on the introduction of Fortran. We also have a film made for the museum just when the last IBM Stretch was taken out of service.

The museum has a videotape of Walter Cronkite talking about the first time Univac predicted the 1952 election results. During the election, there was concurrent reporting about the election and the computer's handling of it. I remember there was a very different attitude than you see today, when everyone says, "Computers have really fouled up elections. Computers shouldn't be allowed to predict results because that will influence the voters," and so on.

The response then was amazement, absolute amazement: "How can this thing know what's going to happen after only a few hours?" The film the museum has of Cronkite's announcing doesn't quite match the amazement of the moment.

This machine was literally telling us what was going to happen. In fact, it seemed so eerie that the networks were refusing to use the results at first. The computer made an early prediction, and the networks didn't even put it on the air until later on because they just didn't believe it.

Museum visitors can operate this card punch and automatic sorter.

Several exhibits show the evolution of card I/O technology, from the original semiautomatic sorters in solid oak cabinets through the standard automatic sorters still found in universities nationwide to the final models of the card era. A small pile of tiny 96-column cards remains from IBM's System/3. They never caught on, and IBM introduced the first floppy disk the following year.

I was fortunate enough not to deal with cards much. I did one year as a Fulbright scholar and used cards all year. I swore I would never punch another card.

Then I went to Carnegie-Mellon University in 1966 as a professor, and they had an IBM machine with cards. I decided to write a book instead of computing — there was no way I was going to put cards in a hopper again!

I was spoiled. I had just built the first time-sharing machine at DEC, so I really didn't believe in batch processing at all. All the DEC machines were interactive, and we believed in having people talk directly to computers.

> *Technology is a driving devil. It conspires, and if there's a concept half-there or a computer half-designed, technology will complete it.*

But the general level of user-friendliness was still quite low at that point. The Apollo Guidance Computer here was used in the first Apollo space vehicle in 1962. Unfortunately, somebody took a piece off it, so we had to cover the console with plexiglass.

Below it, a [Hewlett-Packard] 150 computer performs the same function as the Apollo. When people play with it now, they say, "Oh, this is awful. The human interface is terrible." We answer, "Yeah, that's the way it was!" They ask, "How did they ever really control the spacecraft?" With great difficulty!

Also while I was at Carnegie-Mellon in the early '70s, I went to a seminar on IBM's minicomputer. It was odd — they had a System/3, and on it was this card reader with these little, nonstandard cards IBM was introducing. And I thought, "Oh my God, don't they know? Cards are dead!"

What happens in every technology is somebody tries to make the ultimate version, and it's an absolute disaster. These cards are a perfect example. Just when it was clear that there was no use or need for cards, they introduced these new 96-column cards. If they weren't as big, the logic went, you could have a smaller card reader and it could be cheaper. That was all the little cards had to recommend them.

The trick in any technology is knowing when to get on the bandwagon, knowing when to push for change and then knowing when it's dead and time to get off.

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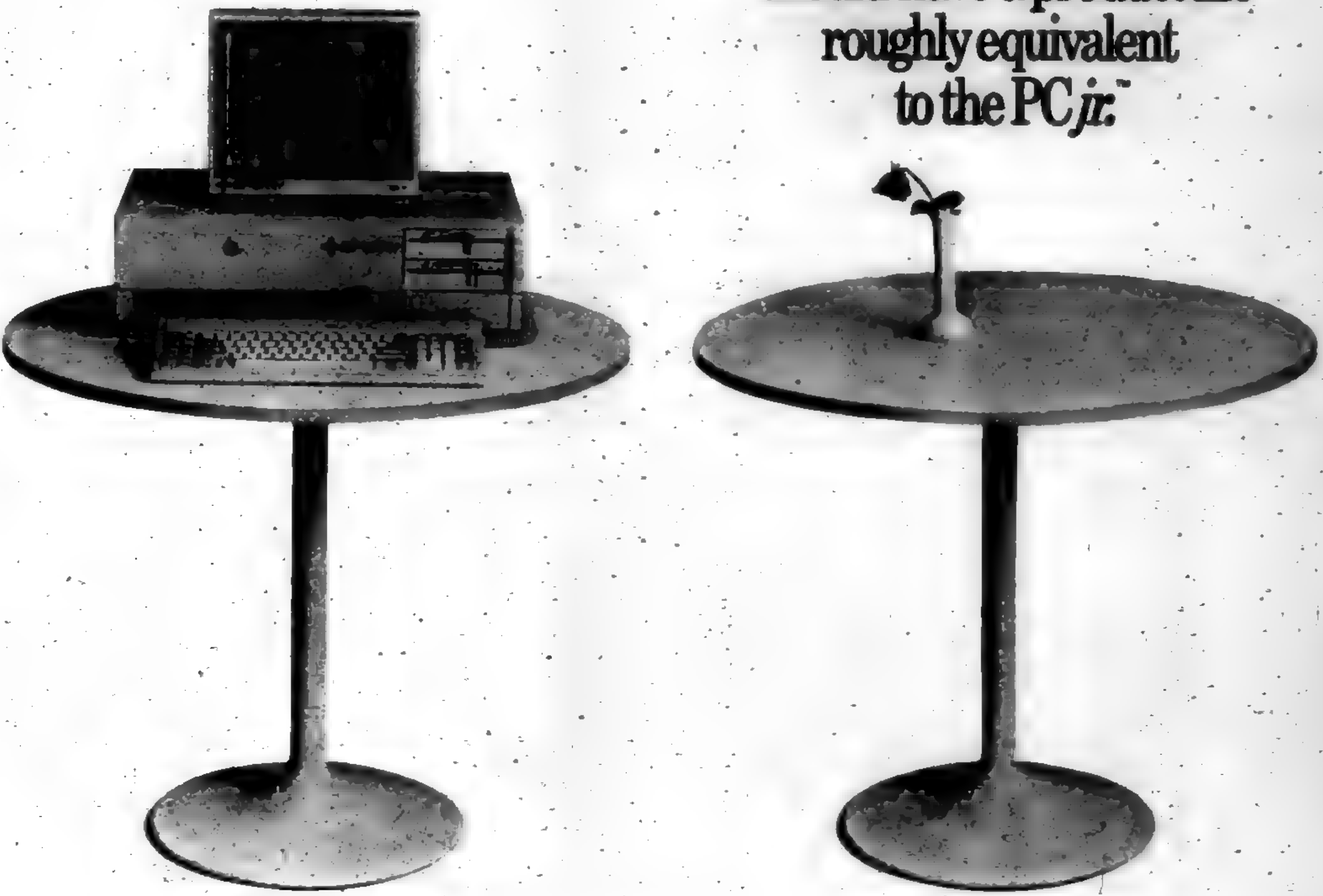

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That's getting on the right bandwagon. The other trick is not to get on any wrong wagons.

The Viatron 21 terminal is an example of getting on too early. Viatron introduced a CRT, a processor, a keyboard — a whole data entry device for $40 per month, which was absolutely unheard of. A $1,600 device in 1968! The museum has a copy of the advertisement that ran in *The Wall Street Journal.*

This was one of the famous fiascos in selling. The company went public and sold stock, and the stock prices went out of sight because of this revolutionary data entry device. The problem was it was too early. You couldn't build it using the MOS technology they had then. They sold thousands, but they couldn't deliver any! The technology was too immature.

IBM's nonstandard punch cards were quickly abandoned.

A glass case packed full of artifacts — components, posters, books and sketches — fills one wall of the museum.

The purpose of this exhibit is to mark a period, 1950 to 1959, and to show a range of firsts, from basic technology to applications. The exhibit shows a complete census of all the machines installed by 1950.

As time went by, you can see there was an exponential buildup of computer installations. About 10 machines were installed during '51. They were all prototype machines. Twice that number were installed in '52 and twice that number again in '53.

There's another theme that's important. A time period of approximately 12 or 13 years shows up over and over again in the development of computing. It shows that things really don't change that fast. For example, it took that long to get the transistor into computers in full scale.

In this museum case lies the patent for the first point-contact transistor, which was filed in June 1948. By 1960, all the machines were transistorized, but that was a full 12 years from the invention of the device. Twelve years of hard work and production so you could produce the transistor, so people understood them, so the circuits got done and so on. It just took that long.

In 1959, the Noyce patent was filed on a new way to build transistors — the planar process. That was the beginning of the integrated circuit, but they weren't really produced until '67 to '68 — sort of a half-cycle. On the other hand, IBM's first integrated circuit computers didn't appear until 1973. That's a full 14-year gap.

In 1960, as the exhibit shows, there was an incredible number of new machines introduced, marking the second generation: the Control Data Corp. 1604 and 160, the beginning of CDC; General Precision's new machine; Sperry Rand's solid-state machine, Univac; Philco's transistor machine that put the company at the forefront; IBM's workhorse, the 1401, plus the 7070 and 7090, a real classic; and the DEC PDP-1, the beginning of DEC.

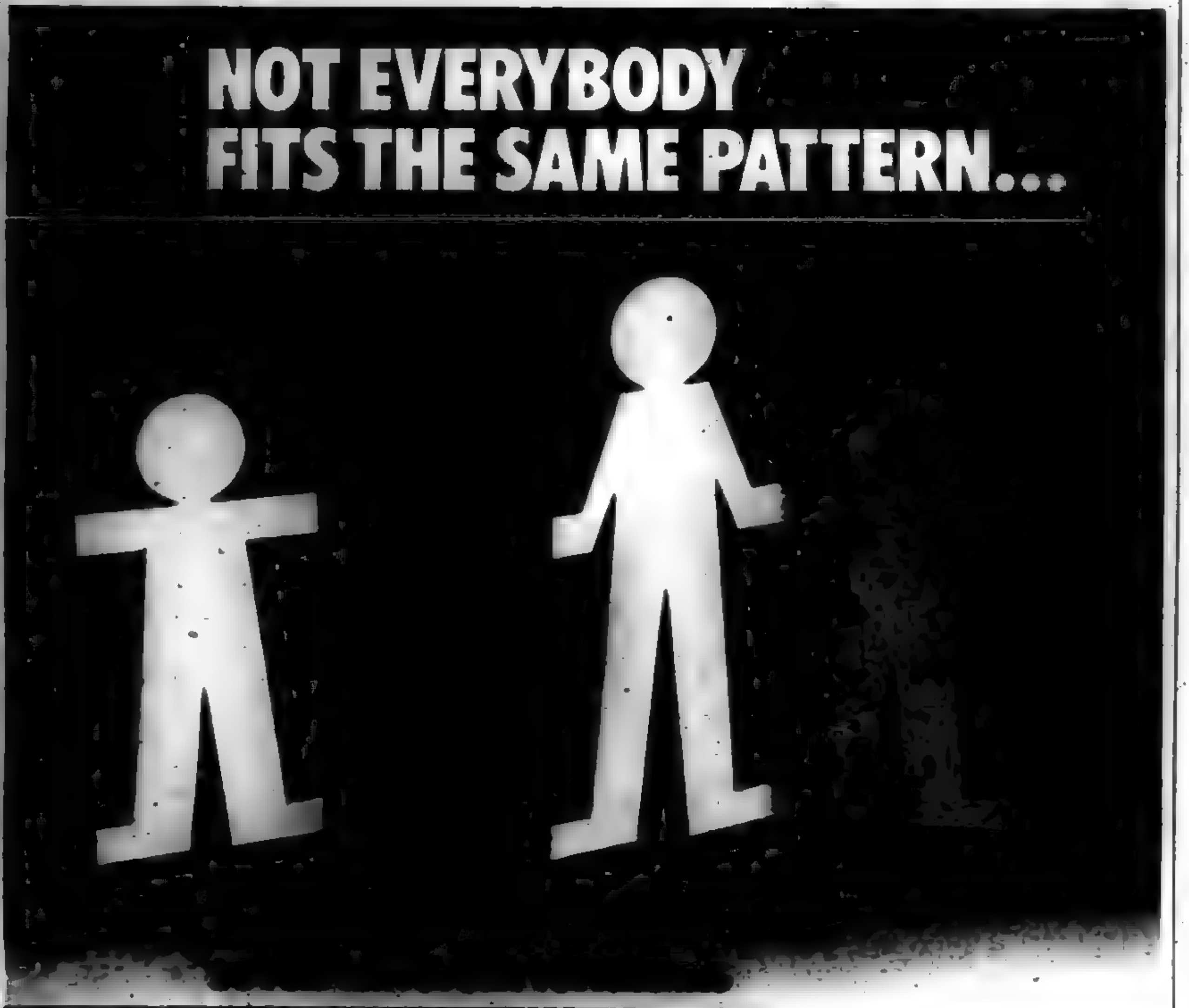
These machines formed the basis for the next 10 years of computing.

That was also the time when I said, "We're not going to have any more modified, kludgy typewriters on our computers." The next machine I designed had a Teletype on it. The next one after that was when we started using the ASR33.

We were the first ones to adopt the ASR33, which turned out to be a major product in marketing minicomputers. For $750 you could include a keyboard, a printer, a paper tape reader and a paper tape punch. Basically, we'd scaled the I/O problem down to something trivial. That's how DEC was able to introduce the PDP-8 at the $18,000 level, because we didn't have to charge $5,000 for a paper tape reader and punch.

In the same case, artifacts from the Atlas project include only a single board and a magazine article about the breakthrough by engineers in England.

Another fascinating introduction during this early period was Atlas, designed at Manchester University. I saw it in '61 and the museum has



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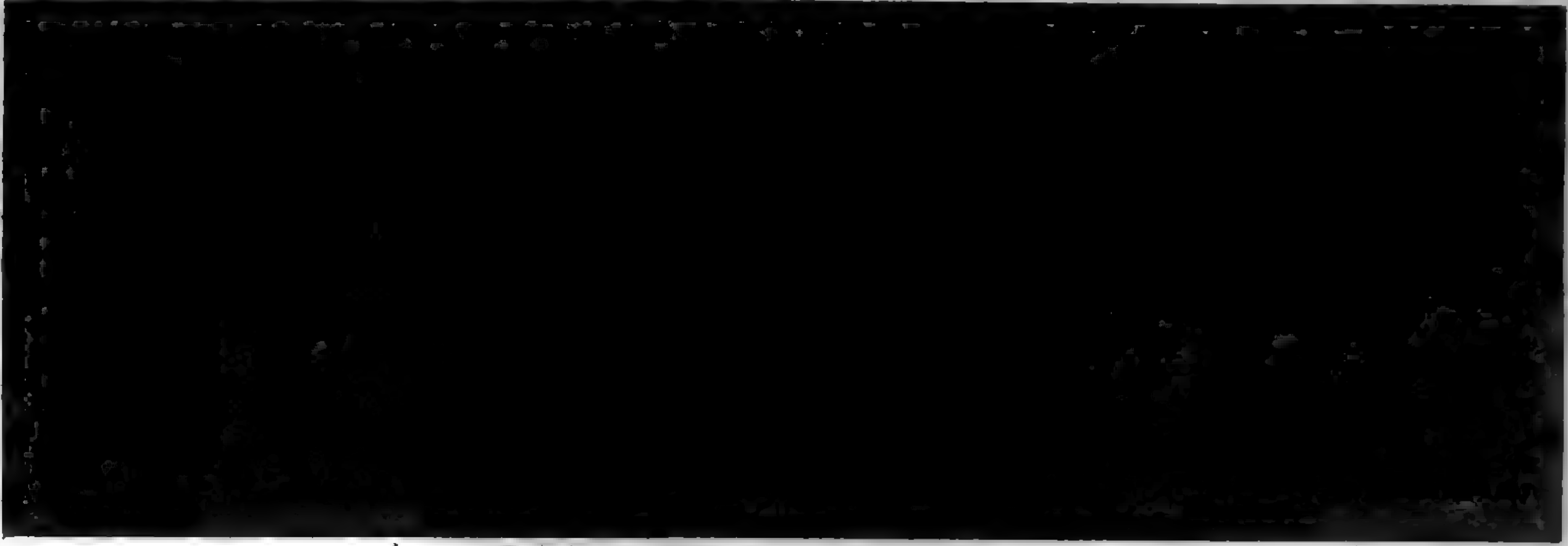


some artifacts from it. Atlas was the first virtual memory machine, using paging.

Again, the 12-year time delay for a major product introduction: Atlas came out as a research machine in '61, but Manchester's first machine ran in '49. It took them that long to find that two-level store is what you want as a programming environment. DEC started building computers in '60, and by '73, we had a good virtual memory on the PDP-10. We were building minis — or what became minis — in 1966, and the PDP-11 had a good virtual memory on it by '78, when VAX was introduced — 12 years again.

In the semiconductor arena, the first processor on a chip was done in '71, and there still isn't a really good virtual memory microprocessor. National Semiconductor Corp. had a good chip set (the 32000) by '83, but they're really just delivering it now.

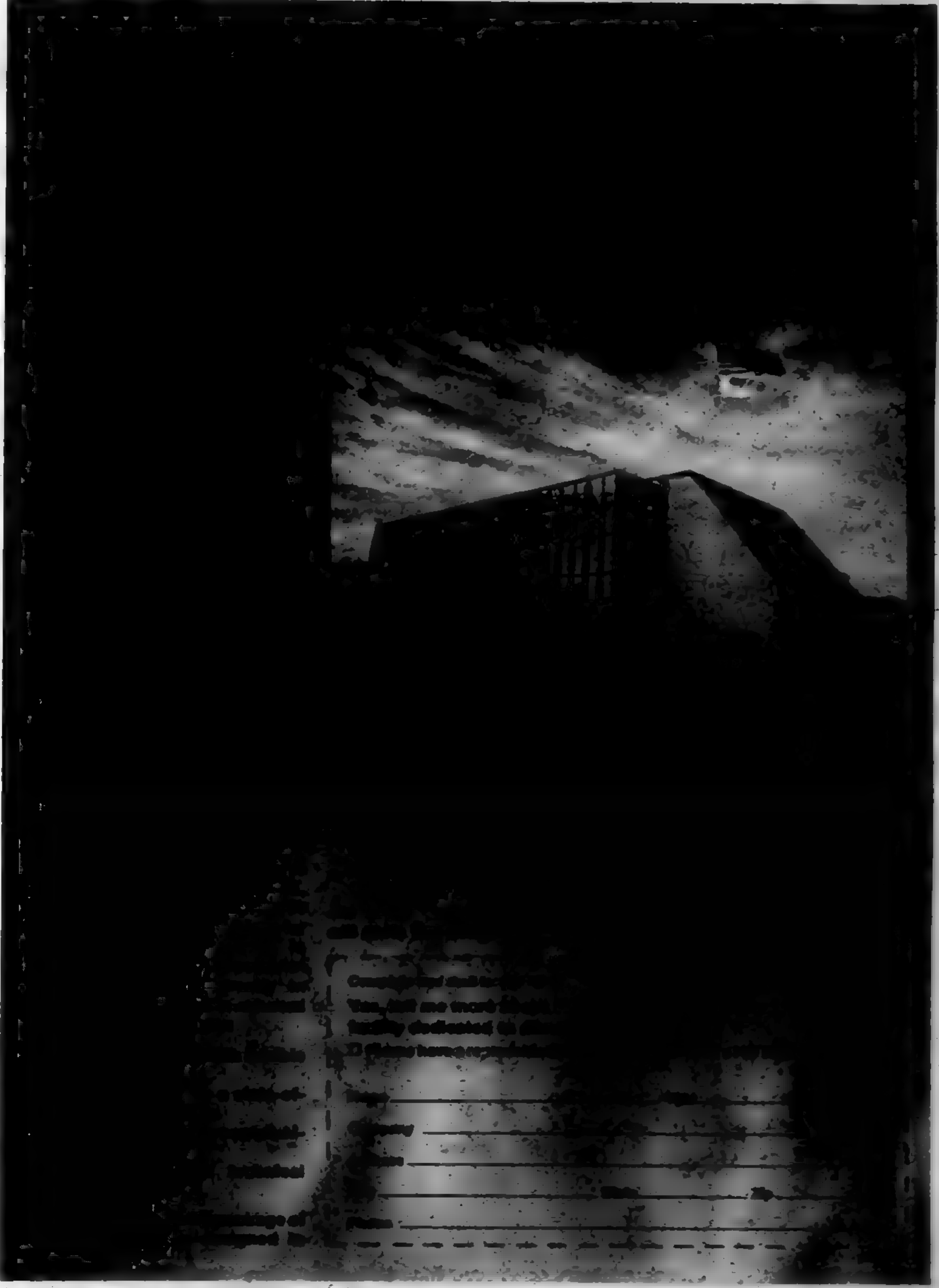
The idea of paging was written up in about five papers. The whole need and motivation for it was totally described by 1962. Anyone who had any feeling at all for computers could look at the concept and say, "Oh yes, this is the way you have to structure memory."

I don't know why it's taken so long to realize the concept. One thing is, all these industries — mainframe, mini and micro — are somewhat independent of one another, and it's unclear whether they learn from each other.

In fact the PDP-6, which was the first time-sharing machine and came out in '66, was designed for Lisp, because Lisp came out in 1959-60. I was convinced Lisp was really going to take over, but it's taken 25 years to catch on. It's amazing how long it's taken to get to a point where people really see the virtue of it. Lisp really is the most elegant language.

Unix was first developed in reaction to [General Electric Co.'s] Multics, and it was implemented on a PDP-9 and then on a PDP-11. Then when we built the VAX, we got [AT&T Unix developer] Ken Thompson to do a Unix critique on the VAX. We asked, "Can you run Unix really well on it?"

People always perceived this war between DEC and Unix, and that isn't the case. I certainly tried to make sure VAX was the best Unix machine. AT&T was a super customer, and I believed that Unix was going to take on about the position it has taken on, simply because of the open architecture and portability aspects it has.



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The glass case also contains handwritten notes from some of the industry's leading technologists.

The work for An Wang's core memory was done in '48 and '49. This is a shift register that he built for the Harvard Mark IV, which stored 64 bits of data, and those are his notes — beautiful notes.

I think there's a good story here. Wang himself is a scientist-engineer, and I really believe you have to have that kind of leadership to build technological companies. Wang Laboratories is an excellent example of a strong company with a technically oriented leader.

DEC is another good example. Ken [Olsen] was involved in the MTC at the outset and went on to work on Whirlwind, then TX-0. Apollo [Computer, Inc.] was started by very strong technologists. CDC, Cray [Research, Inc.] and many others have very strong technological roots.

But the company that's the most amazing to me in every respect, of course, is IBM. To me, IBM is a two-culture company: the very strong group that runs engineering/manufacturing and the field organization that markets their machines. [Thomas J.] Watson [Sr.]'s incredible drive for excellence set the tone.

The interesting thing is that a marketing person runs the company. To me that's a real exception. It's very difficult for a nontechnologist to run a technology company, independent of whether it's computers or bioengineering or any other field. If the technology is moving at all fast, then management has to be able to make decisions based on what's going on in the technology.

Apple [Computer, Inc.], for example, I consider more of a marketing phenomenon. With the exception of the Macintosh, I don't really regard Apple as a technology company, because the Apple I and Apple II weren't so much technological innovations. The first personal computer is right here at the museum, and it's not an Apple. A lot of companies had built small machines at the time.

Personal computers of all shapes and sizes crowd the PC Gallery.. Whereas many regard the personal computer as a relative newcomer, some of these machines have the look of old-guard computers.

In the PC Gallery we have one of the Lincs [Laboratory Instrument Computers] that came out in '64 and which I think of as the first personal computer or scientific workstation. It had a personal filing system, keyboard and interactive display, and it was transportable. It cost about $40,000. Linc marked the beginning of a line of computers that included the Linc-8 and PDP-12 for personal, scientific and interactive computing. There are still Lincs in use.

Linc has all the attributes of a personal computer. It's for one person, it's interactive, you can go automatically from program definition to execution without any intermediate paper tape or cards or anything like that. But the main thing is it was used by one individual.

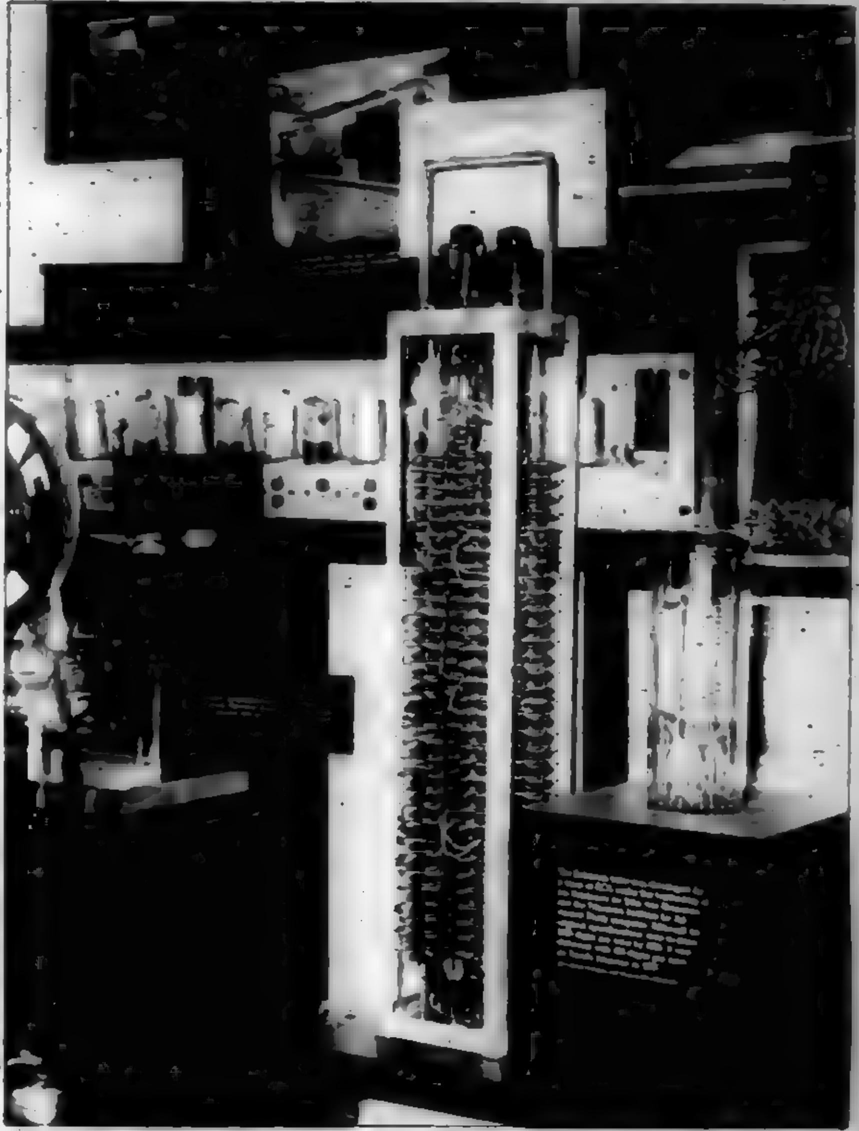
I think the issue of defining a personal computer is really one of scale. How much are you going to pay for a computer for one person? And what does it do?

The purpose of this exhibit is to display things you can't see in stores or in schools. It includes the first personal computers, like Linc and Altair, Apollo's first workstations and other artifacts. All the machines should have their skins off, their insides exposed. Computerland's Bill Millard, who is on the museum's board, has given a grant to collect and to enhance the exhibit. The main thing is to have a definitive, scholarly collection.

From the outset, personal computers were driven by memory technology. In 1975, a 4K memory chip was introduced, and the Altair was built using first a 1K and then the 4K chip. In 1978, the 16K chip was quickly incorporated into the Apple II. In 1981, the IBM Personal Computer came out using the new 64K chip, and then in '84, the 256K chip begot the Personal Computer AT and the Macintosh.

Furthermore, I don't believe anyone really invented the personal computer. "Invention" is too strong a word for it. A lot of things are called inventions when, actually, they were inevitable. I believe technology is a driving devil. It conspires, and if there's a concept half-there or a computer half-designed, technology will complete it.

In retrospect, for example, I don't look at the microprocessor as an invention. It was something we were


Artifacts such as An Wang's core memory fill two glass cases, marking the periods 1950 to '59 and 1960 to '69.

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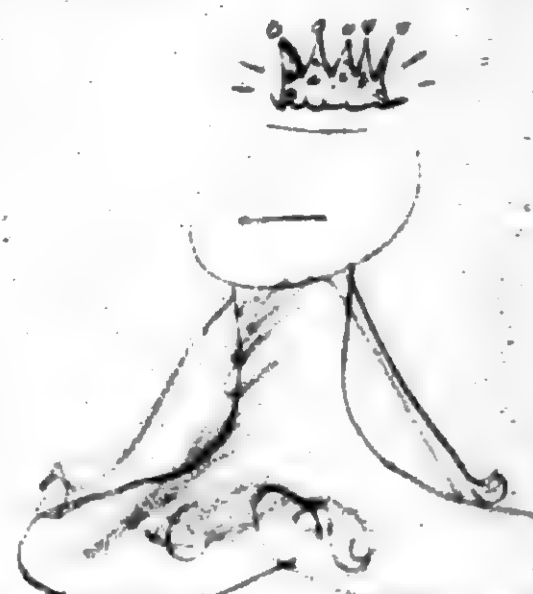

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A personal computer gallery displays all shapes and sizes.

all trying to do for a number of years. One day the technology reached a point where it could be done. In this case, it was a conspiracy between a good chip and adequate memory.

Apple happened to be the first to put that combination into a machine. I don't want to discredit them totally and say, "Oh, they were just a bunch of assemblers." They did a very nice job: The Wozniak disk controller was a very neat little piece of logic. But it was the 6502 processor, the 16K-byte memory chip and that disk controller that conspired, along with the idea of open architecture, in the first Apple computer.

Apple did a very neat job in pulling the pieces together and packaging the computer. If you read all of [Steve] Jobs' accounts, he really worked on the packaging. The key decisions were the user interface and good bit-map graphics. But I can show you all that same work at a laboratory at Xerox Corp.'s [Palo Alto Research Center] four or five years earlier. It was just waiting to happen.

I'm strictly an evolutionist. Get an idea and keep working on it. In the computer industry, we're not idea-limited now, it's just a question of pulling the ideas together. The machines that we can build now with the new technology are fantastic. We're anticipating machines that will execute 100 million to 1K million instructions per second.

The Computer Museum honors Seymour Cray with his own exhibit, titled "A man and his machines." Museum curators name Cray the "undisputed leader in the design of the most powerful computers."

Cray has built the world's fastest computers for 20 years. That's absolutely amazing! He has also produced an incredible string of ideas and basic technology. The reason he has been able to stems from his breadth, starting with the basic physics of the devices, of cooling, of wiring and computation . . . on into knowing how to build a compiler and operating system.

If you look at Cray and what he's done, you end up with a lesson on how to stay out of organizations. People get sucked into them. Cray stayed out of large organizations: first at CDC, by getting out of Minneapolis and going to Chippewa Falls, Wis. It was far enough away that people weren't coming to visit him all the time. He couldn't go to meetings.

He could never have built the 6600 in Minneapolis, I'm convinced. And then as Cray Laboratories grew, he must have seen the same thing happening again and said, "Gee, I've got lots of organizational responsibility, and the way to handle that is to split myself off again."

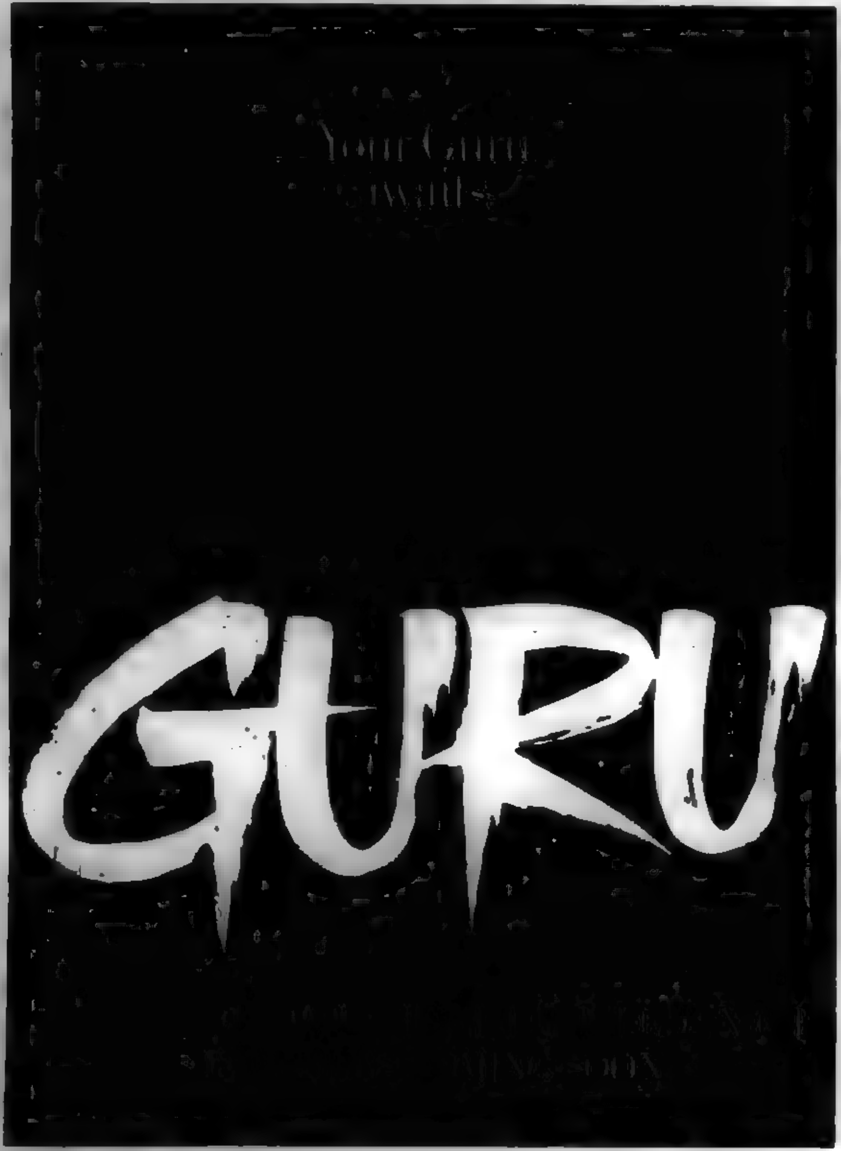
Organizations, no matter how tenuously connected, all start sucking up your time, and basically people don't have enough time for both computers and organizations.

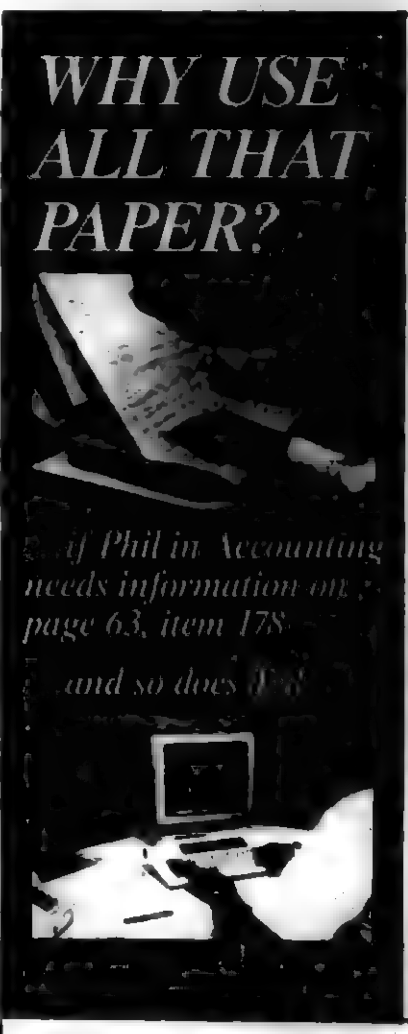
In this case, if you look at the Cray-CDC split from CDC's standpoint, the tragedy was letting him go, not being able to give him the environment he needed. But maybe it was inevitable. There's a discomfort that settles in with certain individuals in large companies. You suddenly see that it's really you who are supporting the company.

> *A small crew is a prerequisite for designing really good machines. That's the nature of great computers — it isn't always the people with the most resources who succeed.*

The Cray exhibit is dominated by the hulking remains of the first CDC 6600. Introduced in 1963, the 6600 was a product of Cray's Chippewa Falls lab and ran three times faster than IBM's Stretch.

CDC's 6600 No. 1 — a Cray brainchild — is preserved here. When the 6600 was announced, I remember being just awestruck by it. I put it with Atlas as one of the greats. In the development of ideas and projects at that time, these two stood out from everything else.

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A section of the Cray 1 on display.

The 6600 represents special creativity in a number of aspects: It executed many instructions simultaneously, and they were all interlocked. Cray had the idea of separate I/O computers and, of course, his [reduced instruction set computer (Risc)] architecture. For the 6600, they had evolved the circuitry enormously. This was the fastest machine running at the time, with a very respectable clock time even by today's standards — almost a 40-MHz clock. The 6600 was also the first machine to employ Freon cooling.

I love [IBM President Thomas J.] Watson Jr.'s comment about the Cray 1 announcement in '63, posted here: "I understand that in the laboratory developing the 6600 there are only 34 people, including the janitor. I fail to understand why we have lost our industry leadership position by letting someone else offer the world's most powerful computer." That says it all!

And in fact, having a small crew is another prerequisite, I think, for designing really good machines. That's the nature of building great computers — it isn't the people who have the most resources all the time who succeed. I think while you are designing and building, you can't deal with the complexity that a large organization implies. It's very hard to segment the work and design all the interfaces so the design comes out right with a large crew.

To me, that's always been a challenge when you're building something large — to develop an architecture that will let the work be partitioned separately and independently among a number of groups. You want to get as many good ideas into the design as possible, yet not thwart it by the complexity of having every project member have to talk to every other one.

That's why I really believe in a strict, levels-of-integration model for segmenting work. That is, we work in very well-defined layers, starting from silicon or semiconductor devices up to hardware systems, operating systems, languages and then generic applications. Each layer has to be very cleanly structured so team members can build and develop them independently.

In a videotape the museum shows of Cray at Livermore National Laboratories, he talks about the size of the design team. He says his ideal number is one. Then he goes up to about six, each of whom leads one level, and then a layer of workers. Then he goes up to the next step, getting to about 30 in a hierarchy. But there's got to be not more than three or four who really understand the whole. That's assuming you've got one person who can lead the project and understand everything from semiconductors to applications.

The museum's collection includes production Model 17 of the PDP-8, introduced in 1964 at $18,000. The PDP-8 was designed by Edson de Castro (now president of DG) and engineered by Gordon Bell as an outgrowth of the PDP-5.

The PDP-8 was the first minicomputer. The reason it can be called a minicomputer is that it was built small enough to fit in a cabinet, and therefore it became a component to other systems. Furthermore, it was fast and easily mass-produced. The PDP-5, its predecessor, came out about two years earlier. It was the forerunner of the PDP-8, but I don't classify the PDP-5 as a minicomputer simply because no one integrated it with other systems.

The PDP-8 was implemented in a number of other technologies. By 1978, it was on a single chip that Intersil [Systems, Inc.] built. In fact, the number of sales of the PDP-8 has been higher in the last three or four years than at any other time because it's inside a word processor — the Decmate. So this one machine has lasted 20 years. Not bad!

The PDP-10 is also now about 20 years old. The PDP-11 was introduced in 1970, and later the VAX-11 was created to extend the PDP-11's range. There are still a lot of PDP-11s being sold, but VAX has really overtaken it as the main revenue source at DEC.

I personally made a decision in 1975 not to work on the first personal computer. I could see it was going to be quite a machine. But I went to work on the VAX instead, which to me was a much more fascinating engineering problem.

I wrote a memo in 1969 when I was at Carnegie-Mellon, urging a strong effort in home computers. It outlined the whole home computer industry essentially the way it has evolved. I have never been that interested in the smaller machines. Having worked on the PDP-8, I've always gravitated toward larger, more complex computers.

If I had decided the other way, I probably would have tried to build personal computers within DEC. In fact, DEC had a number of early

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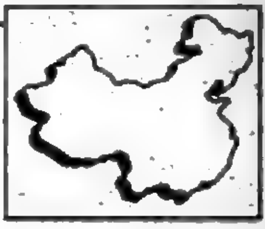

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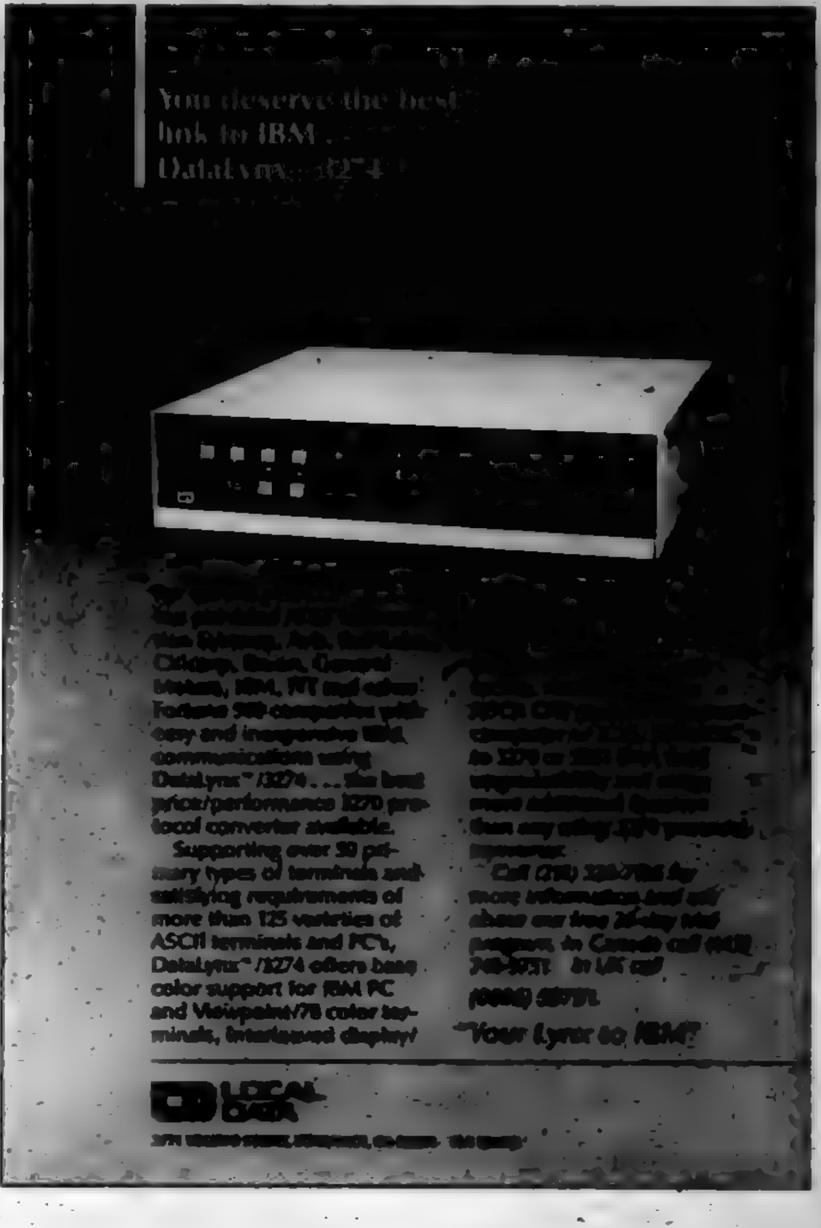

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personal computers, but the company just never marketed them.

At the time, the organizational model rejected the cost structure, the culture — everything about personal computers. The organization at DEC was aimed at a certain kind of machine, and anything that didn't fit that model didn't fly.

DEC actually did put a number of PDP-8s in people's homes. I had a time-sharing terminal in my home in 1966. Our children grew up programming on a terminal. For a long time it was a curiousity. Guests would ask; "What do you do with this thing? Why would you want one?"

The semiconductor gallery includes junked semiconductor boards, a 1970s rubylith mask and several important chips under a 50X microscope: a Mostek 4K-byte random-access memory, an IBM 64K-byte RAM, an NEC Corp. 256K-byte RAM and a DEC Microvax II processor chip.

I think the semiconductor industry people will throw everything away if we don't stop them. It's important to preserve their revolution because it's really been the basis for ours.

This exhibit gives a close-up of another lesson in technology. I feel the Microvax II is the best microprocessor chip or chip set made. It includes a one-chip VAX, a floating-point chip and memory management — it's a complete microprocessor. I came back to DEC partly to get the company involved in semiconductors. That was in 1972, and it took 13 years, but we succeeded.

Here's how: DEC produced what I call the first real computer before a semiconductor company produced a real computer by putting the VAX on a chip. I say the VAX is a real computer!

My criteria are the following: Does it have floating-point? Does it have a paging and memory management unit? And is the machine capable of being used to help design itself?

Now instead of being in competition with it, let's say I'm encouraging the semiconductor industry to build better microprocessors, because Encore is predicated on using lots of microprocessors to gain power. Our whole architecture rests on parallelism using a number of processors — a new computer structure called a "multi," for multiple microprocessor.

Our success depends in part on getting good components, so it's to my advantage to encourage the semiconductor guys to come through with good microprocessors. And that's beginning to happen.

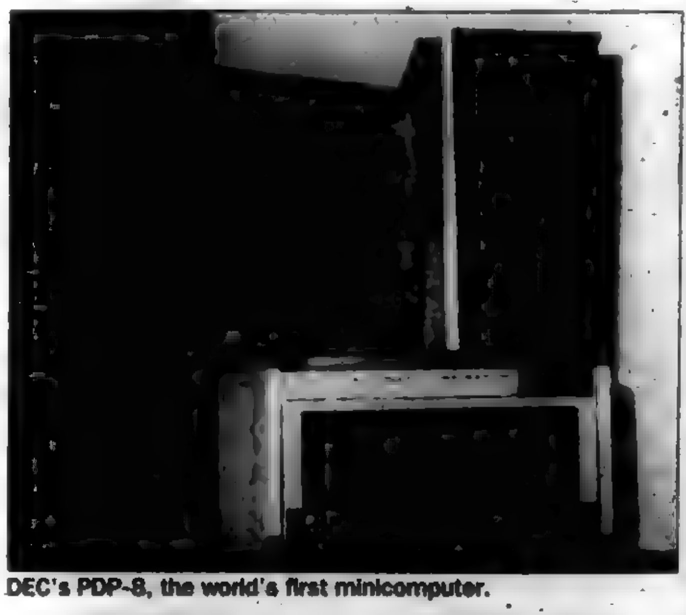
Despite Gordon Bell's official retirement from The Computer Museum board of directors, his interest in and proprietary sentiment for the museum remains lively. Even his necktie is imprinted with the museum's logo.

By 1990, my own personal goal for The Computer Museum is to collect every major artifact. We would need a bigger building, with enough space for storage and archiving. What I'd really like is to merge with the American Museum of Natural History and throw all the dinosaurs out. But I don't think it'll happen . . . it's not natural history!

Right now the goal is to increase people's understanding of the present and future, instead of focusing on history. The museum shows the incredible versatility of the computer. History by itself is too dry.

How do you measure a museum's success? You measure attendance and the attendants' response. But my own measure is the collection of artifacts, including the archiving of works and lectures by the pioneers.

One hundred or 200 years from now, I want people to come and say, "Gosh, I'm glad they saved all that stuff." By then they'll understand that information processing is one of the fundamentals of society.



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Encore's "multi" challenges VAX's price/performance

C. Gordon Bell helped found Encore Computer Corp. in July 1983 with the purpose of creating a new type of computer: the "multi." Two years into the project, he describes how the new product will fit into the ever-changing marketplace for powerful computer systems.

> **"**
>
> ***The multi provides substantially more computing power than any other machine in its price range. The architecture uses a common bus with several microprocessors. It's a very simple machine, built almost like a DEC PDP-11 with Unibus.***

At Encore, we're predicated on making computers out of the current microprocessor technology. We will use microprocessors as the base-level component to build bigger systems. We call our computer the "multi," and I claim it's a new machine class.

If you look at computers in terms of technology generations (see chart below), integrated circuits caused the birth of minis; microprocessors and memories led to personal computers and workstations. Ultimately, they will also lead to multis. If I'm right, in five years everyone will build that way.

Over the last few years, a line of [transistor-transistor logic]-based machines has come out that show a 15% per year compound performance increase. [Emitter-coupled logic (ECL)]-based machines' performance is roughly two to three times higher than that. Of course, you can make bigger ECL machines, like Cray supercomputers and so on, but I'm speaking of maximum minicomputer or mainframe product lines.

The Microvax II has roughly the same performance as the VAX-11/780, on a MOS and Cmos technology line. These MOS-based machines show about a 40% to 50% per year increase in performance.

But performance scales don't show the other dimension: cost. The Microvax II contains two chips, whereas the 11/780s might use 20 boards to achieve equal performance levels. So the Microvax obviously has higher performance per dollar by probably two orders of magnitude. The multi will do even better.

Machine classes come out of price ranges. The mini is what happens when you operate a machine yourself for a group. A mainframe is something that you get somebody else to operate, so it's a service. A supercomputer is often a regional machine, so it's a resource that either a few people have or that you operate for a region.

Mainframe costs cover a range from several million dollars down to $400,000. The mainframes' gradual price increase just reflects inflation. Prices haven't gone up, and there's no real push for them to go down. Companies aren't looking for lower prices when they buy new computers because they're already committed to a certain price range. They're looking for more performance.

The minicomputer came in at the $10,000 level in the 1970s. There were 100 mini companies in that period, of which seven survived. Then the personal computers and workstations were introduced at even lower costs, based on microprocessors. I'm predicting the multi will be a mini-class machine.

The multi provides substantially more computing power than any other machine in its price range. The architecture of the multi uses a common bus with several microprocessors, which connect with memory. I/O runs off the same bus.

It's a very simple machine, built almost like a DEC PDP-11 with Unibus. If you build a computer that way, you can put a great deal of processing power into a very small area and build it much more cheaply than mainframes or minis.

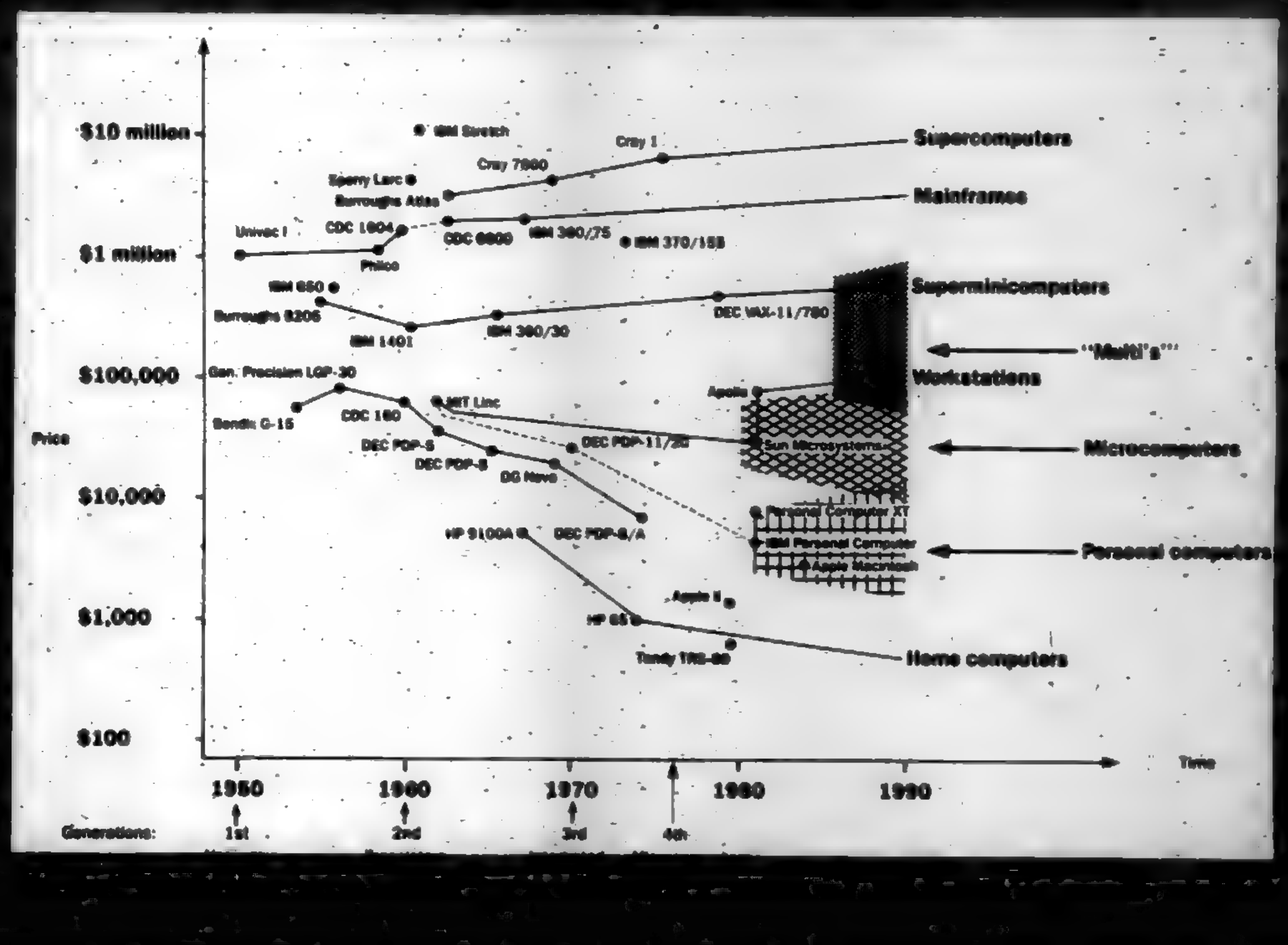
In fact, if you look at the resulting price/performance, Encore has a machine that starts at about $100,000 and goes up to about $400,000. Our first product offering is modular — you can add processors for additional speed and power. Performance goes up to 15 million instructions per second (Mips) in a straight line — sort of 1.5 Mips per card.

Compare that with the VAX family, which goes up to about 5 Mips with the 8600, at many times the cost. I believe we'll be able to deliver more power in one box. Our own bus can sustain operations of 100 Mips.

One factor in our development was that every time you want to create a new computer architecture, you need a new organization. In retrospect, that isn't why I started a new company, but it's turned out to be helpful.

At DEC, I tried to say "we're going to predicate our future on multiprocessors," but I had only a minimal effect, even though I had personally been involved in eight multiprocessor computers over the last 20 years.

The question still ahead of us at Encore is, how do you program them? How will users get the maximum power out of a structure like that?



Encore positions the new "multi" computers above workstations and personal computers.

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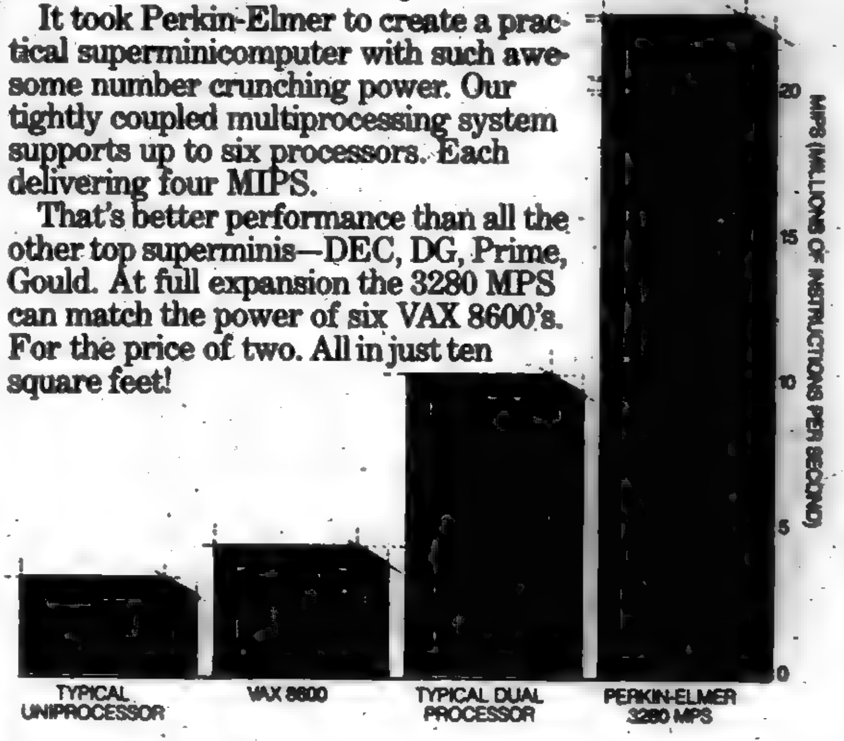

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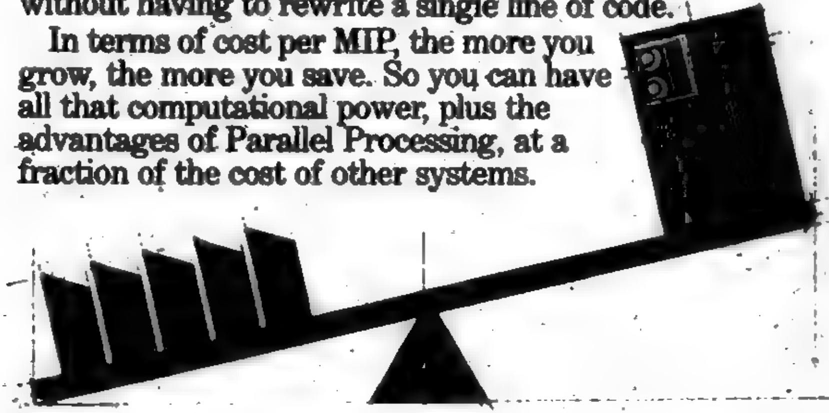

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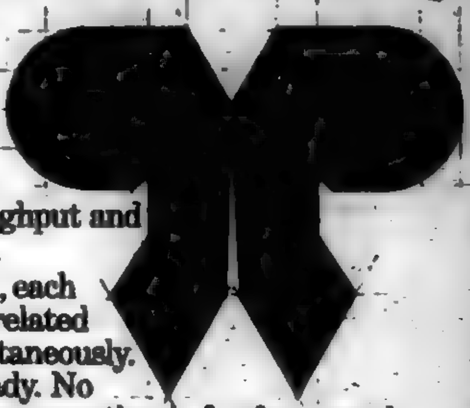

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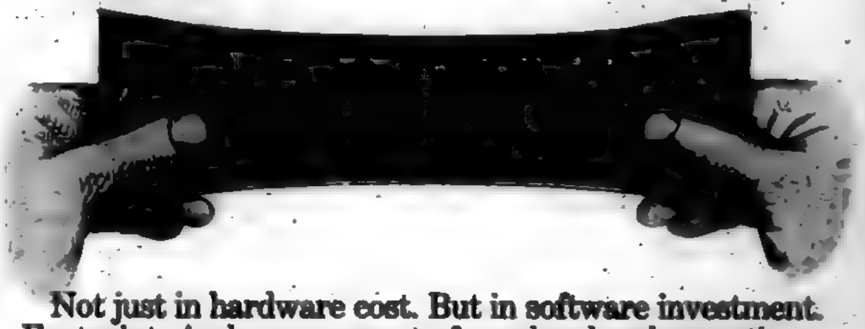

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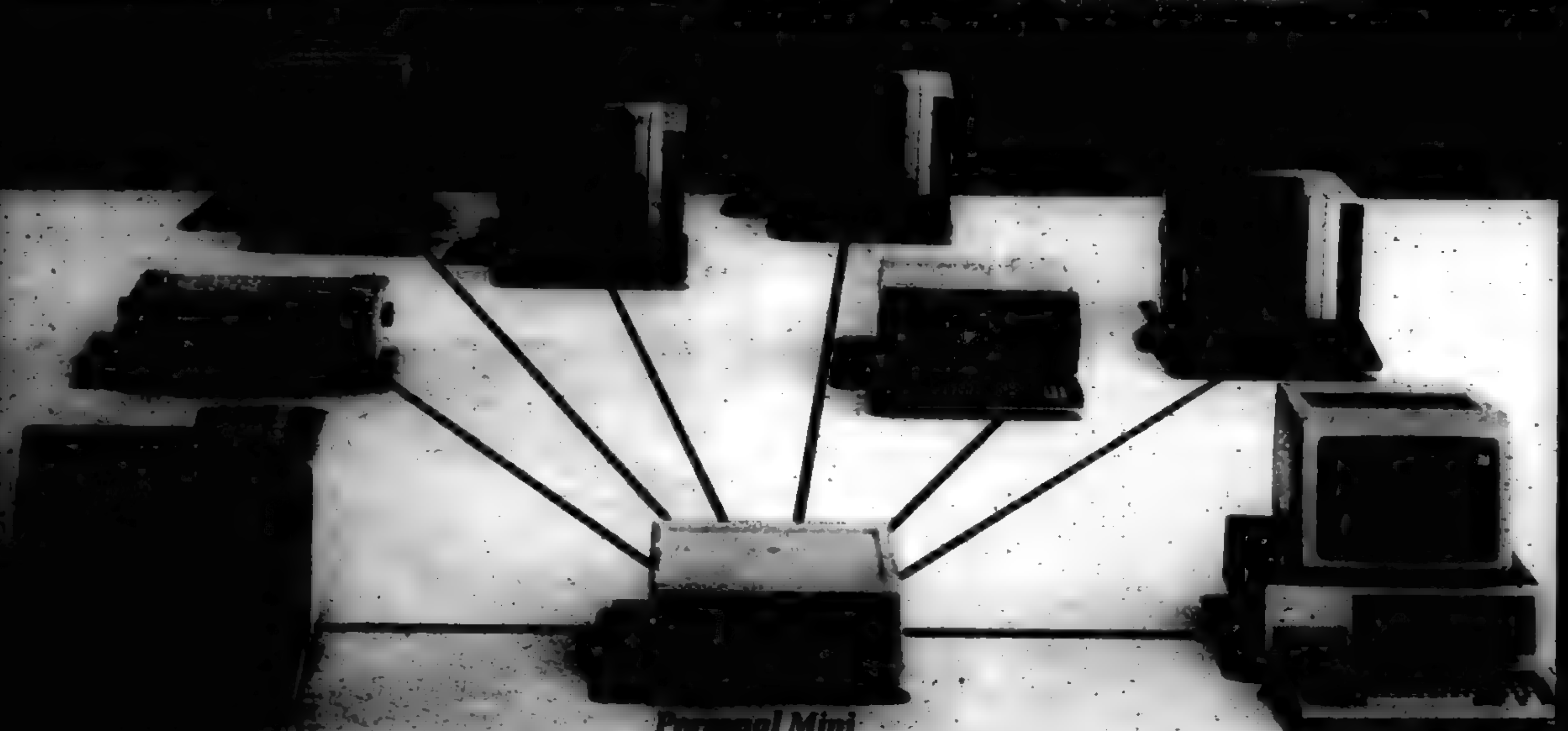

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MAKING CHANGE

By Daryl Conner

It's not enough to design a new system or install new machines. DP must create the environment for change that makes the new technologies work.

An abysmal number of new technologies fail to live up to their productivity potential or fail completely simply because users aren't comfortable with change.

The obvious truth is that people are creatures of habit, scared of anything that jars their sense of balance, upsets their sense of control or disturbs their sense of purpose — exactly what new technology often does. As we continue into the information age, the consequences of not adjusting to change are grave.

Corporations studying the impact of new technologies find repeatedly that resistance, sluggish acceptance, "garbage in/garbage out" and outright sabotage cost millions of dollars. This mounting evidence shows that MIS/DP professionals, whether working for software or hardware vendor firms or inside a user company, are increasingly judged on more than an ability to design, build, install or acquire a fast, accurate machine. These professionals must also help motivate others to use the technology to full advantage — a task easier said than done, as I have discovered in more than 10 years of advising Fortune 500 companies, state governments and the U.S. military on implementing organizational change.

Most people don't dislike or resist technology, at least not to the extent portrayed in current literature. What they generally fear are the changes technology imposes on their lives. "What will this do to my job, my security, my authority, my access to information, my relationships, my values, my life?" These concerns often lead to resistance.

Resistance need not be a malignancy. In fact, it can be viewed as an ally — a tool, which in skilled hands can facilitate technological assimilation. Many within the technical community already have become consciously competent in dealing with human responses by learning the dynamics of change, why resistance occurs and how to use it to augment, not hinder, production.

There are, however, still far too many who can only be categorized as unconsciously incompetent. They don't know that techniques exist for easing the transitions people must make when faced with new technology. Because they are prone to implement change in a manner comparable to a bull in a china shop, these people frequently precipitate disaster.

There are those who comprehend the discipline and effort required to help people adjust but who still don't follow through because of a lack of time or money, political support or other resources. These managers know they must make adjustments because they have not appropriately applied the ground rules for managing change.

Finally, there are those who through superior intelligence, luck, cunning or just seat-of-the-pants common sense, are fairly adroit at human relations. Their skills — learned by trial and error — are often unconscious; not a thought-out methodology that can be taught others; so application is frequently inconsistent.

DEC's story

Marvin Collins and Kathe Tortorice of Digital Equipment Corp. were in this latter, unconsciously competent category when they approached me two years ago. They exemplify how change management can be implemented inside one of the most successful high-tech companies.

By the time I met Tortorice and Collins, the two had begun to wrestle under control a massive, cross-departmental, multifunctional change. As a team of change-oriented managers for DEC, they had figured out that major change is a sophisticated process, not a simplistic event.

They understood that every change can be designated and understood by three states: the

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Daryl Conner is president of Organizational Development Resources, Inc., an Atlanta-based firm that provides organizational consulting and management/supervisory training to a variety of clients.

present state — the way things are now; the transitional state — a time of ambiguity and stress when people must relinquish old habits but haven't totally grasped new ones; and the desired state — the way we want things to be.

Tortorice and Collins wanted more information on how to plan for and move through these stages in environments where players and variables are numerous and complex.

Pivotal roles

They were, for instance, unfamiliar with the universality of the roles in any major change, even though they had seen them in action in their own company. They came to learn that every change effort involves the following three roles, which at first glance seem simplistic but which are pivotal and often complex in the ways they mesh.

Sponsors possess the organizational power to legitimize change. Even in the most unstructured organizations, major change is impossible without them. Generally, the term applies to upper level managers, who may not understand every detail of what they authorize.

Targets must learn new behaviors, skills or knowledge because of a change. They must accept, adjust to and use the technology.

Agents are go-betweens, assigned by sponsors to implement change.

These roles can and often do overlap. A senior officer, for instance, sometimes plays all three parts when pushing for a decision support system that he must also learn to use.

Role entanglement

The intertwining of roles can run amok. For example, when a sponsor tells MIS/DP personnel to force others in a company to use new equipment, sponsorship responsibilities are being pushed downward.

MIS/DP may grab at this opportunity, thinking it means more power, but a year later everyone may be wondering why the new system has failed. By failure, I don't mean that the system doesn't work. Unless people incorporate computers into their daily routine, all of the grand calibrations of productivity increases go out the window. Sponsorship cannot be delegated.

What is needed is a sponsor who is willing to tell targets, "Watch my lips. We've asked MIS/DP to install the system and teach you how to use it. But make no mistake. MIS/DP is not ordering this change. I am. If you have any problems, come see me."

At other times, the roles of target and agent must be assumed by the same person. The sponsor goes to a MIS/DP manager and says, "I want everyone, including you, to start operating this way."

A breakdown can result because the sponsor has forgotten that the MIS/DP manager is, first and foremost, a target who may resist the change. Until that manager supports the new way of doing things, he will have a hard time selling others on the idea.

Even the role of sponsor can itself be split in two. The distinction falls between initiating and sustaining sponsorship. Initiating sponsors are high enough in the organization to force a project into motion; they possess the power to legitimize change but don't always have time to ensure the change process is completed successfully — and on schedule.

> ”
>
> *What is needed is a sponsor who is willing to tell targets, "Watch my lips. We've asked MIS/DP to install the system and teach you how to use it. But make no mistake. MIS/DP is not ordering this change. I am. If you have any problems, come see me."*

Thus, sustaining sponsors are required: managers without the power to initiate change but who are close enough to targets to stay on top of the change project once it begins rolling. They have the logistic, economic and political proximity to maintain the momentum.

The change process is not unlike an ocean liner, which needs far more power in the first lurch away from the dock than in maintaining a speed of 15 knots.

Pyramid effect

Successful change begins by initiating sponsors treating potential sponsors below them as targets. Once these targets become committed to change, they become sponsors who again treat others below them as targets.

The new targets are converted into sponsors also, and so a pyramid of support is built all the way to the assembly area, the section or the branch office — in other words, to the sustaining sponsors at the implementation level.

Without this attention to development of sponsors, many strategic decisions disappear into a black hole somewhere several layers down in an organization, and no one can ever seem to put a finger on exactly what happened.

One other role should be mentioned — the advocate. Advocates want to initiate change but can't show sufficient sponsorship power. I mention the role because some people assume they are sponsors when they are not.

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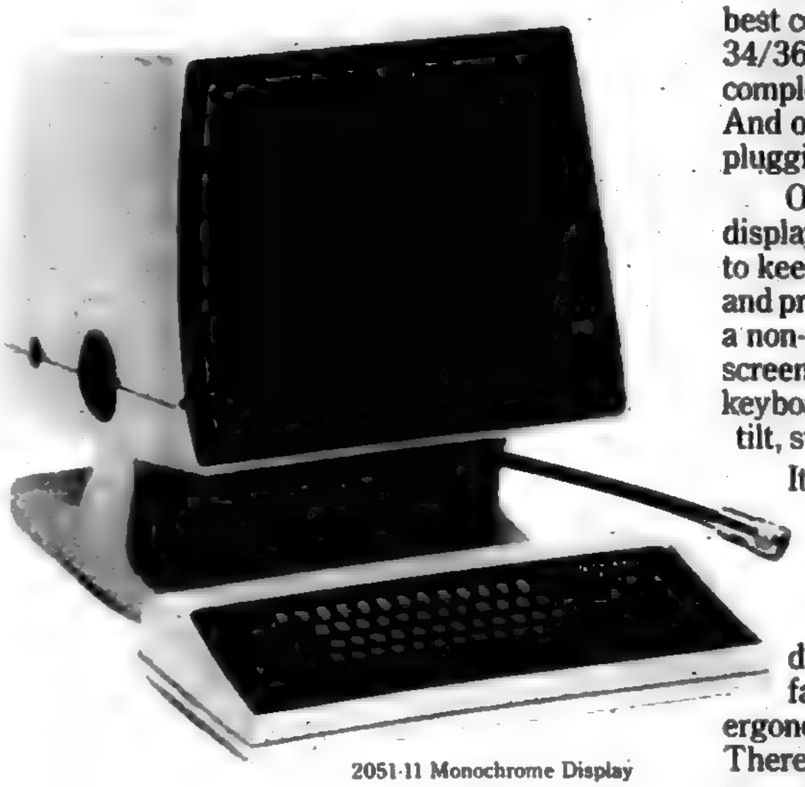

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These role definitions were part of what Collins and Tortorice took back to DEC after their initial training.

Commitment in stages

Before any technology is introduced or any other change is initiated, people must come in contact with the idea that something new is percolating, possibly ready to burst on the scene. Preparing people for change does not end here. It is amazing how often people hear about a proposed change (or glance at a memo), and the information goes in one ear and out the other. The idea doesn't stick.

Skilled change agents know that for preparation to be complete, people must be made aware of the proposed change: "Hey, this is serious. Something new is on the way." Only then will people grapple with what the change means to them.

Later on, confusion could be a sign of resistance, a deliberate smoke screen raised to mask noncompliance. Agents or sponsors, however, make serious tactical errors if they don't perceive early confusion for what it is — simple misunderstanding — which is one reason clear and precise communications about new technology are so important.

Assessments

Once people begin to understand the ramifications of a change — why it is being introduced and what will happen because of it — they weigh the pros and cons.

Individual assessments of new technology are always a jumble of positive and negative judgments, amplified or diminished according to fluctuating moods: fear and hope, anxiety and ambition, ego deflation and inflation. These judgments radiate from individual views of reality, scrambled and shifting in every person because of their mix of emotions, philosophy and manner of analytical thought.

The best expediters of technological change are adroit at perceiving these reactions and accentuating the positive. If negative judgments predominate, resistance occurs — either overtly or in the hidden recesses of the mind; either can hamper the installation of new technology.

If positive perceptions dominate, people can decide to support installation. An actual willingness to give time, effort and other resources to installation is a big step, a threshold that, once crossed, is the first real sign of commitment. In fact, there are various stages of commitment.

As everyone involved with technology knows, early commitment is often ephemeral. Just as newlyweds bask in the glow of a honeymoon, employees in the early stages of change exhibit "uninformed optimism."

Only later will they begin to spot the bugs in the process, just as spouses discover each other's flaws. I call this awakening "informed pessimism" — the cracks in the new system become apparent. Let that pessimism mushroom enough, and people will begin to "check out" mentally, either secretly or overtly, and enthusiasm fizzles.

Without expert coaxing, employees will generally not talk to management about their disgruntlement. Such resistance after installation is, of course, more serious — and costly — than that which occurs before.

Resistance as change

Still, the skilled practitioner recognizes that resistance is an inevitable part of the change process. Instead of browbeating resisters into submission, open discussion of resistance is invited, the cause is analyzed and the information used to fine-tune the new system, which can turn pessimists around toward a more realistic, optimistic view.

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> *The skilled practitioner recognizes that resistance is an inevitable part of the change process.*

A thorough understanding of resistance leads to informed decisions on whether to continue the implementation. Assessment techniques and other written materials are available for gauging the type and extent of each of the many possible grievances. Some typical reasons for discontent include the following:

- People don't understand the purpose for technology, or they don't think the purpose is valid.
- They've changed their routine, or they are learning additional skills or working harder and longer without adequate incentives.
- Once they felt comfortable and successful but now are struggling to learn new ways, worrying perhaps about losing their job, their autonomy, influence or power.
- Barely able to keep up before installation, they think the new technology requires even more speed from them.
- They don't trust or respect those sponsoring or implementing the change.
- They see the equipment as hazardous or painful.
- They believe efficiency will plummet.

Decisions to maintain the new technology for long enough will eventually make it part of established procedure, sanctioned by the entire culture. When that happens, top management has provided its highest level of commitment. A formal sponsorship is no longer needed because organization expectations and momentum take over; accompanying procedures can't easily be scrubbed.

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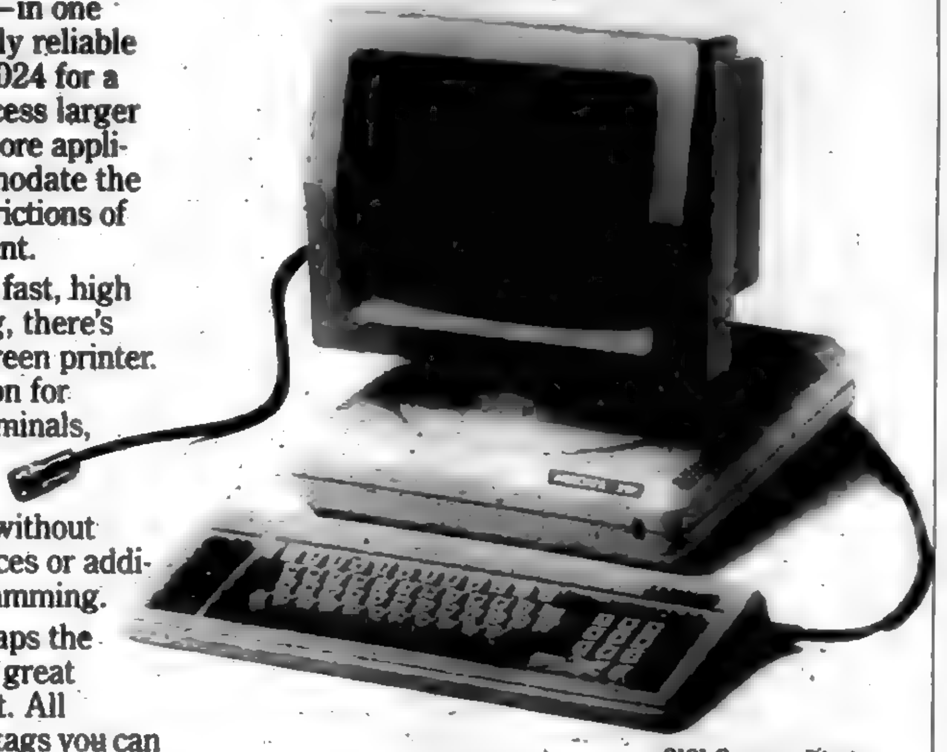

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No longer a deviation, the new norm is bolstered by rewards and punishments designed to perpetuate it. Unfortunately, even at this stage, employees may continue to drag their feet, mimicking suitable behavior while their wills pull in other directions.

"Mach 2" commitment

Targets and agents can reach the highest form of commitment only if their own interests, goals and beliefs are served through optimum functioning of technology.

This "Mach 2" commitment, which I call "internalization," is contagious. It blossoms when employees believe they are doing something worthwhile and have a say in designing new procedures or molding technology to their own specifications. Thus, they have a stake in advocating the technology because they are, in a sense, praising themselves. They don't sit back as easily and say, "I could have told you what was wrong, but nobody asked or bothered to listen."

I don't mean that lower level employees run the show. When that happens, there is revolution and chaos. Creative participation reaches a zenith, however, when targets receive clear, accurate information about a change; are considered to the extent possible in planning and execution; and are rewarded for enthusiastic participation and input.

One further warning: Individuals pass through change stages at different times, intellectually and emotionally, leading to mixed signals, starts and stops. The skilled change agent learns to decipher when emotion and intellect clash.

While the various stages as a rule must be passed through sequentially, a sponsor can skip them by decreeing that the new technology is now part of established procedure, or "institutionalized," and that everyone who doesn't like it can leave.

The dictatorial style meshes nicely with that of many traditional technicians whose attitude was, "If users can't learn to operate the equipment, it's not my fault." Nevertheless, I am the first to say that jamming change down employees' throats and dictating behavior are sometimes appropriate.

> **"**
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> *Jamming change down employees' throats and dictating behavior are sometimes appropriate. This authoritarian approach, however, always costs in poor morale, firings and divisive management-employee friction.*

The authoritarian approach, however, always costs, often massively, in increased monitoring of employees, poor morale, firings and divisive management-employee friction.

Change at DEC

Collins and Tortorice took this knowledge and information from our initial training and inserted it into their own model for changing whole levels of the bureaucracy in a company where high-powered, fiercely independent and creative people feed off each other at breakneck speed. Irrepressible change is the norm at DEC.

Collins and Tortorice applied their thinking first to an attempt to alter DEC's order administration, the step-by-step process in which an order is taken by a sales representative, scheduled and matched with the manufactured product delivered, along with an invoice to a customer. Previous attempts to tamper with the process had resulted in unexpected confusion. This process cuts across several independent departments that had to be involved in the change to achieve the desired impact.

The team decided the first step was to convince those planning the change to concentrate on the specific work or jobs they thought should be transitional. The team wanted managers to analyze in detail "what work is being done now, what work needs to be done in the future and what transition steps are needed so that work continues in the interim," Tortorice explains.

Regrettably, planning sessions often degenerated into discussions about organization, not work. As Collins put it, "As soon as somebody started to talk about change and everybody prepared to jump on the change boat, anybody who was to be affected by the change would get defensive and want to reorganize to protect their work segment. We had to slice out and separate discussions of what the work is and who performed the work from talk about who managed the work."

Adds Tortorice, "One of the reasons you must have a discussion about what the work is today is that in a company growing 30% a year, most people don't have time to document what today is or was. You are at great risk when you change something but don't know what it is."

Focus on work

By concentrating on work, the two downplayed bickering and confusion and were able to help a diverse group of middle managers define the particular work they were examining as a series of 20 steps. The managers then used Tortorice and Collins to help gather more details about the work by dropping down the organizational ladder to ask questions.

At each level, they quizzed personnel to learn as much about the work as possible. They knew to drop down another notch in the organization when people began answering a question with "I think that's the way it is."

Finally, by questioning employees lower in the organization, Collins and Tortorice found that what middle management perceived as a 20-step

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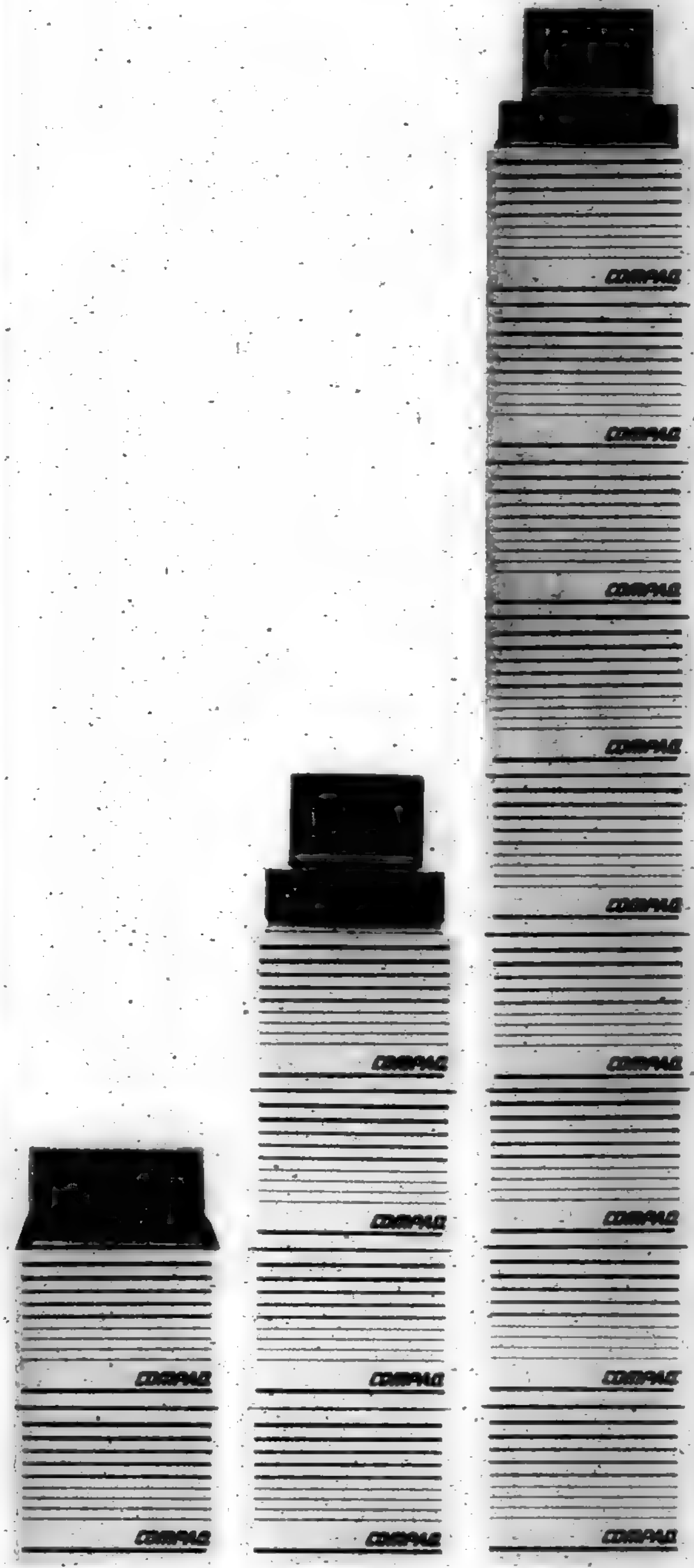

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job really involved almost a hundred steps.

They began "cascading backward" these learned details through the structure, taking them to higher levels of management and making it easier for management to know exactly where change was needed and its potential effects.

Collins cites as example an order for DEC hardware: "The order may have a problem with it because of the technical nature of our products." Employees won't let the order sit idle. They move it off the official flow toward someone who can fix the problem.

"This informal flow is predictable. Every time an order has a similar problem, it will follow the same informal flow until the defect disappears." The order will then return to the formal, planned sequence.

Formal vs. informal

Managerial decisions are often based on the formal sequence, which, Collins and Tortorice note, is just the skeleton of what is actually accomplished. "The insidious thing is that you end up constantly trying to get productivity improvements on the work you can see," Collins says.

"Managers often go after the formal piece, correcting deficiencies there and making it more efficient, when there is this whole chunk down there that isn't being touched," Tortorice says, adding, "That informal procedure is where the major gains are to be made."

Only after managers thoroughly discuss and understand the particular work being done and how it needs to be changed will the conversation shift to organization. Questions that arise include the following: Who are the managers involved today? Who owns the work? Who manages it? Who do you want to own it and manage it in the future? How do you make the transition?

In the next step, systems are explained — whether the work is accomplished through machines or manually. For instance, most companies build work around computer systems. Collins and Tortorice want to do the exact opposite.

"What generally happens is that systems are built, and then the systems begin to define the work," Collins says. "Work, however, is dynamic. The risk of building a system around it is that work is always changing and migrating, making systems quickly unsuitable.

"Inflexible systems lead inevitably to informal work because things can't get done through the systems, through the hierarchal chain of command," he adds.

"The final piece in the model is to identify the means of measuring the particular work," Tortorice says. "Many people change the work but not the measurements; therefore, the behavior stays the same. Changing measurements and integrating them into the work is the lasting way to ensure change stays."

Milestones

At each stage of planning, Collins and Tortorice carefully monitor that milestones are established so that the change can be assessed.

"You develop a picture of today, and then you have milestone one, milestone two, milestone three, milestone *N*, until you eventually get to the new future," Collins explains. This breaks a massive change into manageable chunks so movement can happen over time and be altered as new data is acquired.

If at any point the milestones aren't reached, time schedules and deadlines can be moved back, something that happened several times in the initial DEC project. As in every aspect of their job, when it comes to timing, Tortorice and Collins endeavor to supply management with as many facts as possible.

"We make it a point to get the evidence so that when managers choose to stick with a date for completing the change, they understand the risk involved," Tortorice says.

Using their model, Collins and Tortorice helped bring to successful conclusions this first project and several others since. Their triumphs prompted them to encourage their staff to become certified instructors of change programs. Using these subordinates, Collins and Tortorice now train operations employees to plan and manage major change, a task at DEC normally reserved for staff personnel.

Individual managers assign problems to operations personnel. They work on the change for a while, developing a sense of the difficulties involved, and then are taught change management skills by Collins, Tortorice or one of their certified subordinates.

Environmental impact

The federal government requires an environmental impact statement before a dam is built. Businesses often throw up a "dam" of change and then see how much damage is done.

In the sessions at DEC, the in-house instructors go over procedures for planning change, such as how to analyze sponsors, agents and targets to determine whether they have skills and desires that will augment or retard the proposed change.

In effect, the trainees learn to draw up an environmental impact for change. Without adequate sponsorship, change agents are faced with choices to either train existing sponsors, find additional or new sponsors or prepare for the technological change to fail.

Also taught are the different forms of communication and how to optimize their use. Some people are unfazed by a so-called "charismatic message" because they respond primarily to cold, hard facts. Others are best motivated by their emotional response to the message giver or because they are thrilled by ultimate organizational purpose. Still others turn a cold shoulder to grand theories, succumbing instead to messages that specify how to get their job done.

Participants in these programs also learn the myriad forms of power and how to use each, the positive and negative attributes of various influence and managerial styles and what works best with different employees. Thus, in becoming change agents, these DEC employees are forced to consider strategies and tactics before any change effort begins.

Participants also come in contact with a spectrum of approaches to resistance and when to use them, as well as how to promote synergism between divergent groups that must work as a team in a change effort.

As change agents, they learn how to modify the frame of reference of those resisting the change. They learn that resistance in most targets stems from different sources than does resistance in managers, who must take into account logistical, economic and political restraints.

Rules don't apply

This approach to managing organizational change is not presented in inflexible rules. Major change inside large corporations is too complex to lend itself to a set of regimented steps adhered to every time.

Rather, managers learn general principles and a matrix of possibilities that fit in different ways, depending on the variables. There is, however, one definite rule: The more a change disrupts an employee's routine and the more significant a change is to the company, the more important commitment becomes.

Collins and Tortorice are now in a third stage of training — learning to be internal consultants to anyone at DEC who needs assistance. In this process, they review the latest information on effective leadership — how to elicit the utmost in creativity, enthusiasm and productivity from others.

They delve into the intricate relationship between a company's culture and change projects (how to analyze and document a culture's impact on a change and how to manipulate the

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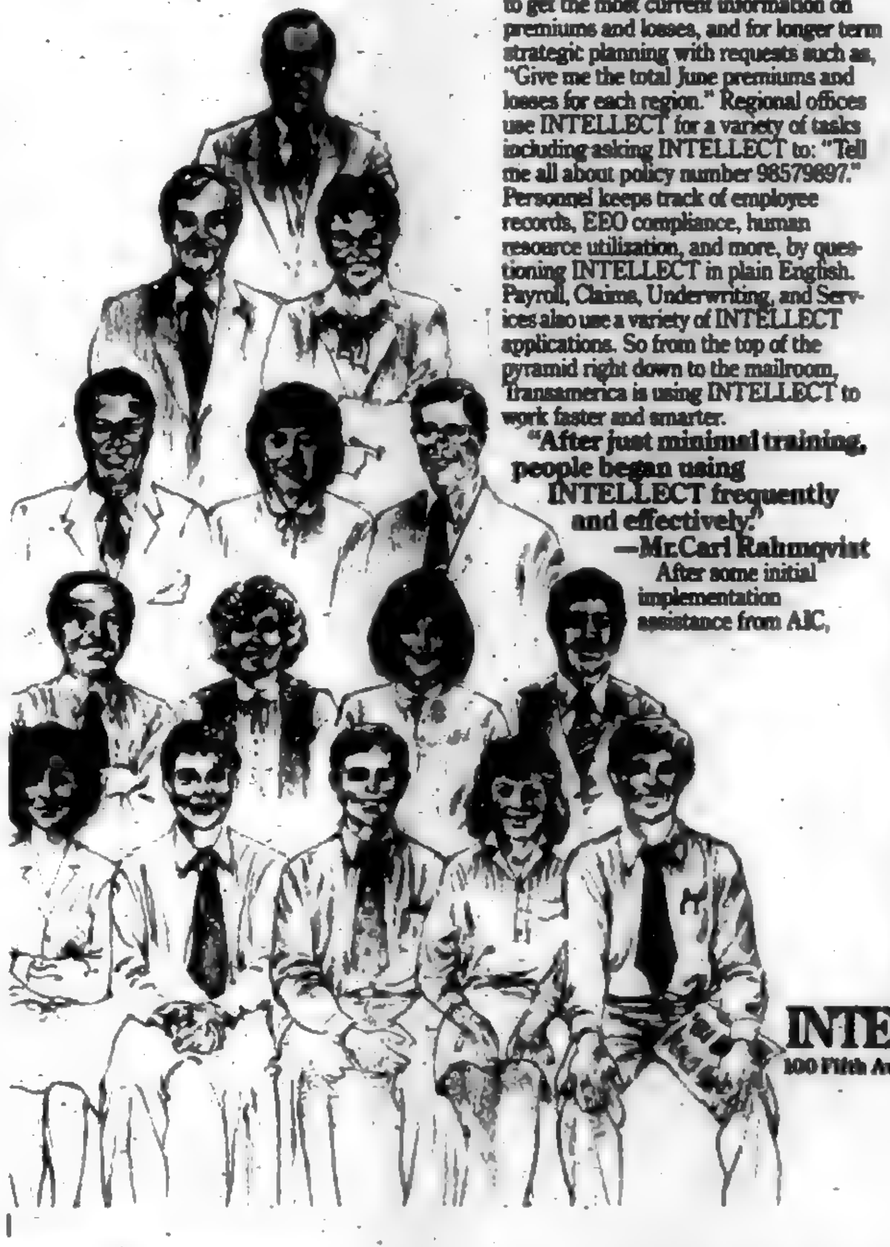

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> *'In computer installations, you don't sell it and walk away; you have to support it. You've got to maintain a relationship, a rapport and, most important, your reputation.'*

culture to support proposed changes). Thus, they gain further insight on how to remold the entire context in which employees view a given situation so that shared meaning and goals can be built.

Meanwhile, they continue to interact with those inside DEC who completed their initial change management training. When these new change agents hit a snag, some problem they don't know how to handle, they forward their questions to Collins and Tortorice.

Likewise, when Tortorice and Collins encounter a new situation, they explore it in periodic brainstorming consultation sessions with me. Doing so keeps all of us on the cutting edge. Whenever I meet with Collins and Tortorice, I learn as much as they do about the evolving science of change management.

The same thing happens when I meet Wally Gramling, vice-president of information systems for Cotton States Insurance Co. When Cotton States developed sophisticated software that could be sold to other insurance companies, Gramling was also named president of the company's new subsidiary, S.T.A.T.S., Inc., formed to handle sales.

Culture shock

In that position, Gramling — who has installed computers in manufacturing, health care, general professional office and now insurance companies — realized that resentment against technology can boomerang against the software and hardware manufacturers when promised productivity gains don't materialize.

As he puts it, "In every case in which I've been involved, and in particular when it was a situation with first-time users or where large groups of people were affected by the technology, there was quite a bit of culture shock.

"You can install the exact same system in two different locations, and one will be totally successful and the other an absolute disaster, depending solely on the people involved, their personalities and whether they accept or reject the new system," Gramling explains. Therefore, he offers to teach change management skills to potential customers to enhance the attractiveness of his products.

After the sale of software, customers who choose to learn those skills can, according to Gramling, "better understand their role in making the computer system work and better equip themselves to deal with the changes that technology will cause. Then you've got a better chance for a successful installation.

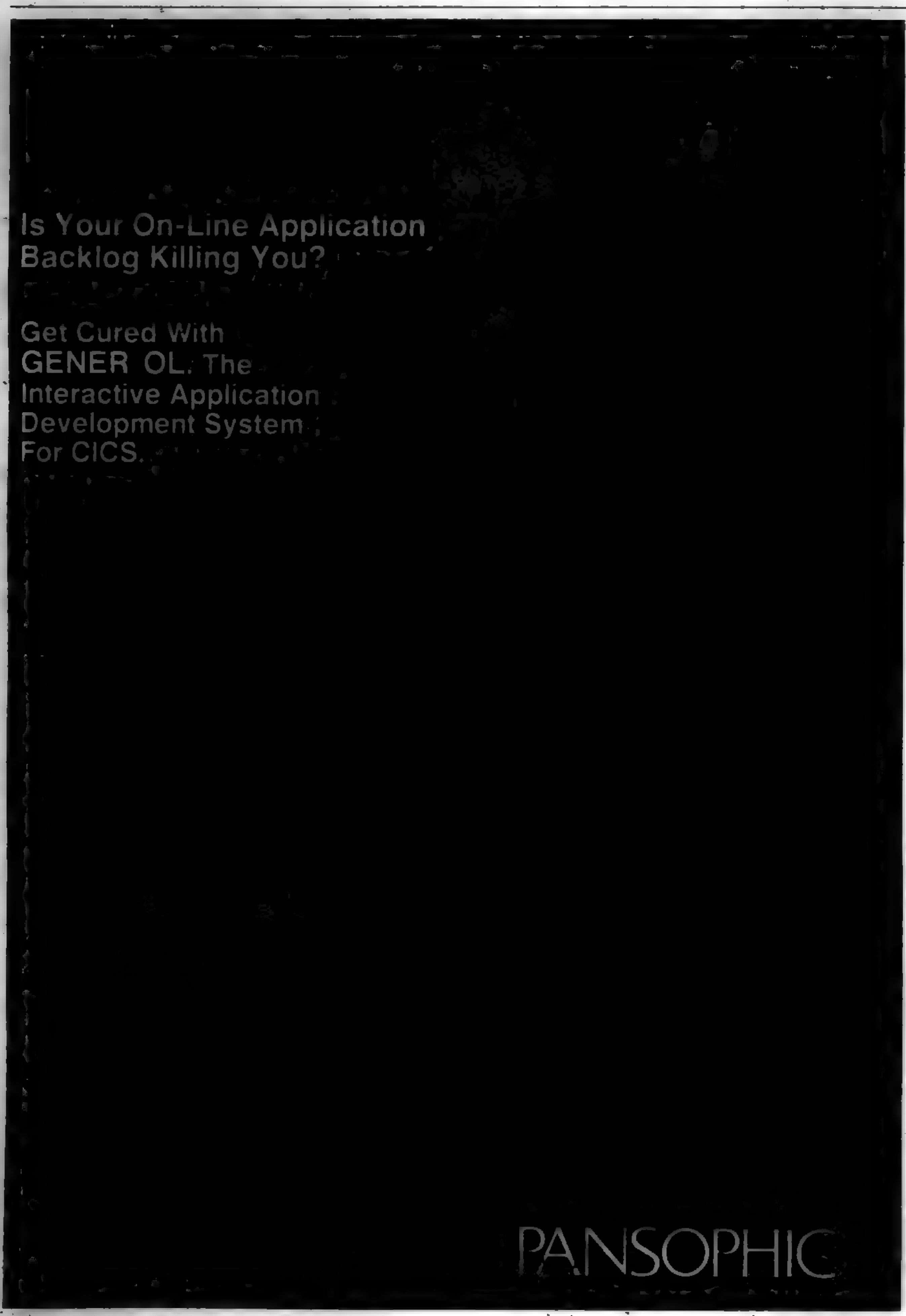
"In computer installations, like anything else, you don't sell it and walk away; you have to support it. You've got to maintain a relationship, a rapport and, most important, your reputation."

Change and revolution

Thus, while the speed and complexity of technological change is outpacing the human capacity to adjust — producing intense resistance — there are numerous success stories.

Users are more sophisticated, increasingly demanding that the MIS/DP and vendor communities understand human foibles, complexities and fears. A revolution has commenced.

As with all revolutions, confusion abounds in the early stages, along with mistakes. Our knowledge of the human ingredient is still a fledgling science. Strides — giant ones — are being made. They nurture the hope that people and technology can coexist harmoniously.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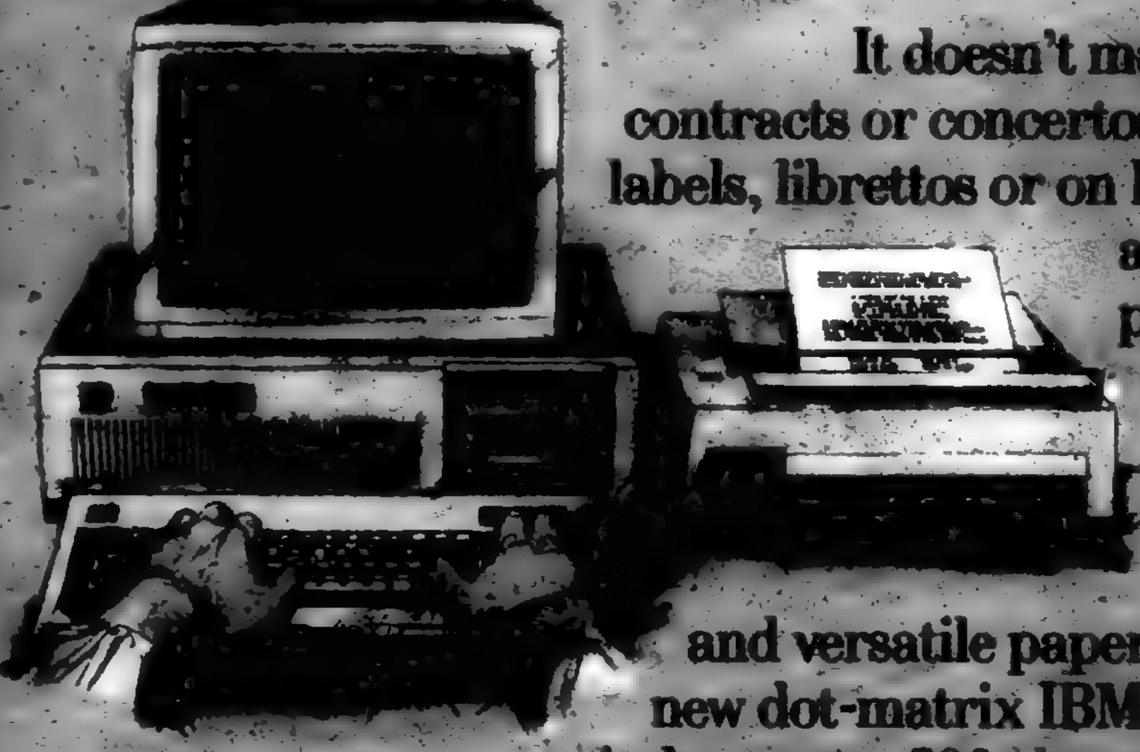

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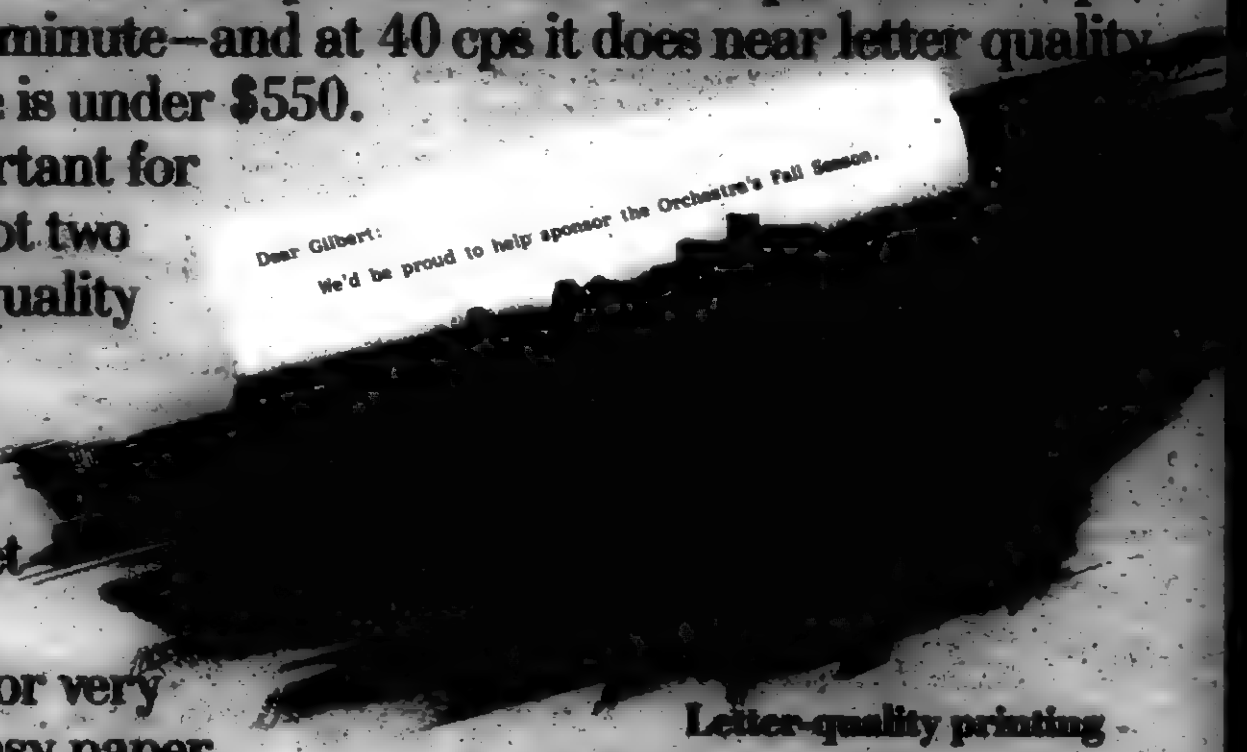

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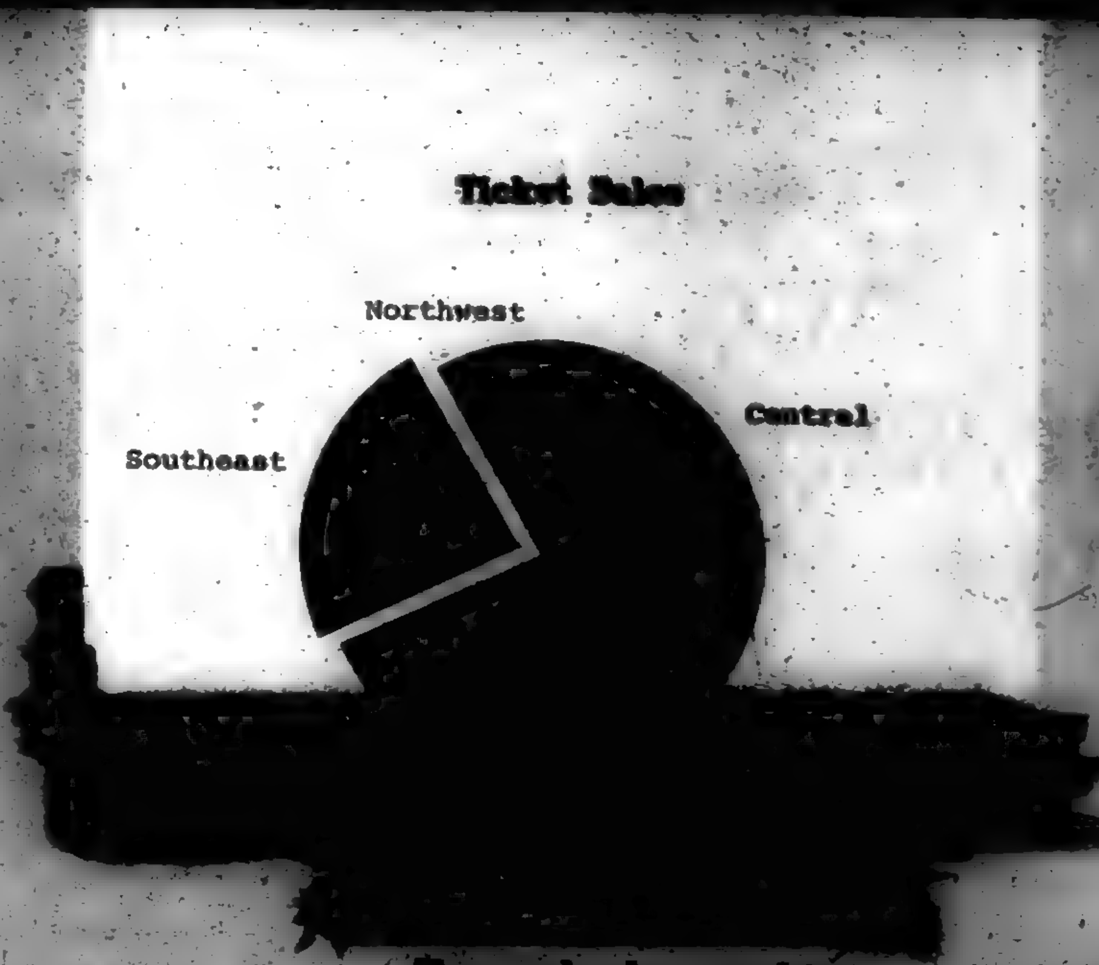

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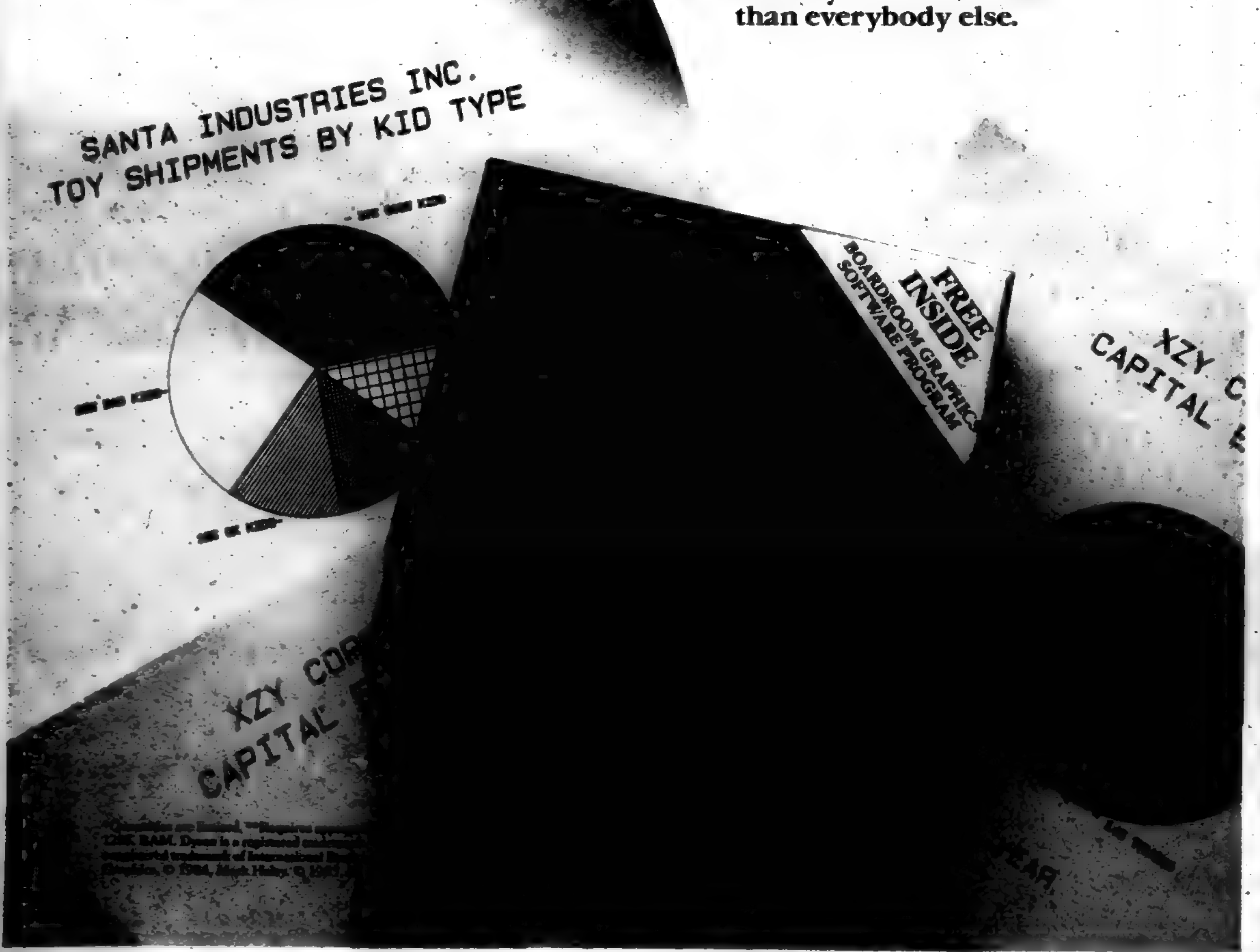

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IN DEPTH

Fourth-generation languages: from backwater to mainstream

By Richard Cobb

The only definition that fits all the products is, "A fourth-generation system is one that improves productivity by providing users with capabilities that are thought by the system's authors to improve productivity."

By all reports, Cobol is still alive and well as the mainstream procedural language for business information processing. An increasing number of Cobol applications are still being developed, but nonprocedural, fourth-generation languages now are being developed and at a much faster rate. In many instances, these languages are supplanting Cobol for new applications development.

Computer languages share one purpose: enabling people to talk to computers. In 30 years, these languages have already passed through three generations into the fourth. We went from machine languages to assembler languages to procedural languages, such as Fortran, Cobol and Basic, to nonprocedural languages — the fourth generation.

One of the most frequently asked questions today is, what is a fourth-generation language? There is, of course, a proper definition. But since all vendors want to say they have a fourth-generation product, the only definition that fits all the products that claim to be fourth-generation is as follows: "A fourth-generation system is one that improves productivity by providing users with capabilities that are brought by the system's authors to improve productivity." This definition, of course, doesn't say much.

PHOTO: PETER VANDERWARKER/STOCK BOSTON

True fourth-generation languages, however, share some characteristics. The first is that they are not Cobol; they all make a true break with the prior generation. Also, they are basically nonprocedural, the word that best characterizes this kind of language.

A procedural language is one incorporating the characteristics developed by John von Neumann in Princeton, N.J. Primarily, a procedural language requires its users to perform two major functions: Users must define what they want the computer to do; and they must define the flow of the program.

Nonprocedural languages

In a nonprocedural language, the concept changes. Here, users define only what they would like the computer program to do, while the nonprocedural language processor algorithmically keeps track of the program's flow. This division of labor leads to enormous increases in productivity.

Examination of a flow chart of a computer program will show about 20% of the boxes defining what the program should do. The remaining 80% defines how to keep track of the flow of the program. It is here the productivity of fourth-generation languages is reflected. By eliminating that 80% of the work, we should see at least a 5:1 productivity advantage in program development from that one point alone.

Another characteristic of nonprocedural languages is that they are user-friendly, a key concept, but one that is overused. User-friendliness

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Richard Cobb is vice-president of Martin Marietta Data Systems in Greenbelt, Md., and general manager of Martin Marietta's Information Technology Division. Formerly president of Mathematica Products Group, Inc., Cobb was the principal architect of the fourth-generation language Ramis.

means the user finds it easy to be effective when communicating with the computer. It should be stressed, however, that user-friendliness is what the user finds to be easy and effective, not what the author of the computer program says is user-friendly.

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> *Although there is still resistance to change, it is important for organizations to cope with change because success is achieved through change. Only organizations that respond to change will win. Change is the key to growth.*

Integration

The next common characteristic is a data base foundation that integrates the nonprocedural language. The data base manager should be completely invisible to the user, allowing the user to be free of the details of getting to and from the data base. But a data base foundation must, in fact, be there.

Additionally, the data base needs to have many common functions, all of which are integrated. These common functions include report preparation, spreadsheet analysis, data entry, micro-mainframe communications, command languages and editors. All of these are menu driven and feature extensive Help facilities.

Until these integrated systems came along, organizations had to purchase a variety of software packages to maintain a range of functions. With the advent of true fourth-generation systems, however, all the functions are integrated.

The history

Between 1967 and 1975, fourth-generation languages were embryonic. During that period, there were pioneer developers and pioneer users. We then moved into what might be called a missionary phase. Then, from 1976 until approximately 1982, an active outreach began.

About 1983, fourth-generation systems began to enter the mainstream of data processing. Fourth-generation languages are just now starting up the steep side of the typical S-shaped curve of growth and product acceptance. They've been moving along the low curve for a long period of time; by 1989 we should see significant penetration of fourth-generation languages.

How are fourth-generation languages used? If they are entering the mainstream, they require a mainstream distribution. In one study of 800 Martin Marietta Data Systems' Ramis II users, the following breakdown was discovered:

■ Ad hoc inquiry	68%
■ Applications development by computer professionals	67%
■ Applications development by end users	53%
■ Information center use	46%
■ Decision support	37%
■ Application prototyping	29%
■ Other uses	3%

Because these percentages indicate what both individuals and organizations were doing, they add up to more than 100%. The survey shows different kinds of people doing different types of processing, a very mainstream distribution of DP today.

What kinds of applications were these people developing?

■ Accounting	22%
■ Financial planning	9%
■ Personnel/human resource management	13%
■ Materials management	7%
■ Marketing/sales	16%
■ DP management	13%
■ Administrative functions	5%
■ Other types	15%

Clearly, the industry has seen a tremendous amount of change as fourth-generation languages have moved from embryonic to mainstream distribution. Although there is still resistance to change, it is important for organizations to cope with change because success is achieved through change. Only organizations that respond to change will win. Change is the key to growth.

In much the same way that fourth-generation languages have evolved and are entering the mainstream, we can see on the horizon that these languages are going to be replaced by fifth-generation systems. A natural question, therefore, is, should I wait?

The answer is no. Most people seem to be getting a 12-month or less payback period from implementing a fourth-generation system. And replacement of fourth-generation languages is not going to take place in the very near future.

It's important, though, that organizations see the trend and be ready for that change, because it is going to come relatively quickly. Even a decade is a very short period of time.

Trends in development

Several trends will affect fourth-generation language development over the next three to five years, as we move from this generation through the mainstream and on to something else.

The first trend is a broadening functionality and tighter integration within computer software. The authors of the leading fourth-generation languages are putting increased effort into adding functionality and increasing integration of their products in an evolutionary way. The results are gains in productivity.

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IN DEPTH/FOURTH-GENERATION LANGUAGES

These authors are building on a firm foundation of data base management. They are adding consumer computing tools and applications development tools, which encourage intellectual ferment in companies.

On top of this foundation sit applications. An application has different characteristics, depending on whether it is to run in a batch, on-line, interactive, distributed or workstation environment. The trend is toward the expansion and integration of all these pieces.

Look at the new facilities becoming available for applications development. We are moving from third-generation languages, such as Cobol, to systems that manage transactions.

In any organization, some people are responsible for entering data into the computers. Data entry is commonly accomplished through CICS applications, using command-level languages that are designed to build applications — for example, Adds Online (from Cullinet Software, Inc.) or UFO (from Martin Marietta Data Systems).

Other facilities improving the development of applications include screen definition and management capabilities, report generators that help ferret information out of data and data analysis tools, such as spreadsheets or statistical software, that manipulate data.

The foundation facilities on which these applications development facilities depend include dialogue managers — the interactive management tools that aid users' interfacing with the system — and smart editors that have built-in intelligence.

Other foundation facilities include workstation gateways that are able to service the need for micro-mainframe links, including transfer of data; data dictionaries, both active and passive, which will help to manage the information resource; and external file gateways, which enable us to cope without having localized data extracts by permitting access to the operational data.

A few vendors of fourth-generation systems clearly know where they want to go and are working toward it. Even though the descriptions might be different, there is a common direction. The evolutionary development process is going to create increasingly better systems.

One thing unique about software is that once a product is bought, vendors continue to enhance it. It is not as though you bought a piece of equipment and had to throw it away when you wanted a new one. This evolutionary development process is very important.

Improving productivity

The second trend is the continuing shift of effort from people to computers. People want to increase their personal productivity, and great progress is being made in response to this need. Touching upon some data from the survey mentioned earlier: Of the company sites responding, 15% had only end users using these systems; 14% of the sites had only computer specialists; but 71% had both. Some systems seem to be developed primarily for the computer specialist, some for the end user.

But what kind of productivity advantages are people getting (Figure 1) For ad hoc inquiries, the survey said that 89% of the people were getting 10:1 productivity advantages or more. Thirty percent claimed 50:1 productivity advantages. Those are enormous numbers.

For report preparation, 83% said they were getting 10:1 productivity or more. Remember, 5:1 is the theoretical minimum achieved. Fifteen percent claimed that they were getting 50:1 or more because of all of the other components that are in the system along with the nonprocedural languages.

Even for data maintenance, 62% said they were getting more than a 10:1 productivity advantage, and that seems to be most difficult to do. Eight percent stated that they were getting a 50:1 advantage. For building complete applications, 62%

Figure 1

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> ***In the first stage of person-machine interaction, the motto was, "Let the worker fit the tool"; in the second stage, "Make the tool fit the worker." . . . The stage that is just now evolving is a very important one in which the worker will choose the best tool.***

claimed they were getting more than a 10:1 productivity advantage. Nine percent even said they had gotten a 50:1 advantage.

Freedom of choice

A third trend is the increasing distinction between specification and fulfillment. In the first stage of person-machine interaction, the motto was, "Let the worker fit the tool." In the second stage of ergonomics, we said, "Make the tool fit the worker." The difficulty with this approach is that there are 50 million different office workers and 625,000 computer specialists in the U.S.

The stage that is just now evolving is a very important one in which the worker will choose the best tool. More than one tool will be integrated into the same system, and the person can choose what is best for the particular job at that particular time.

"Freedom of choice" is a term that we are going to hear more about in the next few years. Most fourth-generation systems will include the ability to specify more than one way to do the same task so that users can do their own thing in their own way. This is going to lead to enormous increases in personal productivity.

Efficiency

The fourth trend is attention to efficiency. The trend toward increased personal productivity becomes a bottleneck if it is accomplished at the expense of hardware. And fourth-generation languages are becoming quite efficient, to a large extent because their authors are recognizing their importance. For most applications, the languages' efficiency equals or surpasses that of Cobol.

Now how can a language possibly be more efficient than Cobol if the user has to do so much less? Cobol must be more efficient if programmers have to do more.

One reason for this apparent contradiction is a performance orientation. Vendors have been constantly increasing the efficiency of these systems. And the Cobol application program doesn't have the same kind of performance orientation — you're not returning it every year.

The second thing that is very important is that the system — the nonprocedural language processor — has knowledge of what's being done. Therefore, vendors, by building in efficiency, are able to achieve tremendous advantages from knowing what people are trying to do based on how they are doing it. Remember, we control the flow of the application.

One point that should not be overlooked is the pressure on people designing and coding computer programs. Each of the 50 million office workers wants to be more productive, but since there are only 625,000 computer specialists, each one must support 79 office workers. This high ratio puts hinders specialists in doing their best job.

But advances in software architecture and engineering systems are being developed to the point that, if the particular fourth-generation language you are using today is not more efficient than Cobol, it soon will be.

Applications life cycle

Most fourth-generation language productivity advantages so far have been directed at the coding process. The fifth trend is a movement away from this concentration on coding.

The applications development life cycle consists of much more: requirements definition, internal and external specifications, product debugging, unit testing,

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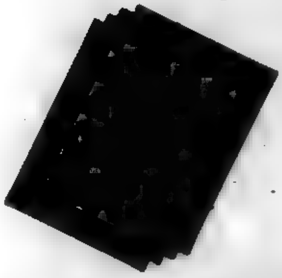

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Communications

A major key to business today is communications. Individuals and organizations that communicate well are more productive. The sixth trend applies the principles of artificial intelligence to improve people-machine communication, using natural languages like English, French and German to talk to the computer.

Several systems are available where people communicate with the computer by typing in English sentences or combinations or fragments of sentences, and the computer responds with the desired information. These technologies, built on the "knowledge-based" concept, are just emerging. These are not toys; they are, in fact, the next communications medium.

The importance of language understanding is clear, and voice recognition is coming along rapidly, assisted by several vendors, such as IBM. We can expect that the surviving form of communication with the computer is going to be largely verbal, and we can expect to see it in the next five to 15 years.

People solve problems by defining a model and then manipulating it, typically using the computer as a calculation aid. The seventh trend, the advent of expert systems, will see this change.

Expert systems

For example, we will see expert systems that can specify a data base. Today, people specify a data base largely by doing the kinds of things that are coming out of the expert systems field. Computers will do a very good job of defining data base structure, calculating the right combination of efficiency and implementation time and all of the different parameters.

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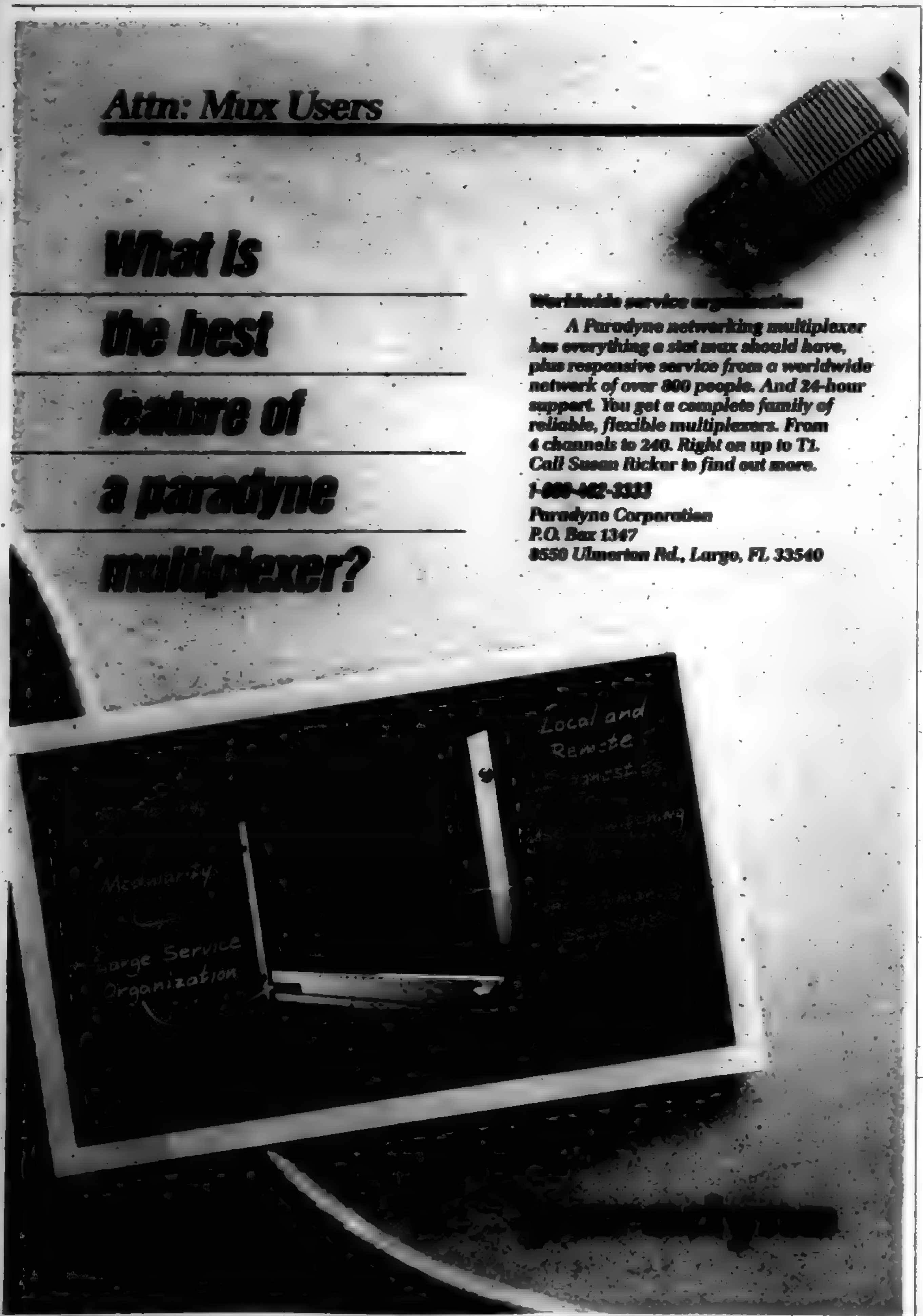
> *Advances in software and systems are at the point where, if a particular fourth-generation language is not more efficient than Cobol, it soon will be.*

Using an encyclopedia (expert systems all are built around a knowledge base or an encyclopedia that they use to reference their data), automatic application generation will replace even the simplicity of a fourth-generation language.

Whether the needed model is an accounts payable processor, an accounts receivable processor or an inventory control processor, we will generate the specifications and code automatically, again by making reference to the encyclopedia. These things are not yet commercially available, but great developments are being made in the field of knowledge-based systems.

Knowledge-based systems will also improve the way one updates an expert system. One of the problems with expert systems is that as soon as you finish debriefing your expert and that knowledge is embodied in your computer, that expert system becomes static — the expert continues to go on and learn, but the system doesn't keep up.

The way to avoid this situation is to continue to do



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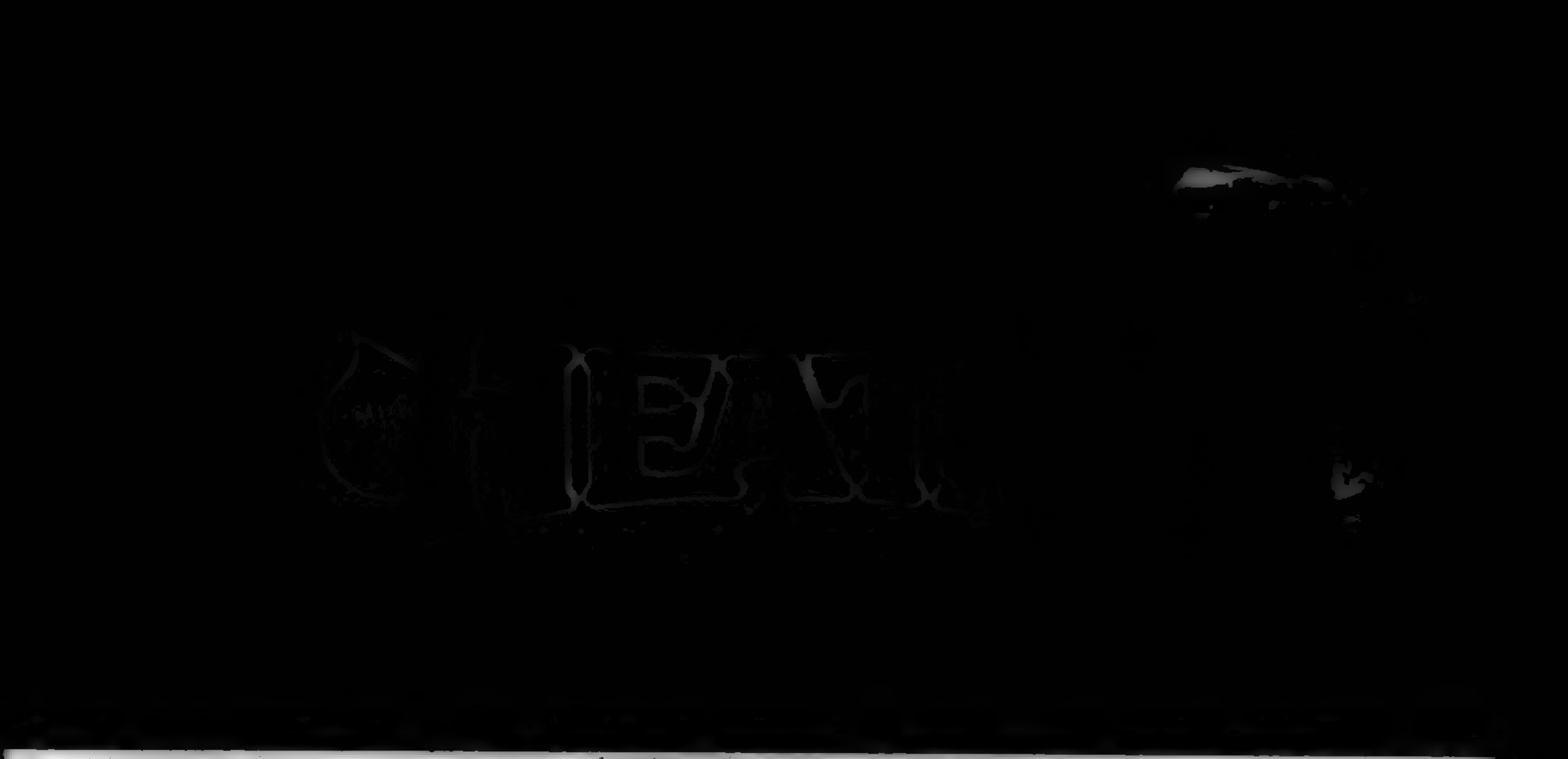

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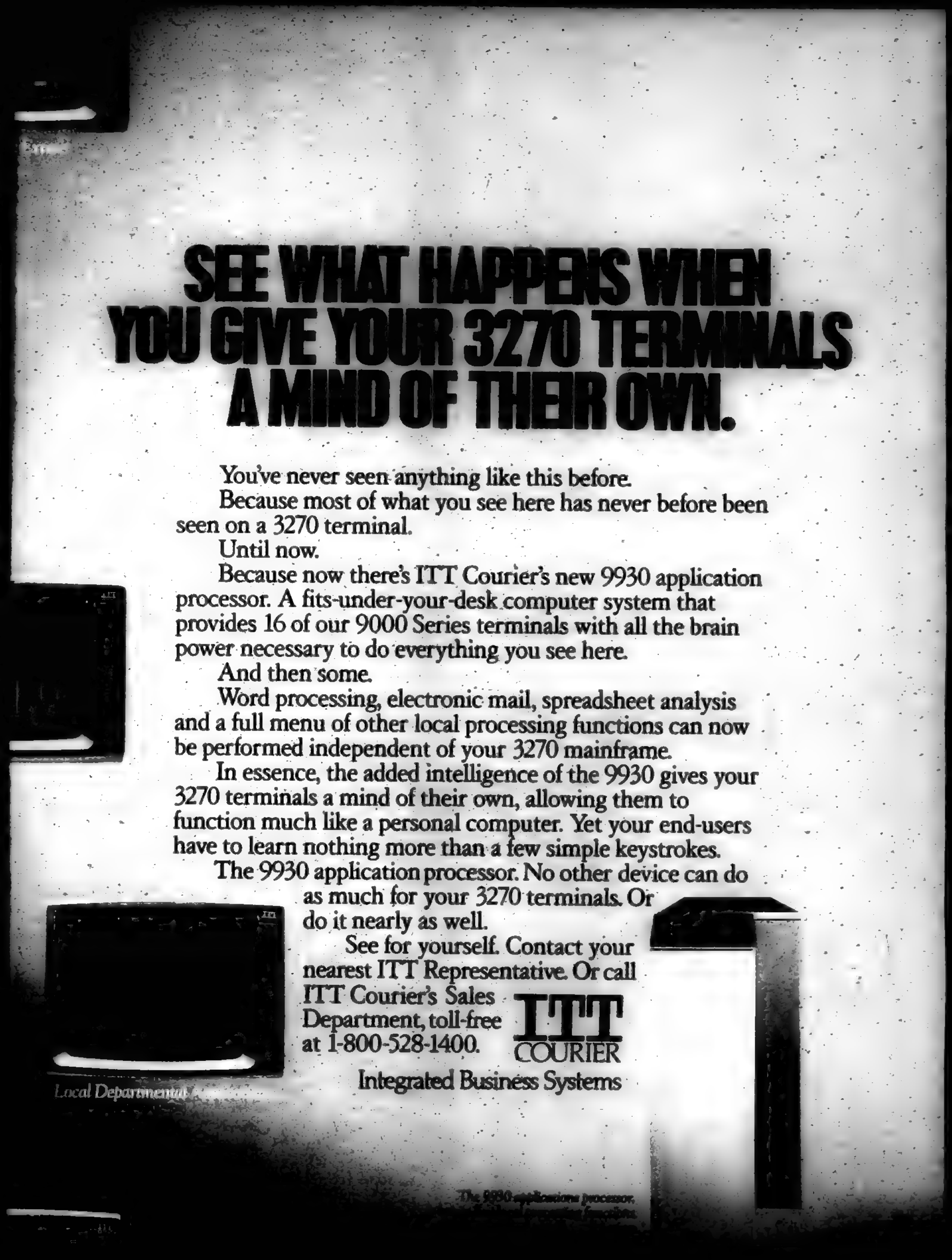

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specifications in a natural way. The process of converting expert systems through Prolog, Lisp or some of the other available methods is expensive — somewhere between half a million and a million dollars to develop a typical system.

The concept of consistency

The concept of being able to make largely correct inferences based upon the data available is the keystone of AI, the "fifth generation." That brings us to the eighth trend — micro-mainframe consistency, micros (intelligent workstations) working together with host computers in an integrated fashion.

Since the advent of hardware, the computer industry has gone through three stages. In the first phase, mainframes operated by themselves, in some cases with IBM 3200 terminals attached. Next, mainframe computers and personal computers worked independently. In this mode, there was a return to the days of keypunch errors, when everybody goes to a meeting and argues about who has the right data or who has the minimum number of keypunch errors in their spreadsheets.

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> *The importance of language understanding is clear. . . . We can expect that the surviving form of communication with the computer is going to be largely verbal, and we can expect to see it in the next five to 15 years.*

The third stage, the one that we're moving into now, integrates intelligent workstations and host computers so that they work together, not independently.

This last stage raises the question of distribution of functions between the mainframe and the workstation. It seems logical that the mainframe would deal with managing the information resources critical to the corporation. Data integrity within the whole system is also very important; someone must control data integrity, and software on the mainframe will need to do it.

What are the workstations going to do? Person-machine interfacing — voice communication and natural-language understanding — is going to be largely delegated to the workstations. This will require a great deal of CPU capability, local analysis capabilities and prototyping. People will develop most of their applications on workstations. Eventually, the applications will run on mainframes and do decision support.

A very important point in this scenario is that the mainframe and workstation must work together as a team. That means they will share a software solution. There will be automatic links for data output and request transfer so that users won't even know when it happens. We will see distributed processing, with appropriate processes, taking place at both locations.

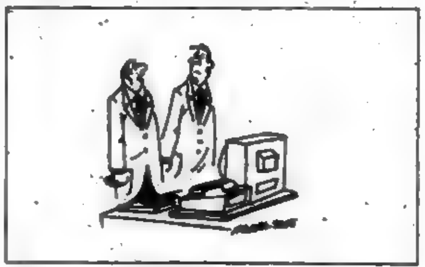
Predictions

These eight trends of the next five to 10 years will continue to drive the development of software products that enable people to increase their own personal productivity.

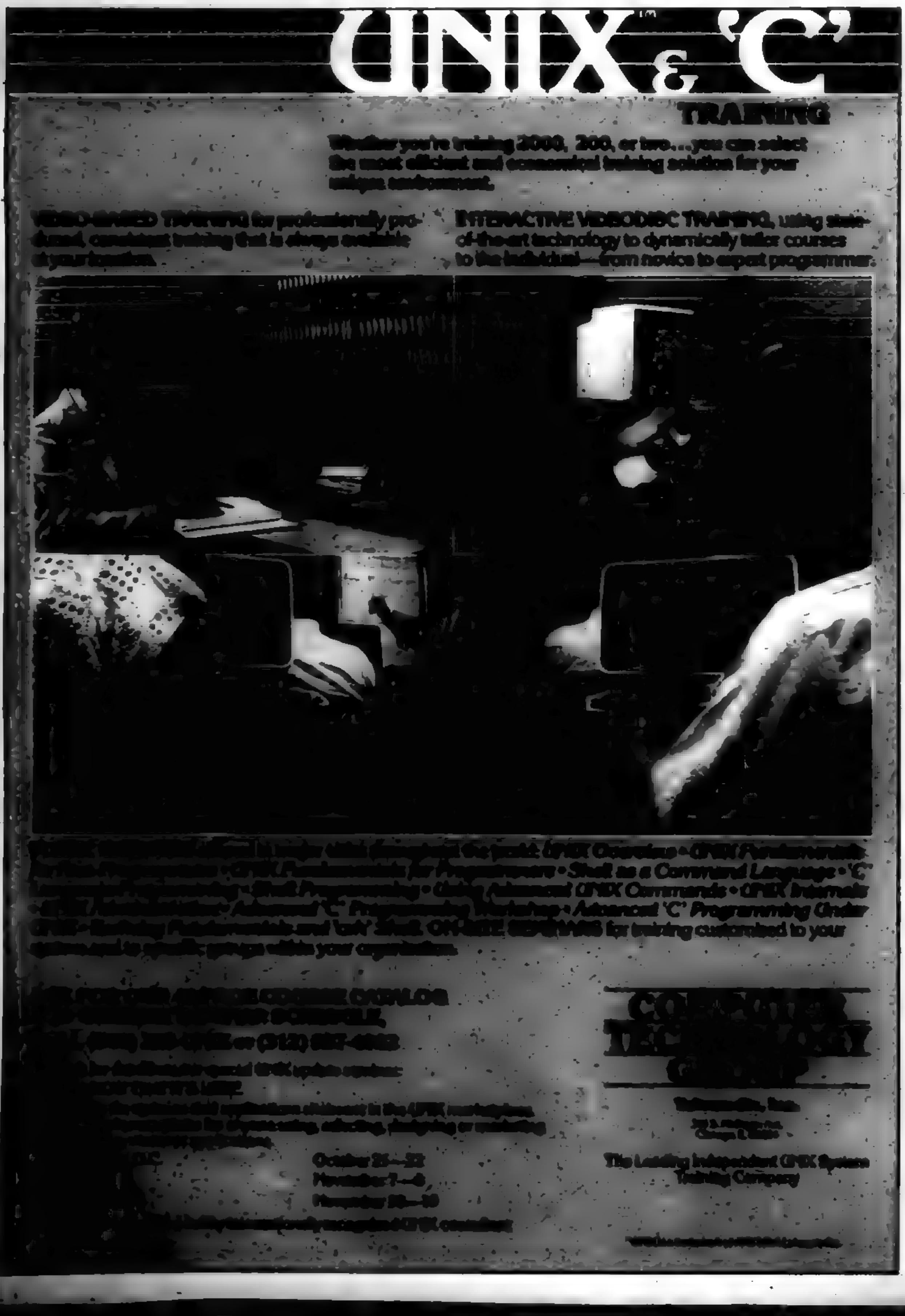
In retrospect, the evolutionary milestones of major software technology include the following: report writers from 1969 to 1975, data base technology from 1976 to 1984, and fourth-generation language systems beginning in 1982.

As the evolutionary process continues over the next decade, fourth-generation language systems will stay in the mainstream until about 1989. Then in 1991, we will move into the fifth-generation model-driven system, the AI-based system. Moreover, the systems of that generation are not going to be composed only of AI products. They are going to be scattered in an intelligent sort of way through the systems as they begin to take over.

It would appear then, that fifth-generation systems will begin to replace fourth-generation systems in the mainstream within the next decade. Although fourth-generation systems are clearly entering the mainstream now, they will be replaced with the more productive systems of the next rank. That's evolution, that's progress, that's just the change we are experiencing in the information processing industry.



"No — I thought your department was going to develop the software."



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MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Javelin, GNP aim high

Javelin Software Corp.'s formal unveiling of its microcomputer analysis software two weeks ago set some kind of standard for product introductions. Held in Boston's Museum of Science, the rollout topped an hour of hyperbole and self-congratulation by winding up the museum's Van de Graaff generator and zapping lightning bolts, accompanied by the triumphal finale of Mussourgsky's *Pictures at an Exhibition*.

It's not clear how that extravaganza will be topped at Comdex/Fall '85, so I'm taking a helmet and Nomex protective suit to Las Vegas.

But the standard Javelin really wanted to set, of course, is in business analysis software, replacing Lotus Development Corp.'s 1-2-3.

Chairman Robert Firman listed five demands from corporate users: They don't want to believe that analysis begins and ends with sticking numbers into spreadsheet cells, they want to know where the numbers come from, they want to understand the reasoning behind recommendations, they don't want the management team to be separated from the people running the machines and they'd like to reduce the overall time devoted to business analysis.

Answering these demands is a worthy goal, and the package looked well designed in a brief demo by President Stanley Kugell. The audience was impressed with that glimpse, although no one had a chance to play with the software. The program is set to ship this month, so we'll soon find out whether it really pushes the frontiers

Continued on page 80

Cauzin unveils Softstrip

Prints digital data on paper to be read by micros

By Eric Bender

WATERBURY, Conn. — A technology that permits data and programs to be printed on paper and then read by personal computers debuted last week from Cauzin Systems, Inc.

Offering cost and durability advantages over alternative methods of distributing data, the Softstrip system will find widespread use in business, the company claimed.

In Cauzin's Softstrip scheme, ⅝-in.-wide strips of encoded patterns are printed on various types of paper, either through commercial printing processes or by desktop laser or dot matrix printers. Holding up to 5.5K bytes, the strips incorporate sophisticated error-checking techniques and can be linked together for lengthy programs or files.

Softstrip permits hard-copy data to be read by micros.

Softstrips can be read by the Cauzin Reader, a lightweight $200 self-aligning optical scanning device that plugs into an RS-232 port. Versions configured for the IBM Personal Computer and the Apple Computer, Inc. Macintosh and Apple II will be available in January.

"Until now, we've had two rather limited methods for distributing data and programs, through telecommunications or on diskettes," according to Cauzin President Robert Brass.

Softstrips can be created with standard printing processes on ordinary paper, are more sturdy than diskettes and fit more easily into existing ways of distributing printed matter, Brass said.

Several computer periodicals will begin printing Softstrips in issues starting early

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■ Micropro International announced site licensing arrangements
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MICROSPOTS

Printers used with business personal computers, 1984-86, 1990*

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Impact Printers				
Matrix	3,318	5,078	7,085	15,144
Character	905	1,289	1,080	2,654
Nonimpact Printers				
Thermal	93	105	109	69
Ink-jet	63	191	328	1,025
Transfer	15	81	252	1,085
Page	15	70	185	720

* U.S. installed base in thousands of units.

[illegible]

Microsoft introduces enhanced mouse version

Microsoft Corp. of Bellevue, Wash., has introduced a version of its Microsoft Mouse pointing device, said to feature improved ergonomic design, higher resolution and near-silent operation on all surfaces.

Microsoft Mouse Version 5 has been reconfigured with buttons that wrap around the shell so they can be pressed from either top or end of the device, according to the vendor.

Resolution has been improved from 100 point/in. to 200 point/in., decreasing the amount of desk space required and permitting users to operate the device by moving their wrist rather than their entire arm.

Teflon runners and a rubber-coated control ball have replaced the steel ball runners and steel control ball for smoother, near-silent operation on all surfaces, the vendor said. The revamped Mouse also features new cable connectors, with thumbscrews that eliminate the need for a screwdriver during installation.

A new version of Zsoft Corp.'s PC Paintbrush software package, improved setup program, new menu and documentation are bundled in with the mouse as are Piano and the Game of Life, two software familiarization tools, and Microsoft Notepad, a screen-oriented editor for program and text files.

The device requires PC-DOS or MS-DOS 2 or higher. Both serial and bus versions of the Mouse, priced at $195 and $175, respectively, are available now.

Sysgen unwraps hard disk drive/tape subsystems

Sysgen, Inc. of Fremont, Calif., has expanded its line of mass storage products for personal computers with the addition of three hard disk drive/tape subsystems.

All provide automatic data backup, mirror-image or file-by-file backup and verification on the fly. They are slated for delivery next month.

The Sysgen Plus, which combines a 70M-byte hard disk drive with a 60M-byte ¼-in. cartridge tape subsystem, costs $5,995. The disk drive offers 30-msec average access time, and the Plus can be suited for multiuser or network server applications, according to Richard Newsome, Sysgen executive vice-president.

The AT Add-In is an internal disk/tape subsystem for the IBM Personal Computer AT that minimizes cost by using the system's existing hard-disk controller and power supply. The AT Add-In incorporates a 60M-byte tape subsystem with either a 20M-byte, 40M-byte or 70M-byte hard disk drive. Prices are $2,095, $2,795 and $4,995, respectively.

Sysgen's Flat-Pak subsystem sits on top of a Personal Computer or Personal Computer XT, under the monitor, and offers either 10M bytes of disk storage with a 20M-byte cassette tape or a 20M-byte hard disk drive with a 60M-byte cartridge tape. Flat-Pak uses the computer's existing hard-disk controller and power supply. The two versions cost $1,395 and $2,095, respectively.

Forte PJ version supports APL for IBM micro users

Forte Communications has announced several enhancements to Forte PJ, its IBM 3278/79 terminal emulation board for the IBM Personal Computer, Personal Computer XT and Personal Computer AT. The vendor said all the features are available as free upgrades to current Personal Computer users.

The new board, Forte PJ APL, supports IBM's APL programming language by emulating the APL extended character set and the 3278/79 typewriter/APL keyboard.

APL symbols are mapped out on the microcomputer keyboard, which reportedly generates 128 characters with font support. IBM Enhanced Graphics Adapter card support allows high-resolution display of APL applications.

Forte PJ APL is said to provide microcomputer users with the same APL support as VS/APL for MVS users and APL Graphpac for VM users, according to the vendor.

IBM light pen support

The San Jose, Calif.-based vendor has also enhanced Forte PJ with IBM 3278/79 light pen support, compatibility with Topview software and 3278 Model 5 emulation.

Additionally, the board now ships with Forte PJ/File Transfer Support software, compatible with the IBM 3270 Personal Computer file transfer package, that allows microcomputer users to access IBM mainframes equipped with Professional Office System/PC2 running under MVS/TSO, VM/CMS or CICS environments.

The enhanced emulator board costs $1,195.

AT&T division introduces plug-in graphics board

Electronic Photography and Imaging Center of Indianapolis, a division of AT&T Information Systems, has introduced a $695 plug-in graphics board said to allow standard color monitors used with personal computers to display television-quality pictures.

The AT&T Truevision Video Display Adapter with Digital Enhancement (VDA/D) is said to increase color resolution by enabling digital red-green-blue (RGB) monitors to display 256 colors chosen from a palette of more than 32,000.

The VDA/D has eight color maps, each of which can accommodate up to 256 different colors. Four maps can be used at the same time in different areas of the screen, allowing the display of up to 1,008 colors simultaneously.

According to a company spokesman, Truevision VDA/D has a high-spatial resolution mode that enables it to display 80-col. text in 512- by 256-pixel resolution. VDA/D has less than 1% memory contention, so software packages execute without any visible delays.

VDA/D pictures can be transmitted over ordinary phone lines, making electronic mail with electronic photographs, on-line data bases with pictures and still-frame teleconferencing possible, the spokesman said.

VDA/D can reportedly display video pictures digitized by AT&T's Truevision Image Capture board frame grabber as well as images created with graphics software packages for AT&T's Truevision Video Display Adapter, including the Truevision Paint software and the Truevision PC Carousel Presentation software. It is also compatible with Media Cybernetics, Inc.'s Multihalo development tool kit and driver.

The board plugs directly into a single expansion slot of 8-bit bus, MS-DOS-compatible personal computers, and its output can be fed directly to composite video monitors, color televisions equipped with radio frequency modulators, analog RGB monitors as well as digital RGB monitors with National Television Standard Code scan rates.

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Tapestry remote link bows

Torus Systems, Inc. of Redwood City, Calif., has announced software that is said to link remote IBM Personal Computers, Personal Computer XTs and ATs to Torus' Tapestry networking program running on the IBM PC Network.

Remote Network Link reportedly allows remote users to access the Tapestry network through an icon-based interface over standard telephone lines. Access is achieved through a Hayes Microcomputer Products, Inc. modem rather than a network adapter card.

Remote Network Link provides all Tapestry features such as electronic mail, telephone management, the icon-based interface, remote printing and file sharing. The remote access is transparent, except that Tapestry operations through the link are slower at 1,200 or 2,400 bit/sec., according to the vendor.

The software requires a micro with a minimum of 256K bytes of memory. The cost of Remote Network Link is $250 per computer.

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APL Plus PC version out

STSC, Inc. of Rockville, Md., has announced an enhanced version of its APL Plus PC Application Development System software. Release 5 is said to include a numeric spreadsheet-like editor and full screen management.

Other enhancements include the ability to enter full screen forms faster through multiwindow input, a library of commonly used Assembler utilities and new on-line tutorials for producing bar and pie chart graphics and other applications.

The full screen editor enhancement allows an object to be edited while other output remains on the screen and provides for recovery of accidentally deleted data.

APL Plus features updated documentation.

APL Plus PC runs on PC-DOS or Microsoft Corp. MS-DOS 2 or higher and uses 256K bytes of memory. Version 5 costs $595, and the upgrade cost for Version 4 users is $125.

Microsoft upgrades Fortran compiler, Basic interpreter

Enhanced tools run on Macintosh

Microsoft Corp. in Bellevue, Wash., has announced the release of Version 2.1 of its Fortran compiler and Version 2.1 of its Basic interpreter, both for the Apple Computer, Inc. Macintosh.

The new Fortran compiler is said to be a full implementation of the Ansi Fortran 77 standard.

The added features reportedly include an expanded set of sample programs, language syntax extensions such as structured programming constructs, a completely rewritten linker and optional case sensitivity.

The new Basic interpreter increases performance speed up to six times faster than Version 2, according to the vendor.

Added features reportedly include use of English-like commands, Macintosh-style full screen editing, the ability to access and incorporate Macintosh features such as pull-down menus and interactive buttons and edit fields into programs, the ability to communicate through the clipboard with other applications such as Microsoft Word, Microsoft Multiplane, Apple Macpaint and Apple Macwrite, and a debugging capability.

Minimum system requirements for both the Fortran Compiler Version 2.1 and the Basic Interpreter Version 2.1 are 128K bytes of internal memory and one disk drive.

Fortran Compiler Version 2.1 costs $295. Basic Interpreter Version 2.1 costs $150. Owners of Version 2 of the Basic interpreter can purchase the upgrade for $20. Owners of earlier versions can purchase the upgrade for $75.

Security system out

Winterhalter, Inc. of Ann Arbor, Mich., has announced a security system designed to protect data on both hard- and floppy-disk-based IBM Personal Computers.

Secure, priced at $495, is said to use the U.S. government-approved Data Encryption Standard algorithm to scramble information into an unreadable and undecipherable code.

The Secure system is menu driven and enables the user to encrypt individual files, complete directories or the entire disk.

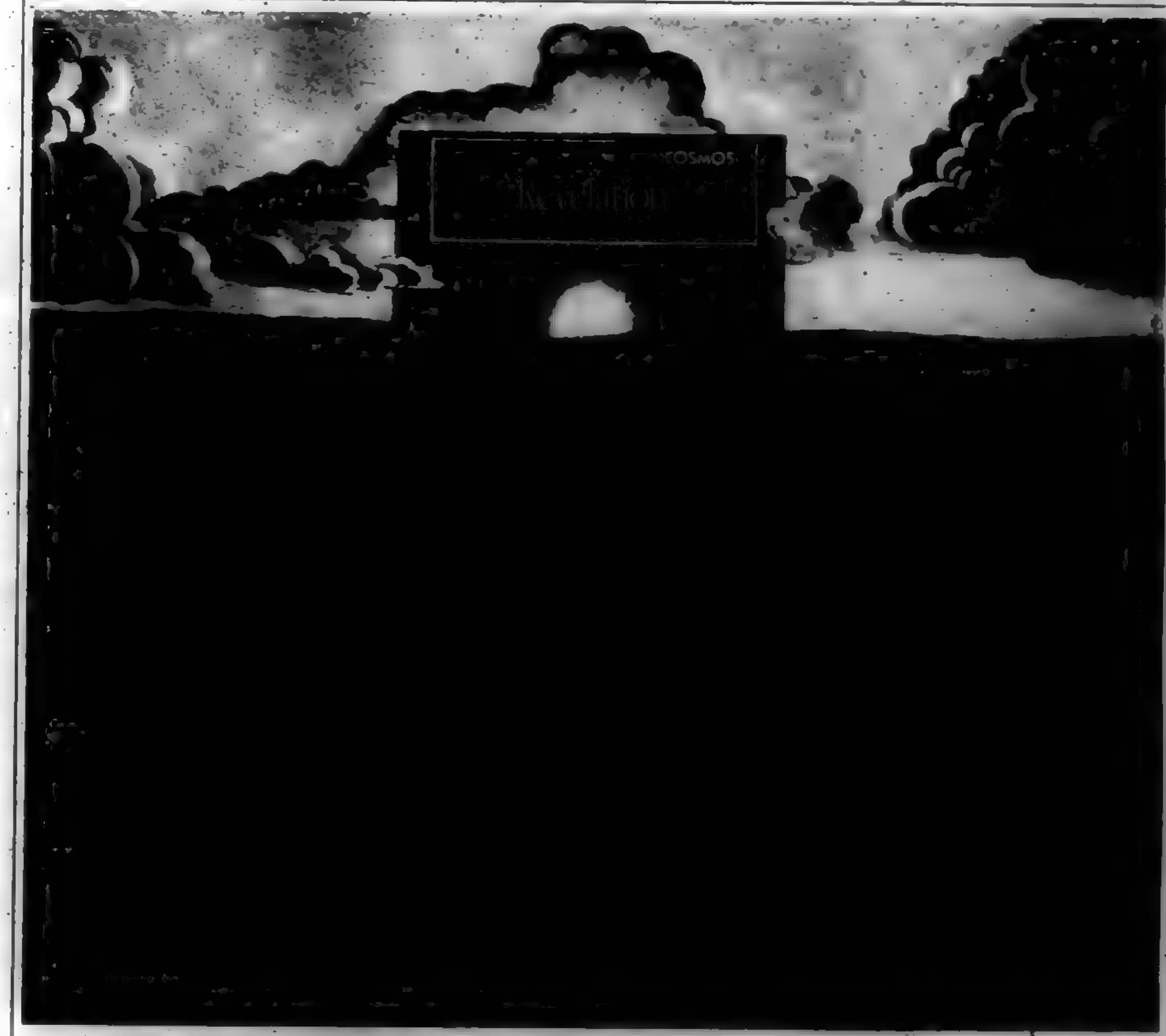
Secure is compatible with the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles. The Data Encryption Standard encryption processor on the circuit board uses direct memory access interface to the Personal Computer, encrypting and decrypting at a rate of 150.5K byte/sec.

System mart goes on-line

The Boston Computer Exchange has created a computer marketing channel by placing its complete data base of used and new computers and peripherals on-line on the Delphi Communications Corp. Delphi network.

For $6 per hour, or $16 per hour during business hours, computer buyers and sellers nationwide can browse through the listings and make electronic bids. Listings are updated hourly and include prices. The on-line marketing channel is also accessible from 25 countries.

The Boston Computer Exchange, which claims to be the oldest computer brokerage, lists more than 100 brands of used and new computers, ranging from the Osborne Computer Corp. Osborne I to IBM CPUs, as well as peripherals and software.



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Micropro OKs sites

Another major microcomputer software manufacturer has stepped forward with a site licensing program. Micropro International Corp. of San Rafael, Calif., is making its Wordstar 2000, Wordstar and Chartstar packages available under the program. In addition to site licenses, Micropro will offer volume purchase discounts and optional technical support.

A site license, available for a minimum purchase of 100 units, enables a purchaser to reproduce and distribute programs within a company. Site license prices for Wordstar 2000, which is available with or without documentation, range from $135 to $225.

Volume purchases offer discounts to users who buy 25 or more copies. Prices for Wordstar 2000 range from $213 to $272.

Micropro stated that corporations' current purchases will be credited toward the licenses. Also, documentation may be reproduced by a user. The site licenses and volume purchase are available for three-year periods.

The company is also offering technical support to corporations. For a fee of $1,000 per year, companies receive a toll-free number that will connect them to the software company's technical support staff.

Microsoft meets date

Microsoft Corp. began shipping its Excel package for the Apple Computer, Inc. Macintosh Sept. 30, meeting the delivery schedule announced when the package was introduced in May.

The $395 package from the Bellevue, Wash., firm integrates spreadsheet, data base management and business graphics.

The spreadsheet combines macrocomputers that automatically record user actions, interactive worksheet linking and two-way file transfer with Lotus Development Corp.'s 1-2-3 package. Excel runs faster than any spreadsheet currently available on the IBM Personal Computer, according to Microsoft.

Excel requires 512K bytes of internal memory and an external disk drive, according to the vendor.

Current owners of Microsoft Multiplan for the Macintosh can buy Excel for $200 until Dec. 31.

Software directory unveiled for engineering applications

Management Roundtable, Inc. of Chestnut Hill, Mass., has published a guide to personal computer computer-aided design and manufacturing packages.

"The PC Software and Systems Directory for Computer-Aided Engineering" details what software packages are available and on which personal computers.

It provides listings of suppliers, applications, compatible hardware and prices. Listings are cross-referenced according to applications and systems.

The 82-page directory costs $79.

IBM upgrades emulation control program for AT

IBM Information Systems Group has upgraded its Personal Computer 3278/3279 emulation control program to add support for the Personal Computer AT.

Version 2 of the software, priced at $235, includes a new diskette and published material for the Personal Computer AT, according to the vendor.

A keyboard aid card for that machine also is provided, a company representative said.

The Personal Computer 3278/79 Emulation Adapter card, which costs $905, is unchanged.

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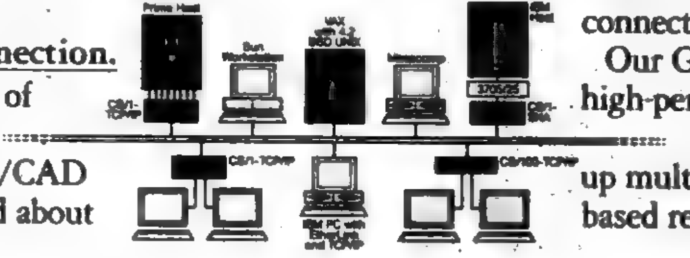

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SOFTWARE

■ **Improved System Technologies, a division of McDonnell Douglas Professional Services Co., has announced Version 2 of its DFDdraw personal computer-based graphics software.**

Version 2, which requires a minimum of 640K bytes of memory, has expanded the list of DFDdraw-supported hardware to include the IBM Color Graphics Adapter and monitor, the IBM Enhanced Graphics Adapter with enhanced display, the IBM Enhanced Graphics Adapter with color and monochrome display, the IBM 3270 Personal Computer with color and monochrome display, the IBM 3270-PC with 5272 monitor and APA graphics adapter, the Hercules Computer Technology Co. Graphics Card with monochrome monitor and the Tecmar, Inc. Graphics Master with monochrome and color monitors.

Additional printers and plotters now supported include the Hewlett-Packard Co. 7220 Plotter and the Toshiba Corp. P351, P1350 and P1351 printers. Mouse capabilities have also been added to include the Mouse Systems Corp. Personal Computer Mouse and the Microsoft Corp. Mouse.

It also includes an off-page connector symbol and the ability for data flow diagram bend points to move in relation to moved elements.

The product costs $500.

McDonnel Douglas, P.O. Box 516, St. Louis, Mo., 63166.

■ **Assimilation, Inc. has announced a software utility that allows Apple Computer, Inc. Macintosh computer users to print one file while working on another.**

Work N' Print is said to make the print files created by the Macintosh visible, saving them for later printing, at the same time as it controls the printer driver. This enables users to continue to work while the Macintosh is printing.

Work N' Print costs $29.

Assimilation, 485 Alberto Way, Los Gatos, Calif., 95030.

■ **Greenleaf Software, Inc. has enhanced its set of C libraries, known as the Greenleaf Functions, for eight compilers that run on IBM Personal Computers and compatible computers.**

Version 3 upgrades are available for Lattice, Inc.; Microsoft Corp. (including Version 3); Computer Innovation, Inc.; Mark Williams Co.; and Aztec, Inc. C compilers, among others.

Enhancements include the ability to adapt function names to compiler options by truncating or leaving them at full length; the ability to optimize granularity by using assembler code and breaking modules into minimum size functional groups; and the ability to alternate C source files for all functions written in assembly language.

The Greenleaf Functions cost $185.

Greenleaf Software, Suite 101, 1411 LeMay Drive, Carrollton, Texas 75007.

■ **Softsell Specialized Computer Systems, Inc. has unwrapped an APL emulator that reportedly converts IBM Personal Computer, Personal Computer XT, AT or compatible computers into full-function APL terminals.**

Called APLterm, the emulator provides all APL characters, including overstrikes, with 10 predefined function keys plus 30 function and eight cursor keys that are user programmable.

A communications protocol allows the personal computer to communicate with up to three host computers varying in bit/sec. speeds. Other features include ability to upload and download, screen transmissions capability, plus a status line that can display the current communications configuration, cursor position and mode (ASCII or APL). APLterm costs $195.

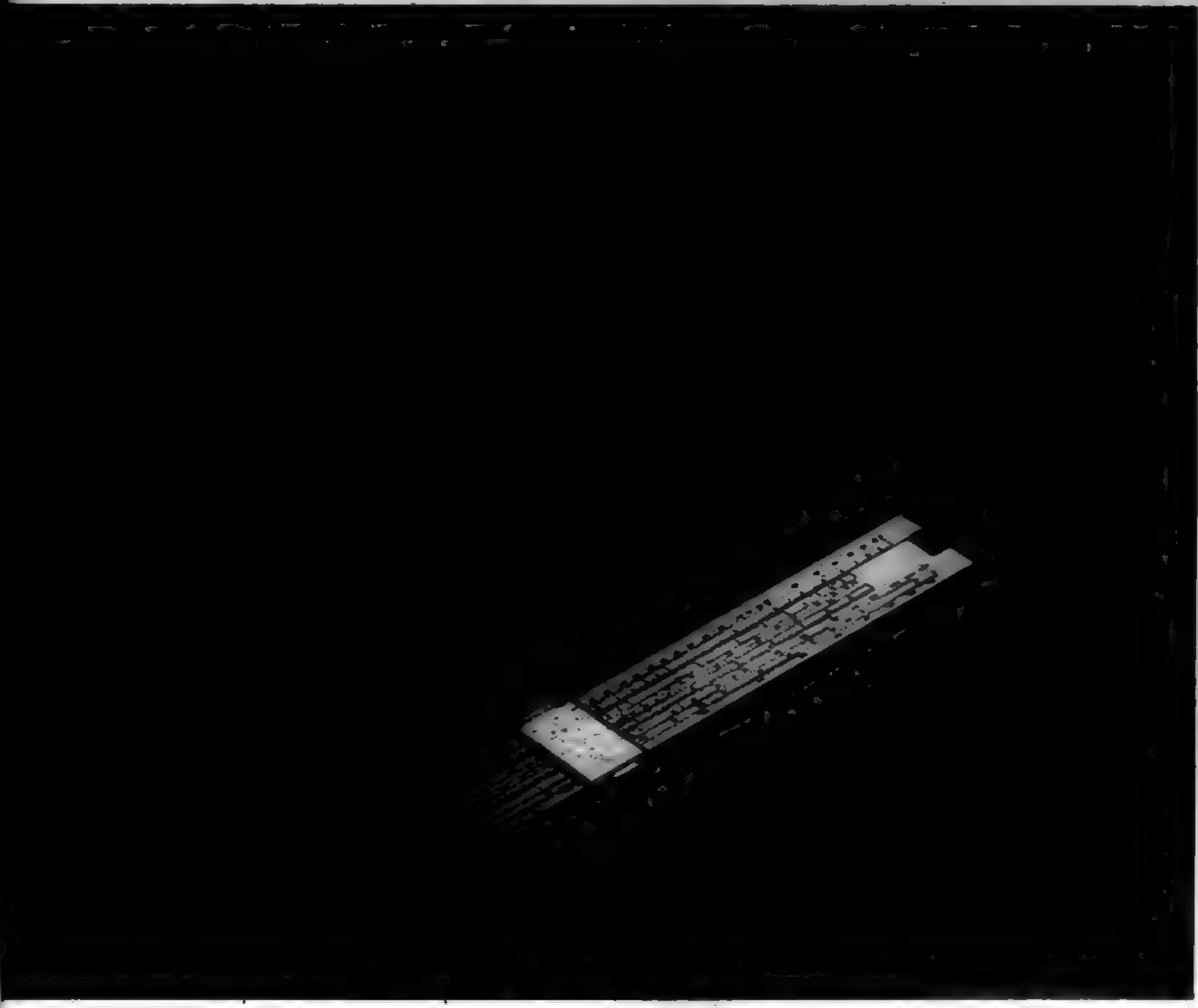
Softsell Specialized Computer Systems, Suite 204, 1899 Orchard Lake Road, Pontiac, Mich. 48053.

■ **Airus Corp. unveiled a word processor for IBM Personal Computers that is said to use artificial intelligence technology to check spelling in real-time.**

AI:Typist scans the dictionary between each keystroke to find matches and highlights mismatches on the screen, the vendor said.

The dictionary is report-

Continued on page 80



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ONCE UPON A TIME THERE WAS AN EGG THAT STOOD ON ITS END.

The scene: a royal banquet with tables of food, goblets of wine and a basket of eggs.

The time and place: Barcelona, Spain, in the year 1493.

The main characters: Christopher Columbus, one of history's boldest and most innovative thinkers, who has just returned from the New World to cheering crowds and jealous enemies. And Juan Fonseca, a Spanish noble with bushy brows and a perpetual scowl.

The story: as the guest of honor, Columbus is enjoying himself immensely. Until Fonseca, his voice reeking of envy, pounds the table with his fist.

"Señor Columbus," says Fonseca, "In Spain we have no lack of clever navigators. If you had not made this great discovery, one of our own countrymen would have done so."

A deathly silence descended upon the banquet as hundreds of ears awaited Columbus' reply. But instead, Columbus took an egg from the basket and placed it before Fonseca and his followers.

"Gentlemen," he said, "as the first to discover the Indies, I challenge you to make this egg stand on its end—without any support whatsoever."

The Spanish nobles tried. They tried and they sweated and they cursed in four different languages—but they could not succeed.

Now it was Columbus' turn.

Picking up the egg, he tapped it on the table, crushing a little of one end—and made the egg stand up on his first try.

"But that's unfair," cried the nobles. "That's easy. Anyone can do it that way."

"Yes," replied Columbus, "it's easy—once someone shows you how."

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Continued from page 77

edly based on word frequency instead of standard word lists. It includes proper names and can be expanded. Along with spelling control, menu-driven AI:Typist provides onscreen Help and text merging, according to the vendor.

Priced at $99.95, AI:Typist requires 256K bytes of random-access memory. The introductory price until Jan. 1 is $69.95.

Airus, 11830 S.W. Kerr Pkwy., Lake Oswego, Ore. 97034.

SYSTEMS

■ **Continental Telecom, Inc.'s Cado Systems Corp. has announced an IBM Personal Computer AT-compatible micro that reportedly supports up to three terminals and one printer.**

The Contel Cado Tiger AT/4 is based on the Intel Corp. 80286 microprocessor and Cados, a proprietary multiuser operating system running co-resident with DOS.

The basic system includes 512K bytes of random-access memory, a 20M-byte hard disk and a 1.2M-byte floppy disk drive. The system can support an optional second 20M-byte hard disk and second 1.2M- or 360K-byte floppy or stand-alone 45M- or 60M-byte streaming tape cartridges with integral power supplies.

The base price is $6,165.

Continental Telecom, Cado Systems, P.O. Box 3759, 2055 W. 190th St., Torrance, Calif. 90510.

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Cauzin's Softstrip prints digital data

next year, and a number of textbook publishers have committed to printing the data strips in upcoming titles. Cauzin also intends to market Stripware, a library of software programs, according to Neil Kleinfeld, Cauzin's vice-president for marketing and sales.

General business applications are likely to emerge somewhat later, Kleinfeld predicted, with the data strips most suitable for applications with up to 60K bytes of data or program code.

In large corporations, a Softstrip setup could aid in transferring data between incompatible machines or in storing lengthy documents, according to Kathleen Lane, software analyst at Dataquest, Inc. in San Jose, Calif.

"Transporting data is much easier than with a floppy disk," she said. "They're not going to melt in your car." Additionally, users might want to store Softstrip data in standard filing cabinets rather than in computer files, she suggested.

The most likely competition for the scheme will come from other optical scanning devices, she suggested. "We're going that way; the keyboard will not be the primary method of entering data."

Cauzin was founded in 1983 by Brass, who previously worked at Xerox Corp. as director of market analysis and of telecommunications strategies, and Jack Goldman, previously Xerox's chief technical officer.

From page 73

Javelin, GNP aim high

of business analysis and decision support.

Regardless, Javelin officials make an interesting argument that spreadsheets in general, and 1-2-3 in particular, have been pushed far beyond their limits as analysis tools. Spreadsheets stand accused of inflexibility, insufficient signals and difficulty of use.

These are serious complaints, with considerable evidence behind them, and Lotus has not bothered to address them seriously in the new release of 1-2-3, which shipped late last month. Most of the upgrade's improvements focus on power-user features. You can build bigger spreadsheets and crunch them faster — which is fine but irrelevant to both new users and most current users.

While many features are hard to assess quickly, ease of use seems both crucial and relatively straightforward. At least in the demo, Javelin can handle commands typed in simple English (within limits). If that works as well as it seemed to, it's a genuine step past 1-2-3 in ease of use.

However, Javelin may be aiming at a moving target. The week of the Museum of Science blowout, a small supplier of 1-2-3 add-on software began demonstrating an impressive-looking natural-language interface for 1-2-3. GNP Development Corp. President Bill Gross maintained that the HAL add-on could greatly simplify work even for existing users.

He gave the example of one veteran user who called GNP's hot line and was flabbergasted to hear that the program can do sorting. Led through the sorting procedures, the user then thanked the support personnel and commented that he would never be able to do that again, according to Gross.

If GNP drops the tentative $295 price — or better yet, makes a deal for Lotus to distribute the software — HAL might spread through corporate America as quickly as *People* magazine gets around a lunchroom.

Or Lotus could do the job itself. That would be an easier transition than asking users to throw out a standard analysis tool. "It's extremely difficult to introduce any new product from a start-up," remarked Egil Juliussen, chairman of Future Computing, Inc. "To replace 1-2-3 or even make a dent, you've got to be two to three times better.

Will users decide that the much-ballyhooed new packages from firms like Javelin and Ansa Corp. are cause to scrap their current software? We're months away from finding that out, but Javelin seems to have a fighting chance.

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Computerworld Extra! will discuss IBM's strengths and weaknesses. We'll look at how SNA evolved, and how it will continue to evolve. And we'll discover whether IBM plans to provide a universal interconnect to SNA. Finally, we'll cover the alternatives, from PCs to mainframes. LANs. Communications. And, of course, the compatability issue.

As you can see, this issue will have complete appeal for computer professionals working at IBM installed sites.

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There is no special classified section: all recruitment ads are considered display advertising for this issue.

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WHAT TO LOOK FOR IN ON-SITE TRAINING

With all the technical training options around today, it's hard to figure out which company will offer the most professional, reliable on-site training. Here's Sys-Ed's checklist of key benefits that will make your training investment really pay off.

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COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

Switching light possible

In the last two years fiber-optic communications systems have increased in speed ten- to twentyfold. While still higher rates are probable, we are nearing the theoretical limit of fiber purity, meaning improvements in speed will depend mostly on developments in the electronics used to drive the fibers.

LM Ericsson, the communications equipment giant based in Stockholm, is developing a device that may be used for two fiber applications — as a photonic switch and as a high-speed signal modulator.

Photonic switching is a relatively new concept. It would enable light pulses to be switched from one fiber to another without having to convert light back to electricity.

Imagine a simple three-port switch that can be used to connect incoming line A with either outgoing line B or line C. Currently, if you want to switch a fiber-optic signal from line B to line C, the light pulses must be interpreted, converted into an electrical signal to make the switch, then interpreted and regenerated as new light pulses.

Ericsson has developed a working model that enables this switching to be done without converting the light signal. In rudimentary terms, the switching is achieved by diverting the light signal from one line to another by changing a field of current between the incoming and outgoing ports. The company demonstrated this capability, which was housed in a switch about as big as a pencil eraser.

Even though light travels somewhat faster than electricity, diverting light to achieve a switch takes longer than

Continued on page 86

Overseas E-mail here

But wait may be long for other direct connections

By Edward Warner

(CWN) — It used to be that users of public electronic mail (E-mail) systems who wanted to send messages to coworkers overseas faced the same problem U.S. telephone users did before the trans-Atlantic cable was installed.

There simply was no direct connection.

In September, though, Western Union Co. established a direct connection between its Easylink E-mail system in the U.S. and Britain's Easylink system, operated by Cable & Wireless Easylink, Ltd., a Western Union licensee.

While this is the first such connection, analysts expect other electronic mail service providers — such as ITT Dialcom, Inc. and GTE Telenet Communications Corp. — to follow suit. The industry watchers warn, however, that international connections may be long in coming, despite the multitude of firms with foreign offices.

Interest in offering direct international electronic mail connections is weak because the services are languishing domestically, according to Mark Winther, director of new communications services for Link Resources Corp., a New York market research firm.

Additionally, some public electronic mail traffic is already supported by private electronic mail systems such as those based on IBM's Professional Office System or Data General Corp.'s Comprehensive Electronic Office system office automation software packages.

While the public systems are far more plentiful, Winther said subscriptions are lagging because "E-mail is not worth anything by itself. You've got to hook it to some application." The service providers have to "get in bed with their customers, customize their services to certain applications."

The vendors could encourage service use, for example, by integrating a sales report application with a mail service that salesmen overseas could use dai-

Continued on page 86

NEC America modems debut

A 19.2K bit/sec. modem that works with a proprietary modulation technique highlighted a series of modem introductions from NEC America, Inc. in San Jose, Calif.

The DSP 19200 is a four-wire modem intended for use on leased lines with D-1 conditioning. The device supports data transmission rates from 2,400 to 19.2K bit/sec. and uses orthogonally multiplexed quadrature amplitude modulation. The modem features trellis-encoding error correction and includes an eight-channel time division multiplexer and is protocol insensitive.

DSP 19200 sells for $12,900.

The company also announced a network control package designed for small and me-

Continued on page 86

Case unveils multiplexers

Two diagnostic modems and two multiplexers have been introduced by Case Communications, Inc. of Silver Spring, Md.

Case 4096, a 9.6K bit/sec. modem, features a trellis-encoded error-detection scheme. The synchronous modem, designed for point-to-point or multipoint configurations, is compatible with the CCITT V.29 standard and works with quadrature amplitude modulation.

The modem features diagnostic and remote control capabilities through an optional printed-circuit card that works in conjunction with the Case 5000 Network Management System.

Case 4096 sells for $2,995.

Case 4000-DB1 is an automatic dial-back modem that can restore a four-wire

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- ITT's long-distance unit has announced a business telephone service designed to enable customers to place calls automatically over its network via the least expensive route/83

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Voice/Data Communications/[illegible]

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS

Modems with time division multiplexers unwrapped

Anderson Jacobson, Inc. based in San Jose, Calif., has released a Trellis-coded 14.4K bit/sec. modem and a 9.6K bit/sec. synchronous modem, both equipped with time division multiplexers.

The AJ 1411 enables six users to transmit data over a single four-wire leased telephone line. The 14.4K bit/sec. modem may be used in point-to-point or multiport polling applications, the vendor said. When line quality problems arise, the modem has a fallback capability and will transmit at speeds of 9.6K, 7.2K or 4.8K bit/sec.

The product provides six test loops including CCITT V.54 Loops 1, 2, 3 and 4. An integral test-pattern generator and bit error-rate detector permit network performance tests.

The AJ 1411 modem including Trellis coding costs $5,495.

The AJ 9611 supports up to four terminals over a four-wire leased line and operates over unconditioned lines at speeds of 4.8K, 7.2K and 9.6K bit/sec. Switch settings and changes can be downloaded without remote operator intervention.

The 9.6K bit/sec. modem costs $2,245.

Independent proof shows Tandem wares follow MAP

By Jeffry Beeler

CUPERTINO, Calif. — Tandem Computers, Inc. last week became the industry's first vendor to furnish independent proof that its hardware and software conform to key parts of General Motors Corp.'s Manufacturing Automation Protocol (MAP).

In an Oct. 8 announcement, Tandem reported recent independent test results that certify the firm's products as compatible with the Data Link and Transport layers of the Open Systems Interconnect (OSI) model.

The results were provided by the Ann Arbor, Mich.-based Industrial Technology Institute, which evaluates systems for compliance with MAP 2.1, the latest version of the GM protocol.

Both MAP 2.1 and its predecessor, Version 2, use the OSI standard as their architectural model. Developed by the International Standards Organization, the OSI protocol consists of seven levels of networking specifications, the second and fourth of which are the Data Link and Transport layers, respectively.

In the view of Andy McMillan, Industrial Technology Institute's manager of network evaluation and testing, Tandem's compliance with the OSI model's Transport level is especially deserving of recognition.

"The fourth layer is probably the most complex protocol in the entire OSI specification," McMillan said during a telephone interview. "So in conforming to the requirements of the Transport layer, Tandem has taken a big step toward compatibility with the interconnection standard as a whole."

Within about six months, in fact, the manufacturer of on-line transaction processing systems expects to announce compliance with the rest of the OSI model's constituent layers. "We plan to return to [the institute] and test our products for full MAP 2.1 conformance by the end of the first quarter of 1986," according to Jim Faxon, Tandem product manager.

Possible deliveries in 1986

If the tests prove successful, the company will probably be able to begin volume deliveries of its first certified MAP-compatible products during the second half of next year, Faxon predicted.

Tandem is far from being the only systems supplier that has successfully tested its products for compliance to MAP specifications. But the firm is the first vendor that has accomplished the feat at the Industrial Technology Institute, the only MAP-conformance testing center currently recognized by the MAP Users Group, McMillan said.

To date, every other company that has tested its products for MAP compliance has done so as part of preparations for a huge, multivendor networking display that GM is readying for the Nov. 5-7 Autofact show in Detroit. The display is intended to demonstrate the purported ability of MAP 2 to link systems of dissimilar make and enable them to exchange data freely.

To ensure a successful demonstration, all the participating vendors have done their necessary MAP conformance testing under the auspices of GM.

But, according to Faxon, the days of the giant automaker's direct involvement in compliance evaluation are numbered.

"GM has already gone on record as saying that any product it purchases in the future for manufacturing purposes will have to be certified as MAP 2.1-compatible by an independent testing agency [like the Industrial Technology Institute]," Faxon said.

CONTROLLERS

■ **Perkin-Elmer Corp. has announced a front-end processor that works with its Xelos and Series 3200 computer lines.**

The 3200-CP supplies up to four serial synchronous lines operating at speeds up to 19.2K bit/sec. One line can be used for an Ethernet network with transmission speeds of 10M bit/sec. A single connection from a host PE system to the front-end processor transmits data at speeds up to 500K bit/sec.

Each line can be configured to act as a gateway between the PE machine and a computer working with IBM Systems Network Architecture and Binary Synchronous Communications or X.25 protocols. Up to four front-end processors can be connected to host systems.

The 3200-CP hardware configuration consists of a 7-in. chassis, two I/O interfaces, universal clock module and two line communications multiplexers. Hardware costs $13,000. Prices for software that supplies support for 12 protocols range from $1,000 to $5,000.

PE, 2 Cresent Place, Oceanport, N.J. 07757.

■ **Trax Softworks, Inc. has announced a device that links IBM host communication controllers to intelligent modems.**

The Traxlink 1 works with Trax Terminal Simulation Facility software and enables local and remote 3270 series terminals running IBM VM/370 or VM/SP operating systems to emulate ASCII terminals. The terminals could then access dial-up services such as Dow Jones News/Retrieval service.

The Traxlink 1 sits between a host's communications controller and intelligent modems and supports Terminal Simulation Facility outbound calls. The product works with IBM 3705, 3704 and 3725; Memorex Corp. 1270 front-end processors; and other compatible communications controllers.

One Traxlink 1 is required for each line in use. The device features a 1,200 bit/sec. modem, a Zilog, Inc. Z80 2.5-MHz microprocessor, 16K-bit erasable programmable read-only memory and 8K bytes of random-access memory. It is said to flush all data to ensure data integrity, to allow the use of a normal asynchronous line as a Terminal Simulation Facility line and to support these lines individually instead of allocating them in groups of four.

The processor costs $1,250, which includes one year of maintenance.

Trax Softworks, 10801 National Blvd., Los Angeles, Calif., 90064.

VOICE/DATA COMMUNICATIONS

■ **ITT Communications Services Group has announced a business telephone service designed to enable customers to place calls automatically over its net via the least expensive route.**

ITT Smart-Wats can reportedly be used with any private automatic branch exchange, so there is no need to modify a customer's telephone system. It automatically finds the least expensive way to deliver calls and bills the customer at that rate, regardless of the line that carries the call.

ITT Smart-Wats service billing schedule includes monthly access charges ranging from $75 to $120, depending on the city, and graduated rates by Wats band.

ITT Communications Services Group, 100 Plaza Drive, Secaucus, N.J. 07096.

From page 81

Case unveils multiplexers

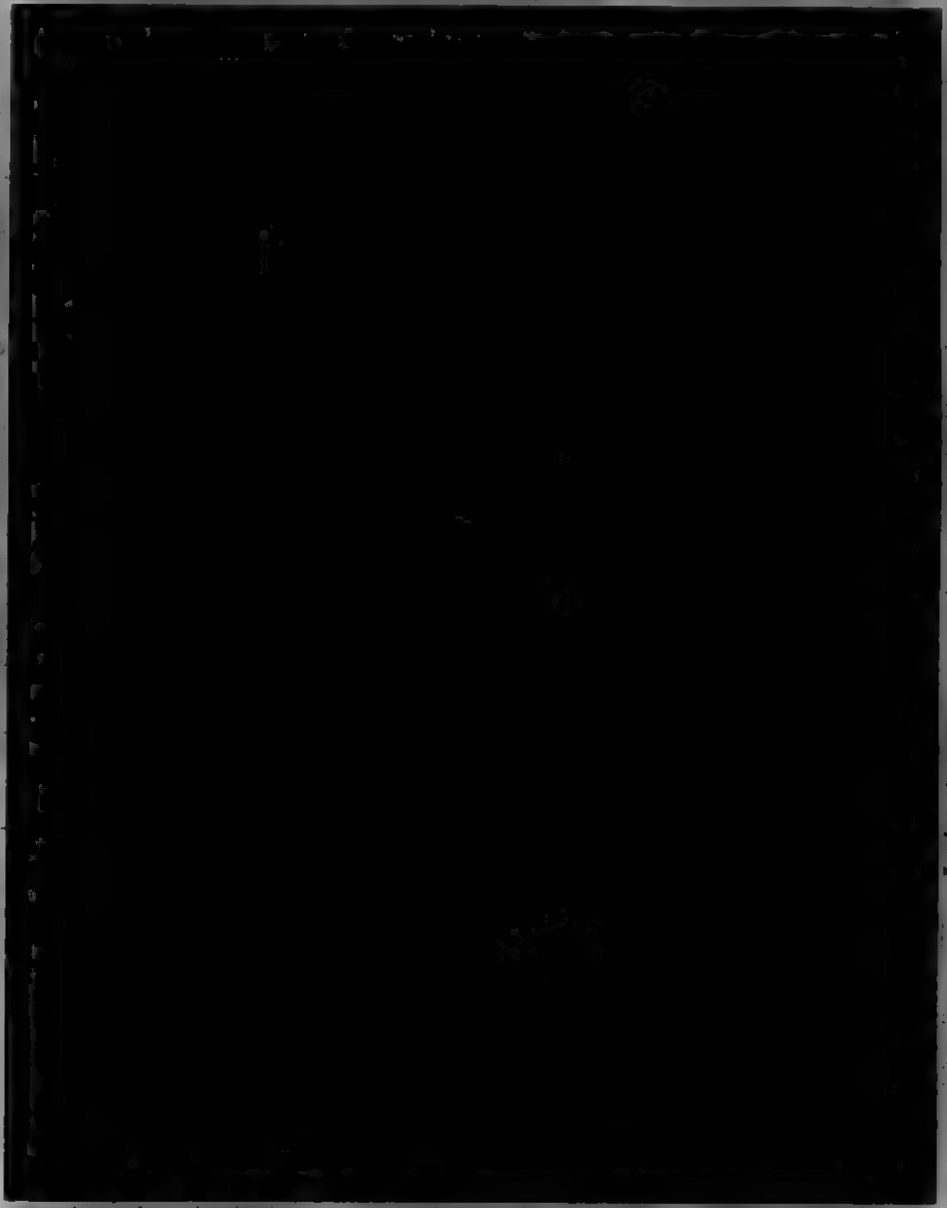
point-to-point or multipoint link via public switch network or direct-distance dialing. Restoration of a line can be controlled at the site or by remote terminal.

A stand-alone version of 4000-DB1 costs $950, and a card version costs $900.

The DCX/T1 works with T1 lines that transmit data at speeds of up to 1.544M bit/sec. The product features a drop-and-insert capability that enables linking bundles of information by an intermediate node without demultiplexing and remultiplexing operations.

The product is compatible with AT&T's Accunet network and supplies redundant capability for automatic switchover at every major point of concentration in the line.

Prices range from $15,500 to $22,500 for the product.



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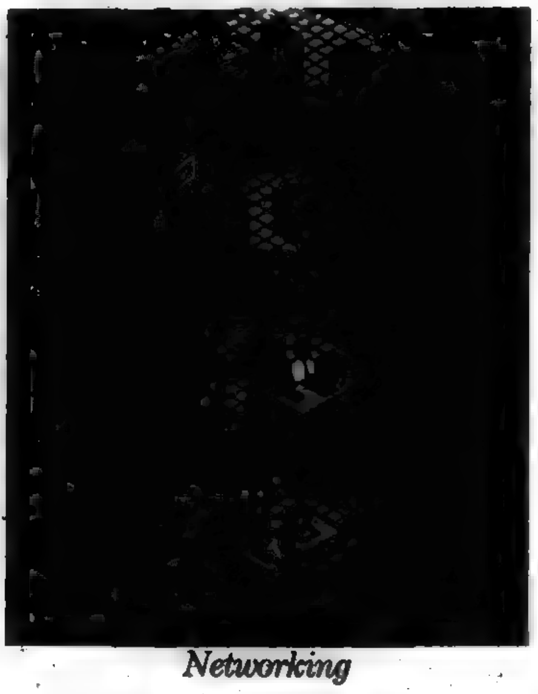

Networking

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From page 81

NEC American unveils several modems

dium-size networks. Network Control and Management System runs on NEC's Advanced Personal Computer and can be used to monitor one to 15 lines with transmission speeds ranging from 2,400 to 14.4K bit/sec.

The package monitors line parameters including power levels, signal quality, frequency offset and dropout. It supports functions for analog and digital loop-back testing, multipoint and end-to-end self tests and automatic polling. The network management package sells for $16,000.

The N2420/30 is a full-duplex modem that operates at speeds from 300 to 2,400 bit/sec. over two-wire dial-up networks. The modem has a modular design and is available in card and stand-alone models. Options include a call-back security system that can store up to 96 user codes and passwords; a Hayes Microcomputer Products, Inc. Autodialer; a NEC automatic dialer that stores 12 numbers and logon sequences; a synchronous dialer; and a security option.

Prices for the N2420/30 range from $575 to $999.

NEC's N500A is a digital service/customer service unit, designed for use with digital transmission facilities, that features four-wire and half- or full-duplex operation at speeds from 2,400 to 56K bit/sec. The asynchronous modem, available in either card or stand-alone models, can be used with point-to-point and multipoint networks and supports RS-232 and V.35 interfaces. An LCD monitors the tests. The devices range in price from $795 to $995.

From page 81

Overseas E-mail here; other connections not

ly to report on foreign sales, he said.

Sending an electronic message long distance is faster and more expensive than sending a letter, Winther noted, and yet, like a letter, the sender has no way of knowing immediately if the message has been received.

Despite this, Winther said, "There's going to have to be interconnection" of the public E-mail systems of different nations. That interconnection, he said, will be speeded as electronic mail vendors set up similar systems in other countries. ITT has already sold versions of its Dialcom E-mail system to both Germany and Britain for use in their national telephone systems, Winther said.

E-mail messages from public systems are most often converted to telexes when being sent to public E-mail systems in foreign countries. But at least one vendor, Electronic Mail Corporation of America, is offering what it claims is the capability to translate public E-mail messages from one format to another and then transmit them overseas on its packet-switched network.

With the company's GEM Service, before messages are routed overseas, they are processed at the firm's headquarters in Old Greenwich, Conn., and translated into the electronic mail form of the recipient country. In return for the slight delay in transmission, Electronic Mail Corporation of America makes "everybody compatible with everybody else," said Nina Scozzari, manager of corporate communications.

From page 81

Light switching now a possibility

switching an electrical signal. A photonic switch may not be able to match the speed of an electric switch, but it does supply other benefits. For example, higher speed connections can be maintained by obviating the need to convert light signals back to electricity for switching purposes. Additionally, photonic switching may increase system reliability by doing away with electronic transceiving equipment.

Large photonic switches could be made by applying this technology to fiber junctions in a switch matrix. This would enable any incoming port to be routed to any outgoing port. This same switching technology can also be used to modulate light pulses to build communications systems capable of higher operating speeds than are currently possible.

Light travels at more than 186,000 miles per second — less than a foot in a billionth of a second. Our ability to modulate or encode light signals to carry information is limited by the speed with which we can turn a light source — usually a laser — on and off. Instead of modulating the light source, Ericsson's light switch can be used to modulate the light itself, a technique called external modulation.

By turning a laser on and off we can encode information into a binary signal (light/no light) that can be interpreted by a computer as ones and zeros. Ericsson's switch provides the same effect as turning the light source off and on by diverting the light signal.

Envision the same simple switch example used before. If a constant light source was being pumped into line A, it could be modulated or encoded to go out line B by diverting the light away from that port, perhaps to a dead-end line C. A light signal, for example, could represent a zero, and lack of light (a diverted signal) could represent a one.

After having said these switches were slower than electrical varieties, remember that to improve on today's fiber-modulation techniques, it is only important to improve the speed with which we can turn lasers on and off. Ericsson has demonstrated that it can achieve communications speeds of up to 3G bit/sec. and claimed it is possible to transmit at 6G bit/sec., more than seven times faster than today's best systems.

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SYSTEMS & PERIPHERALS

SHOP TALK
Nicholas M. Baran

Micros moving in engineering

The battle between microcomputers and minicomputers has been developing slowly in the engineering industry. Engineers traditionally are conservative and reluctant to change old ways.

As recently as 1982, many engineers were still using keypunch machines to enter their data, even though the next room was filled with interactive terminals. Project management was done by hand or with a pocket calculator. Engineers were skeptical about microcomputers and considered them to be toys for hobbyists. Mainframes such as the Control Data Corp. Cyber 170 and superminis like the Digital Equipment Corp. VAX-11/780 had a lock on the engineering industry.

But in recent months, microcomputers have been making significant inroads into engineering firms. Engineering software, previously limited to more powerful machines, is becoming available on micro and supermicro computers. These smaller machines now can handle some of the problems that always were solved in minis or mainframes. Software such as Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase II are becoming increasingly popular for project management and data tracking tasks.

Engineers traditionally have relied on large mainframe machines for solv-

Continued on page 109

Baran is manager of computer operations for Cigna Corp., a San Francisco engineering consulting firm.

Through the years with DEC

MIT academics launched interactive processing

SEVENTH IN A SERIES

By Donna Raimondi

At a time when computers cost $3 million apiece, three men developed a system that sold for $120,000, giving birth to what would become the second largest computer company in the world.

In 1957, Ken Olsen, his brother Stan Olsen and Harlan Anderson — all working at MIT at the time — started Digital Equipment Corp. in 8,500 sq ft of a rundown former woolen mill in Maynard, Mass. Most computers at the time were large, batch processing machines, but Ken Olsen decided that interactive processing was a better idea for many applications.

"We proposed how to make computers with transistors, and people laughed at us and said we were just academic. Now we laugh at people at MIT and say they are just academic," Ken Olsen said in a recent interview.

DEC was founded on the philosphy that computers should not be reserved for the government and large, wealthy corporations, as they had been until then, but also should be available to smaller organizations.

By 1960, after three years of selling digital logic modules, the company released the PDP-1, a small, interactive computer. Annual sales reached $6.5 million in 1962, giving DEC the lead in the market they helped to create — the minicomputer industry.

Under Ken Olsen's leadership, DEC outgrew its original 8,500 sq ft, then the rest of the 1.6 million sq ft, 23-building mill that it purchased in 1974. The company spread into neighboring towns, other states and foreign countries as its sales multiplied.

MIT's attitudes toward computers strongly influenced the fledgling company. The freedom the university gave to its researchers and students to use its early computer equipment led Ken Olsen to conclude that interactive systems were the way to go. Out of MIT's policy of letting students work unhindered on its systems came computer games and much of what the world knows about interactive computing, he said.

> *DEC's philosphy was that computers should not be reserved for the government and large, wealthy corporations.*

"The third thing that came from MIT was that computing should be fun," Ken Olsen said. This attitude, which DEC adopted, also gave birth to hacking, which, he added, is both good and bad. DEC's success rests in the company's decision 10 years ago to adopt one architecture and one operating system, according to Ken Olsen. All of the DEC product lines — the PDPs, the VAXs, the LSIs — are compatible from their earliest to their latest versions, a DEC spokesman said. Software that ran on a

Continued on page 96

- Applied Expert Systems introduced an artificial intelligence-based personal financial planning system/88
- Fairchild debuted in the 32-bit microprocessor market with a three-chip module/88
- Xerox Computer Services released a turnkey manufacturing management system/88
- Digital Equipment enhanced its Vaxstation II design and manufacturing workstation/90
- Adage announced four DEC Microvax II-based workstations/90
- A discussion of IBM connectivity and open architecture with Wang Laboratories' J. Carl Masi/104

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Masscomp announces Motorola 68020-based 5000 line

BOSTON — Claiming to offer higher performance than superminicomputers and minisupercomputers, Masscomp last week introduced its Masscomp 5000 family of computers, systems based on Motorola, Inc.'s 68020 microprocessors and 68881 floating-point processors.

The product line includes the previously available MC500, renamed the MC5500, and four other models supporting from one to 64 users in scientific and technical environments.

In a press conference telecast to about 25 U.S. locations, the Westford, Mass., company's spokesmen compared the Masscomp 5000 family's performance to systems ranging from the size of the Digital Equipment Corp. Microvax II to that of the Cray Research, Inc. Cray-1 supercomputer.

The Masscomp spokesmen characterized the machines as micro supercomputers that enable scientists and engineers to perform continuous calculations on large sets of data in real time — the type of applications run on supercomputers — in smaller scale systems and at a fraction of the cost of the Cray-1 and the DEC 8600 superminicomputer.

A spokesman said a fundamental characteristic of the Masscomp products is their ability to bring computing to the type of applications used in environments such as those aboard ships and laboratories in the Arctic Ocean.

According to the vendor, the systems feature a triple-bus architecture, including the Intel Corp. Multibus and the Masscomp STD+Bus, Masscomp's Lightning floating-point accelerator and a two-way associative cache that manages memory references in parallel fashion. They run Masscomp's Real-Time Unix, which is said to be compatible with both AT&T Unix System V and the University of California at Berkely 4.2 version of Unix.

Masscomp claimed the products provide up to one million samples per second in data acquisition sampling rates and perform 700,000 to 10 million instructions per second, 625K to 12M Whetstone operations per second and up to 13M floating-point operations per second.

The low-end products are the MC5300 and the MC5400.

The MC5300 supports one to four users, features a 12.5-MHz 68020 CPU and 2M to 4M bytes of memory, according to Masscomp spokesmen. The MC5300's price starts at $16,000.

The MC5400 is said to support one to 12 users, and features a 16.7-MHz 68020 CPU, 8K bytes of direct-mapped virtual address cache and 2M to 10M bytes of physical memory. It is priced starting at $25,900.

The MC5300 will be available in early 1986. The MC5400 is scheduled to be available in 90 days.

The MC5500 is available as a single or dual processor, supporting up to 18 users, and has been available since 1982. It ranges in price from $16,000 to $54,000, according to the vendor.

The MC5600 is available now in single- or dual-processor configurations with up to 16M bytes of main memory, 8K bytes of cache and 4G bytes of virtual address space, Masscomp spokesmen claimed. Typical configurations costs range from $78,400 to $88,750.

The four-processor MC5700 is scheduled to be available in 90 days.

It supports up to 64 users with 8K bytes of cache memory, 32M bytes of main memory, and 4G bytes of virtual address memory. A typical four-processor configuration costs $167,150.

Fairchild unveils CMOS microprocessor

Fairchild Camera and Instrument Corp. of Mountain View, Calif., last week announced its first 32-bit CMOS microprocessor, using the basic elements of a reduced instruction set computer architecture.

Clipper, scheduled for sample-quantity availability in June 1986 and volume delivery in the fourth quarter of 1986, reportedly runs at 33 MHz and uses hard-wired rather than microcoded instructions to achieve peak performance of 33 million instructions per second (MIPS). Fairchild claimed an average performance of 5 MIPS.

The three-chip module was designed as an AT&T Unix-based engine for use in both scientific and professional computing applications. The three chips include a central processor with an on-board floating-point execution unit and two cache and memory management chips, one for instructions and one for data. The cache chips are linked to a CPU via a dual-bus architecture with one 32-bit bus dedicated to instructions and one to data. Another 32-bit multiplexed address and data bus allows the chip set to interface with main memory and with industry-standard peripheral chips.

A Fairchild official said the key to the module's performance is a scoreboard mechanism that simultaneously tracks events in all resources, a feature he said was previously available only in supercomputers like those made by Cray Research, Inc. and Control Data Corp. He also said the microprocessor has a load-store architecture with instruction prefetch overlapped with integer and floating-point execution units.

The major functional blocks of the Clipper's CPU chip are an integer pipe with a three-port 32- by 32-register file, serial 64-bit double-bit shifter and 32-bit arithmetic logic; a 64-bit floating-point unit with its own eight 64-bit registers; prefetch logic to support an 8-byte instruction buffer; and a macro instruction read-only memory used to execute sequences of standard machine instructions. Clipper costs $2,451.

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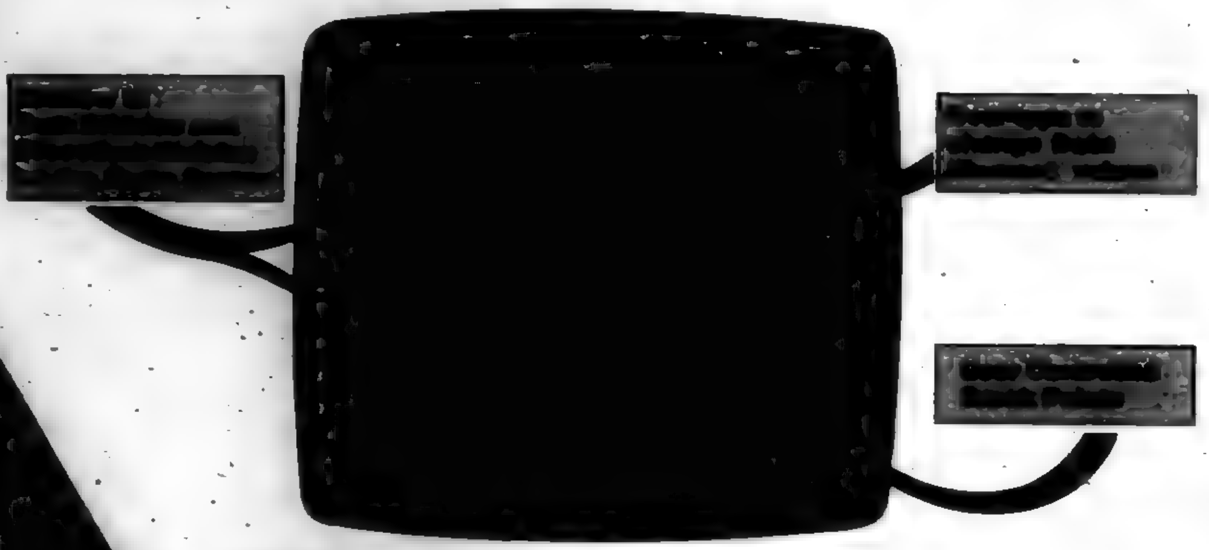


Tool applies AI to finance

Applied Expert Systems of Cambridge, Mass., has introduced a turnkey expert system that applies artificial intelligence to a personal financial planning product.

The company claimed that Planpower can use a knowledge base of financial expertise to reduce the time required for a typical professional planning project from 60 hours to a few hours.

Applied Expert Systems also said it has signed an agreement to allow First Financial Planner Services, Inc., a Travelers Insurance Co. subsidiary, to distribute the system to independent financial planners. The company still will market Planpower to major financial institutions, such as banks, insurance companies and brokerage firms, through its own direct sales force.

Planpower includes a Xerox Corp. 1186 artificial intelligence workstation and a coprocessor that allows the workstation to run software written for the IBM Personal Computer and Personal Computer XT. It also features the company's proprietary expert system software; data base and spreadsheet software, word processing, an English language interface and compatibility with a Hewlett-Packard Co. Laserjet printer, the vendor said.

The Planpower knowledge base is said to consist of the equivalent of 6,000 decision-making rules and more than 125 types of financial products.

Scheduled for shipment in early 1986, the system costs about $50,000.

Turnkey system out

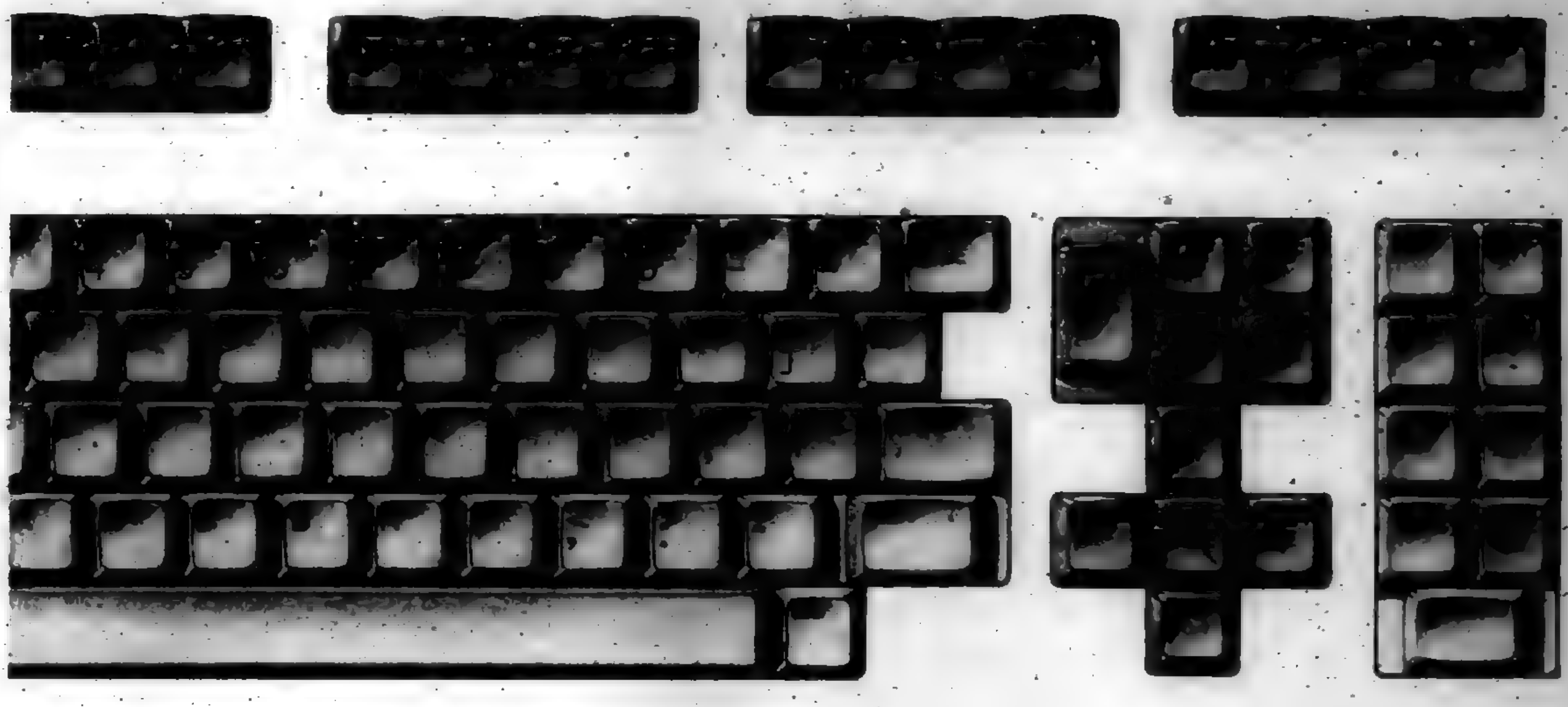
Xerox Computer Services, a Los Angeles-based division of Xerox Corp., has released a turnkey manufacturing management and control system scaled to companies that generate up to $40 million annually in revenue.

The Entry Turnkey system, priced at $236,000, the result of a value-added remarketer agreement with IBM, combines Xerox business and manufacturing software applications with an IBM 4361 Model K3 mainframe running under IBM's SSX and DOS operating systems.

Peripheral equipment includes IBM's 3370 DASD, 8809 magnetic-tape unit, 3262 line printer, 3278 display console and a 3178 user-display terminal. Up to 20 3178 terminals can be added at additional cost.

Modules in Xerox software include management packages for inventory, orders, receivables, sales and procurement, material requirements planning, cost planning and control, accounts payable, general ledger and an interactive query and report generator.

The company reported that the software can be migrated to any IBM 370-compatible system as the user's needs increase.



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Vaxstation II capacity boost tops DEC announcements

A boost in the capacity of its Vaxstation II design and manufacturing workstation headed the list of announcements by Digital Equipment Corp. The Maynard, Mass., company also unveiled a program to allow Vaxstation I users to upgrade to the Vaxstation II and an upgraded version of its MicroVMS Workstation Software.

DEC released a configuration of the Vaxstation II, which incorporates the company's Microvax II computer, that has a larger enclosure with a 12-slot backplane capacity plus provisions for four mass storage units, a spokesman said. The large enclosure configuration allows three RD53 71M-byte hard disks and a tape backup, as opposed to the standard enclosure that allows RD52 31M-byte hard disks.

In addition, the newest version of Vaxstation II includes 3M bytes of main memory, as opposed to 2M bytes in the standard version; 71M bytes of hard-disk space, said to be more than twice the capacity of the standard version; and a ½-in. tape cartridge. The system features a 5¼-in. floppy disk backup storage device, a three-button mouse, a 19-in. monochrome monitor, a Decnet/Ethernet interface and a graphics subsystem.

The $36,980 price includes DEC's MicroVMS operating system, the newly announced MicroVMS Workstation Software Version 2 and GKS-0B graphics software licenses.

A program scheduled to close on Dec. 31 will enable Vaxstation I owners to replace their systems with a standard Vaxstation II system. The Vaxstation II configuration includes 2M bytes of main memory, a monitor, a keyboard and mouse, a video controller, a Decnet/Ethernet networking interface, RX50 and RD52 31M-byte disk drives and associated software. The exchange costs $16,500.

Software in the exchange includes Version 2 of the MicroVMS Workstation Software. Owners may exchange Microvax I layered-software licenses for Microvax II equivalents at no additional charge, the vendor said.

Version 2 of the MicroVMS Workstation Software package and the graphics interface for the Vaxstation I and II systems are said to provide tools that allow programmers to write application programs in which the user can create, manipulate and draw into windows displayed on the Vaxstation screen. This capability is said to enable users to enlarge or reduce one or more windows.

The programs that can be developed will enable users to emulate different terminals on the screen on a window-by-window basis.

A license for the Version 2 Microvax Workstation Software costs $1,000.

Adage offers workstations

Adage, Inc. of Billerica, Mass., has taken the wraps off four Digital Equipment Corp. Microvax II-based stand-alone workstations — two for DEC environments and two for both DEC and IBM computing environments. All of the workstations operate under DEC's MicroVMS operating system.

Each of the workstations features multiwindowing, multiterminal capabilities that are said to allow users to run concurrently a Tektronix, Inc. 4100 window, four simultaneous DEC VT200 windows and the DEC MicroVMS console window. In addition, the 6580 and 6585 workstations provide an Adage 6080/IBM 5080 window. Four to eight RS-232 ports are available for additional serial devices.

An entry-level workstation consists of Adage's Ocean Graphics Engine; a Microvax II with 3M bytes of memory and hardware floating-point processor; eight RS-232 lines; dual 800K-byte floppy disks; a 105M-byte, 5¼-in. fixed Winchester disk drive; an Ethernet interface; 1M byte of graphics memory; a 19-in. monitor; and keyboard. Software includes a MicroVMS license supporting up to eight users and the Adage graphics library, including Tektronix 4100 and VT200 emulators and the Adage window management system.

The company said the 6580 and 6585 workstations provide IBM 5080 emulation and two- and three-dimensional color graphics capabilities. These models will operate with all IBM 5080-compatible software, such as Cadam, Inc.'s Cadam and IPC and Dassault System's Catia computer-aided design and manufacturing software, as well as with most DEC and third-party software written for MicroVMS.

Prices for the 6580 and 6585 start at $66,500 and $71,500, respectively, and range upward depending upon factors that include the amount of main memory, display list memory and storage capacity.

The DEC-environment-only models provide the same 2-D and 3-D color graphics functionality as the 6580 and 6585. The 6500 and 6505 models cost $49,500 and $54,500, respectively.

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IBM plasma-panel display station and coupler out

IBM's Information Systems Group has announced a replacement for its 3290 Model 1 plasma-panel display station and a coupler to pair its 3480 tape subsystems.

The company said the 3290 Information Panels, Models 220 and 230, are functionally equivalent to the 3290 Model 1.

The Model 220 is functionally equivalent to the Model 1 with displays up to 9,920 characters and a data and typewriter keyboard, the vendor said.

The Model 230 reportedly also displays up to 9,920 characters but includes an integrated numeric keypad with the keyboard, similar to the keyboards of the IBM 3179 and 3180 display stations.

Each terminal costs $6,500. In addition, there is a minimum annual maintenance charge of $288, the vendor said.

The Control Unit Coupler 3211 is said to allow customers to couple two 3480 Control Unit Model 22s to form a single magnetic tape subsystem.

It is attached to only one of the coupled control units.

The Control Unit Coupler 3211 is priced at $4,045.

PROCESSORS

■ **Perkin-Elmer Corp. has introduced an array processor for its Series 3200 superminicomputers.**

The MAP-310 processor was developed by CSP, Inc. of Billerica, Mass., to process 32-bit format floating-point calculations and control I/O in a real-time environment, Perkin-Elmer said.

Software available for the MAP-310 includes CSP's Snap II Executive, a multitasking, real-time operating system for task scheduling, monitoring and control and the Snap II Array Processor-resident library, the vendor said.

The basic MAP-310 system includes 500K bytes of data memory and 128K bytes of memory devoted to the operating system plus an interface to Series 3200 superminicomputers.

The basic MAP-310 costs $44,700. The Snap II software system costs $5,000 for a single-user license.

Perkin-Elmer, Data Systems Group, 2 Crescent Place, Oceanport, N.J. 07757.

DATA STORAGE

■ **System Industries, Inc. has unveiled an addition to its 9700 family of disk drives for use with Digital Equipment Corp. VAX and PDP series machines.**

The 10½-in. Winchester-type 9761 disk drive has a transfer rate of 2.5M bytes and a capacity of 689M bytes. It has an 18-msec average positioning time and a dual-channel option. The drive can be used with System Industries' 9900 series of controllers, including the cluster controllers that allow up to eight DEC systems to share a common data base.

The 9761 is said to offer a mean-time-between-failure rate of 20,000 hours. It costs $16,500.

System Industries, 1855 Barber Lane, Milpitas, Calif. 95035.

■ **Aviv Corp. has released a tape system and a multiport electronic switch for sharing tape drives among up to six controllers.**

The 200 in./sec. group-coded recording (GCR) tape system comes in four configurations and operates in start/stop mode. It can read/write at 1.25M byte/sec. in GCR and phase-encoded densities. The GCR 200 system contains the Fujitsu Ltd. tape drive Model 2436 and Aviv-designed and manufactured controllers.

Configurations for Digital Equipment Corp. VAX, PDP, Microvax and LSI systems cost $38,000. For Multibus systems based on Aviv's Tape File Controller (TFC) 505D controller and for Data General Corp. MV and Nova/Eclipse systems based on Aviv's TFC 715A/B2 controller, the cost is $39,000.

The Multi Port System 300 electronic switch allows the sharing of tape drives with I/O devices that are formatted to be compatible with Pertec Peripherals Corp. devices. Tape drives can be shared among up to six controllers, the company said. The allocation of the tape drives to a particular computer is done via a switch on the front panel for the MPS chassis.

The Model 300-2 two-port switch costs $2,950. A Model 300-4 with four ports costs $4,450; and a six-port version, the 300-6, costs $5,950.

Aviv, 26 Cummings Park, Woburn, Mass. 01801.

■ **Thorn EMI Technology, Inc. has announced an embedded interface card option for each of its three ½-in. streaming tape drives that reportedly makes them compatible with the American National Standards Institute's (ANSI) small computer systems interface.**

The company's family of ½-in. 9-track streaming tape drives includes Models 8900, 9800 and 9900, which are said to be compatible with IBM, ANSI and European Computer Manufacturer Association systems.

The option costs $1,845.

Thorn EMI Technology, 8601 Dunwoody Place, Atlanta, Ga. 30338.

Continued on page 98

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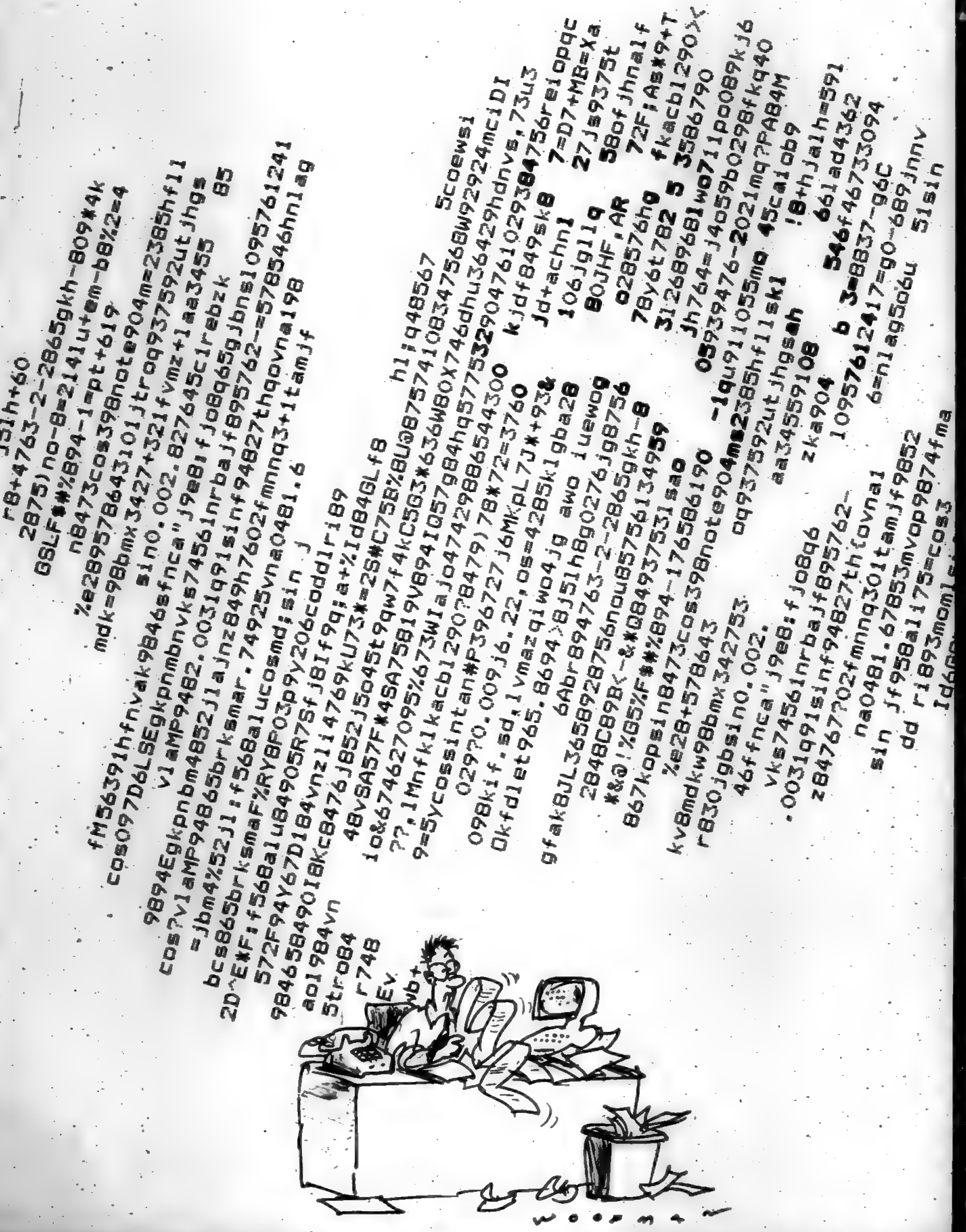

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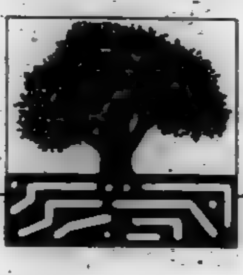

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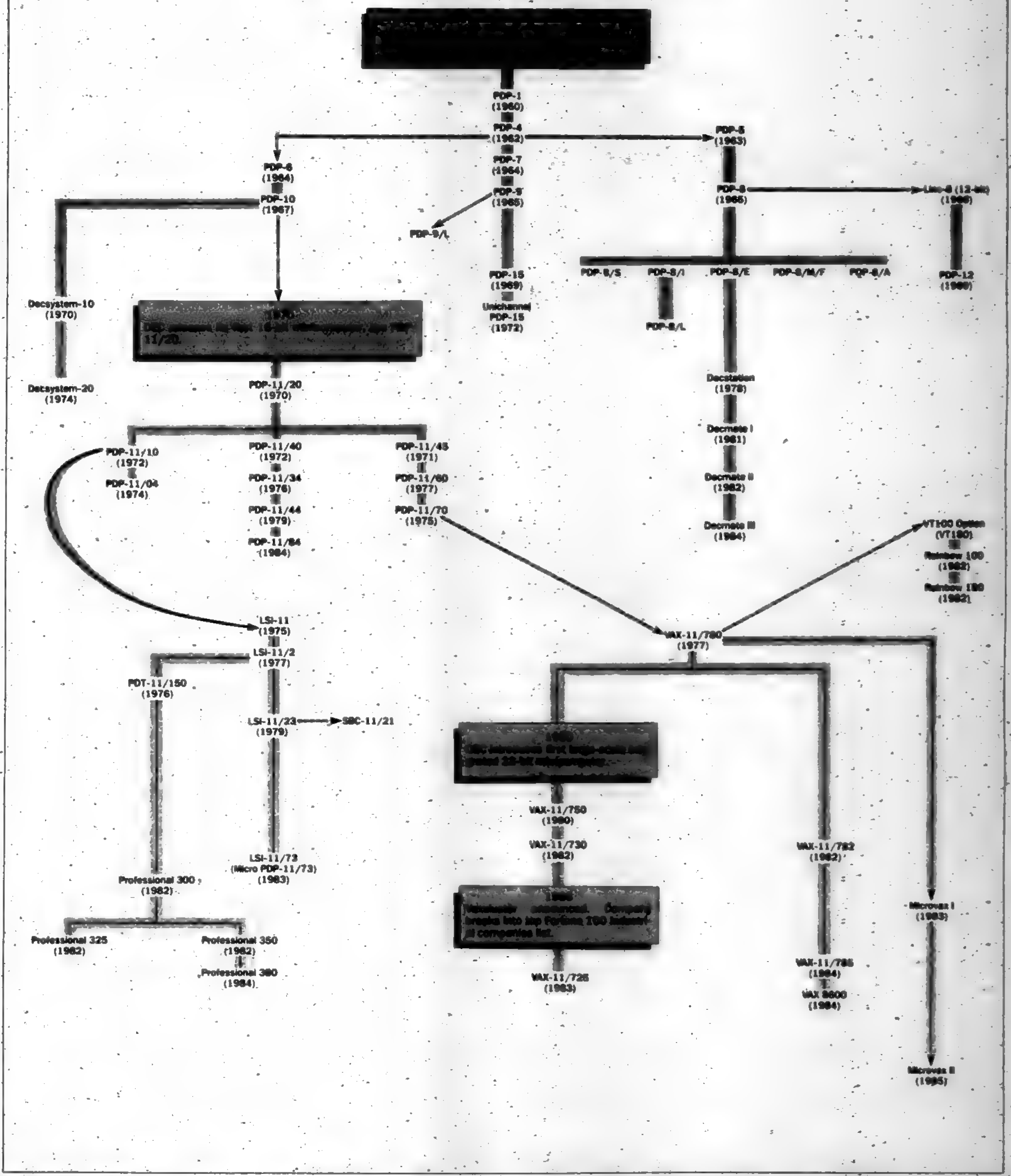
Digital Equipment Corp. Family Tree



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Through the years with DEC

PDP-5 can run on a PDP-8 and on a Decmate III. The earliest VAX machine's software will run on the Microvax II, he said. "We . . . decided that it would be an architecture that would work from the desktop to the large data center. . . . It took 10 years to get both, but it's still basically the same architecture," he said. The VAX series machines, with their VMS operating systems, are the backbone of the single-architecture, single-operating-system philosophy.

Some DEC customers would disagree that the company adopted a unified approach.

One of the stormiest events in the firm's history occurred in 1983 when the company discontinued its Decsystem line of computers running under the TOPS operating system. The decision left users without a migration path. DEC, the users maintained, promised its Decsystem-10 and -20 customers a bigger and better machine, dubbed the Jupiter project in development, but then dropped the project. The users were stranded with systems that were not easily compatible with the newer VAX line.

The single-architecture philosophy calls for the use of only one version of each programming language, Ken Olsen said. There are about 15 languages, including Cobol, Ada and Fortran, but only one version of each that has been refined continually over the years.

Another of DEC's strategies over the years has been to buy, rather than build, parts for its products that could easily be bought. "However, a number of years ago it became clear that there were certain things we had to design ourselves," said Ken Olsen, in reference to DEC's semiconductor facilities. For pioneering or special devices, such as the chip for the Microvax II supermicrocomputer, DEC now has its own semiconductor design and manufacturing facilities.

To talk to Ken Olsen today is to talk connectivity. Networking and clustering computers are the subjects that fire him up as well as the strategies that propel his company. "Networking is [an] exceedingly complicated business because we have got to tie everything we make together — all kinds of computers — even those that aren't in our main VAX strategy (all those that we made before) — and we have got to talk to other people's computers," he said.

Networking developments include the Decnet Phase III network and Ethernet. A major step for DEC, according to Olsen, was the development of Ethernet, in cooperation with Xerox Corp. and Intel Corp., the networking standard designed to "tie it all together."

In 1983, DEC introduced the Vaxcluster process for tying VAX processors together in a loose coupling scheme. The clustering concept allows customers to tailor systems to their needs, a DEC spokesman said, adding functions such as memory or storage in the needed quantities.

A spate of small business machines released in 1982 — the Professional 325 and 350, the Rainbow 100 and Decmate II — was part of an effort to broaden DEC's position in the office automation arena.

Personal computers are an important part of an overall communications strategy, but they aren't for everyone, Ken Olsen said.

"That's what I was beat up so badly for two years ago — when I wouldn't admit that the personal computer was going to take over everything and that they were just a component in the big system," he said. "Personal computers are . . . basically a key part of off-loading computers, and they will be the terminal of the future," he said.

Olsen may be philosophizing a bit too much, however. When given a choice between DEC and IBM's personal computers, users choose IBM almost every time, according to market research firms. That trend leaves DEC with stockrooms full of Rainbows and Professionals. The systems are still being made but only to order, according to DEC spokesmen.

Ken Olsen said that when he started DEC, he never thought that the company would grow so big or that he would remain in charge for so long. His MIT experiences set the style for a company that would become loosely organized and fairly undisciplined in its design and marketing approaches. That way of doing business worked well for several years because the market was wide open to almost everything DEC was selling, Olsen said.

As the market tightened up, however, the company structure had to be drastically changed, he added. "We moved all the way from 38 product lines to an organization in which what we offer is an integrated network."

Many of DEC's entrepreneurs left at that point, Ken Olsen said. "Some were sure that the company was going to pot because they didn't have the freedom of being independent, or they never talked to so-and-so before and were not about to start," he said.

In engineering, the metamorphosis from the entrepreneurial spirit with little discipline to a structured approach with a lot of discipline has unfolded over a 10- to 15-year period, so the change has not been painful, Ken Olsen said. "You end up with a lot more creativity if you have structure," he said.

Ken Olsen is still running the show at DEC although, he said, "I definitely plan to retire someday." He will not publicly set a date, and without a date, one never leaves, he said. "It's more fun now. I'm more involved in products and strategies."

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Data Storage

■ Wespercorp, Inc. has introduced a universal storage module drive (SMD) disk controller for Intel Corp.'s Multibus computer systems.

The Multibest Model MB-SMD is a single standard printed-circuit board, said to be installable in any available Multibus card slot in the Multibus computer or expansion chassis. It is also said to be software compatible with the Intel iSBC 220 disk controller.

It provides the interface for a disk system of up to four large-capacity removable or fixed Winchester media SMD disk drives at data transfer rates of up to 2.4M byte/sec.

The MB-SMD costs $2,100.

Wespercorp, 14511 New Myford Road, Tustin, Calif. 92680.

■ Sigma Information Systems, Inc. announced a Q-bus tape-cartridge controller for Digital Equipment Corp. LSI-11 systems and QIC-2 drives.

The STC-TSQ11 links a 5¼-in. QIC-2 streaming tape cartridge drive to the Q-bus, providing a bootable backup for Winchester and other large-capacity disk drives. It reportedly can operate as a file-structured drive as well as a fast streamer and can save or restore 60M bytes of data on a ¼-in. industry-standard tape cartridge in 12 minutes.

The controller emulates the DEC TK25/TS11 and is compatible with LSI-11 series and DEC Microvax II CPUs, the vendor said.

The STC-TSQ11 costs $1,250.

Sigma Information Systems, 3401 E. La Palma Ave., Anaheim, Calif. 92806.

■ California Computer Group, Inc. has announced a line of ½-in. tape subsystems compatible with Digital Equipment Corp. Microvax systems, designed to speed disk backup and enable Microvax users to utilize their ½-in. tape libraries.

The CMQ45-KS reportedly features rates of 45 in./sec. start/stop and 100 in./sec. streaming, both at 800 and 1,600 bit/in. densities. It offers front autoload and autothreading, adjustment-free operation and built-in diagnostics.

The CMQ75-C 75 in./sec. Group Coded Recording (GCR) cache streamer has 128K-byte cache buffers allowing continuous streaming at 75 in./sec.

The CMQ50-T GCR subsystem offers 50 in./sec. start/stop, and the CMQ75-T GCR subsystem offers 75 in./sec. start/stop. Both operate at a density of 800, 1,600 and 6,250 bit/in. They offer autoload and autothreading, resident diagnostics and expandability to up to four drives per controller.

The CMQ200-MS 200 in./sec. cache streamer reportedly backs up an entire DEC RUA81 on a single 500M-byte book-size tape cartridge in 36 minutes.

The CMQ45-KS costs $6,495. The CMQ75-C and the CMQ200-MS both cost $9,995. The CMQ50-T costs $12,950. The CMQ75-T costs $15,250.

California Computer Group, 3303 Harbor Blvd., G-10, Costa Mesa, Calif. 92626.

■ Point 4 Data Corp. has announced the addition of an 86M-byte, 5¼-in. Winchester disk drive to the mass storage devices supported by its Mark 2 computer system.

The addition of the Winchester disk is said to double the capacity of the Mark 2, which is capable of supporting up to seven concurrent users.

The cost of the upgrade is $4,600.

Point 4 Data, 2569 McCabe Way, Irvine, Calif. 92714.

■ System Industries, Inc. has unveiled its CS/80 disk system and a 500M-byte cartridge tape drive for disk backups for the Hewlett-Packard Co. HP 3000 series.

The CS/80 disk system costs $19,000 and emulates HP's 7933 disk drive. It comes with System Industries' 7000 controller and includes a cabinet that houses two systems in one space and a 404M-byte Winchester-based drive. It is said to offer a reliability of 10,000 hours mean time between failure.

The SI 7730 cartridge tape drive features 200 in./sec. streaming mode. It is said to have a mean time between failure of 5,000 hours and can handle up to 500M bytes of data. The 7730 is rack mountable and can be housed in the same cabinet with the CS/80.

The SI 7730 costs $13,500.

System Industries, 1855 Barber Lane, Milpitas, Calif. 95035.

■ Thorn EMI Technology, Inc. has added tridensity recording to its Model 9900 formatted 9-track, ½-in. streaming tape drive.

The IBM/American National Standards Institute/European Computer Manufacturers Association-compatible unit now offers as an option 800 bit/in. nonreturn-to-zero recording in addition to 1,600 and 3,200 bit/in. phase encoding on standard 7-, 8½- and 10½-in. tape reels, the vendor noted.

Recording at 3,200 bit/in. phase encoding, the tridensity 9900 stores 138M bytes of unformatted data on a 3,600-ft tape reel.

Streaming speeds are 25 and 100 in./sec. in the phase-encoding mode and 50 in./sec. in the nonreturn-to-zero mode, according to Thorn EMI Technology.

Other features include single tension arm, intelligent display, built-in diagnostics, see-through tape path cover and optional true start/stop recording.

The OEM price for the Model 9900 with tridensity recording is $3,700 in quantities of 250.

Thorn EMI Technology, 8601 Dunwoody Place, Atlanta, Ga. 30338.

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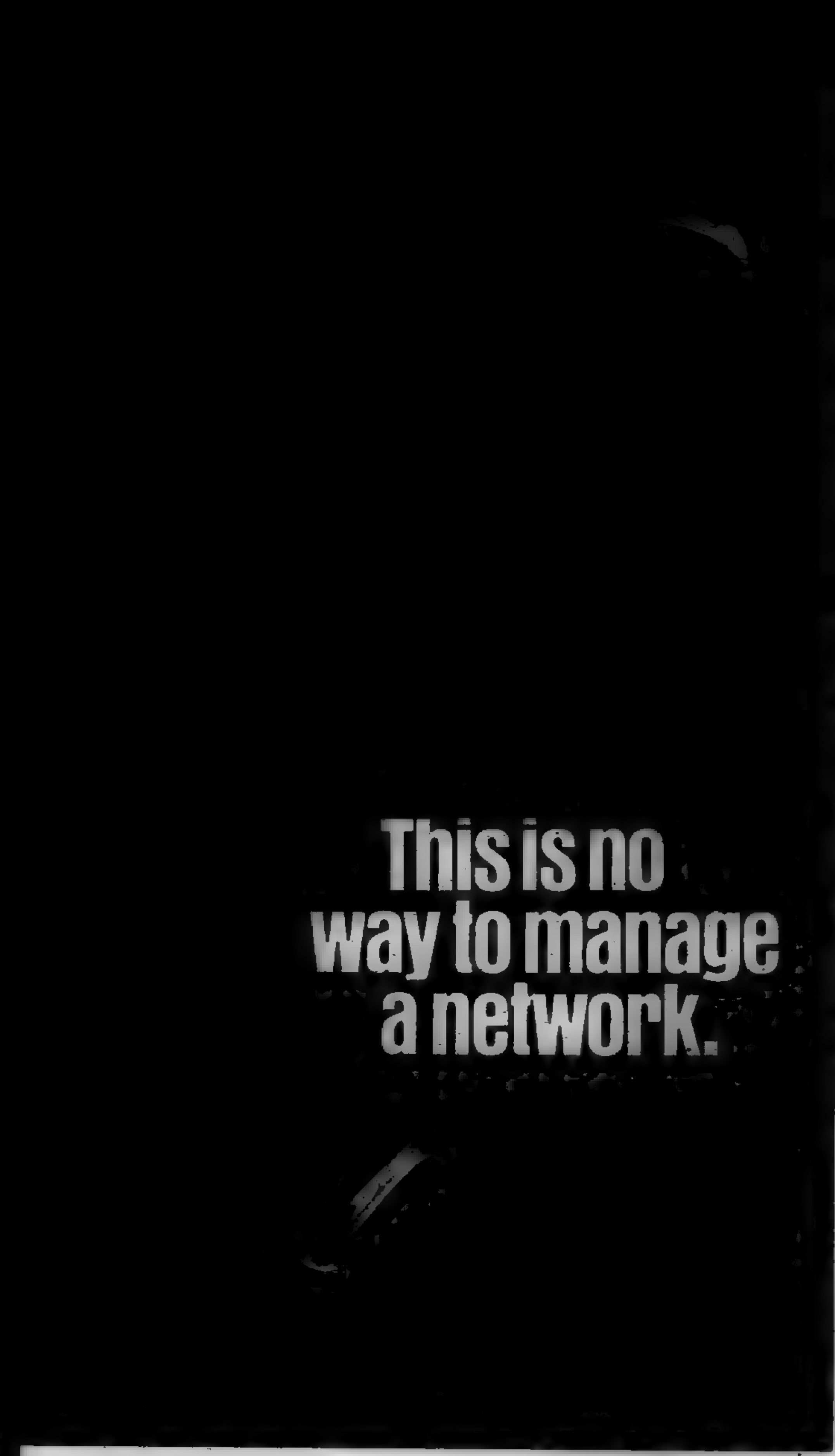

It takes more than wishful thinking to keep a network up and running. Particularly if you're working with more than one vendor and coordinating resources in many locations. Just by adding users, small problems can turn into big ones and, before you know it, your network's down from here to Hong Kong.

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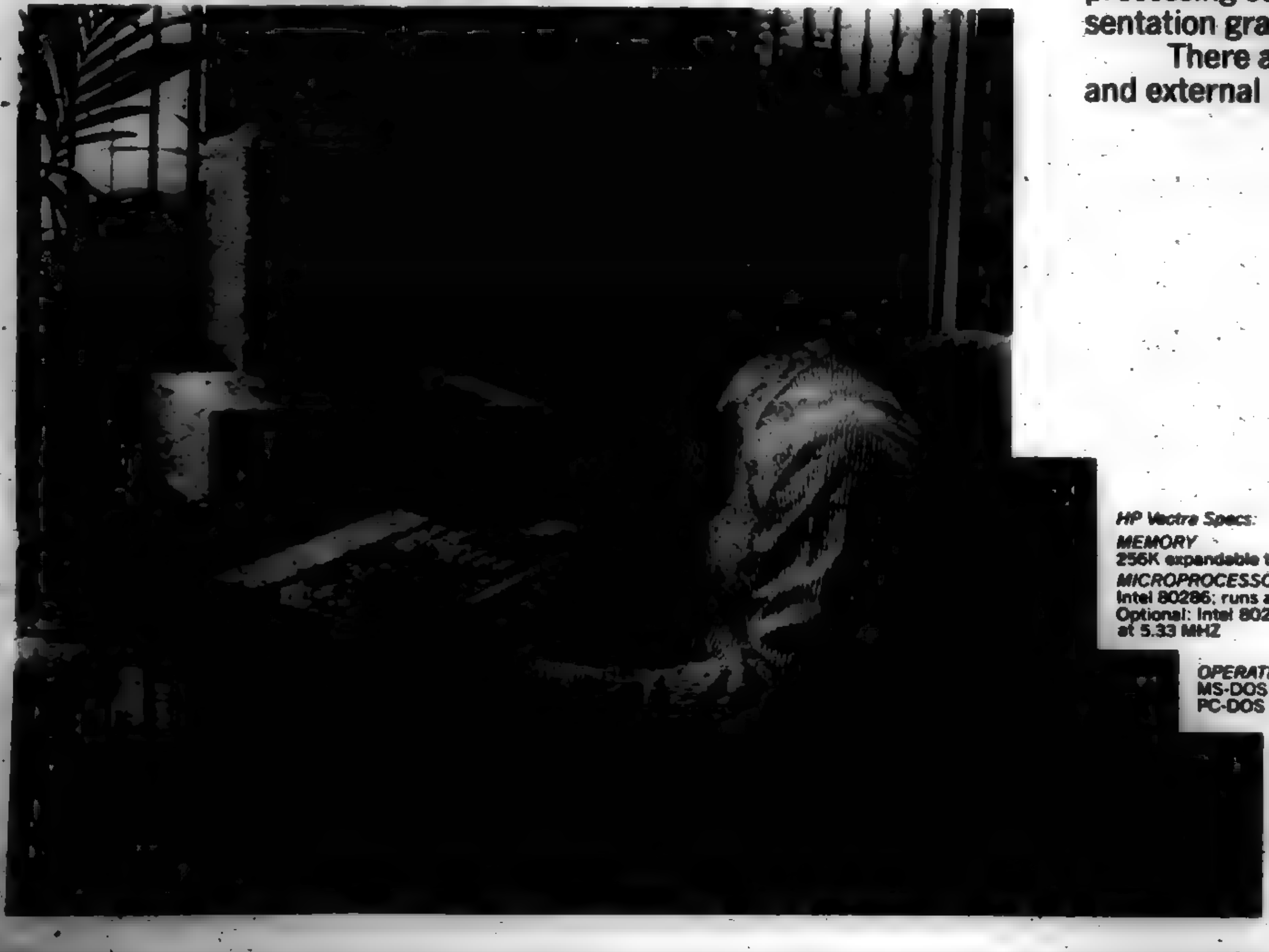
You get the *performance* you need, because you can select the power, speed and memory capabilities that suit you best; the *software* you need, because it's compatible with the IBM PC/AT; and the *hardware flexibility* you need, because it's designed to access a full range of accessories and peripherals.

The HP Vectra PC is a high performance computer. It's 30% faster than the IBM PC/AT. And with the addition of the optional co-processor, it can run even faster.

And since the Vectra PC is compatible with the IBM PC/AT, it runs PC-DOS 3.1 programs—without alteration. Like Lotus® 1-2-3®, MultiMate™ and R:BASE™ 5000, plus HP's new AdvanceWrite word processing series, TextCharts presentation graphics, and more.

There are several internal and external memory storage



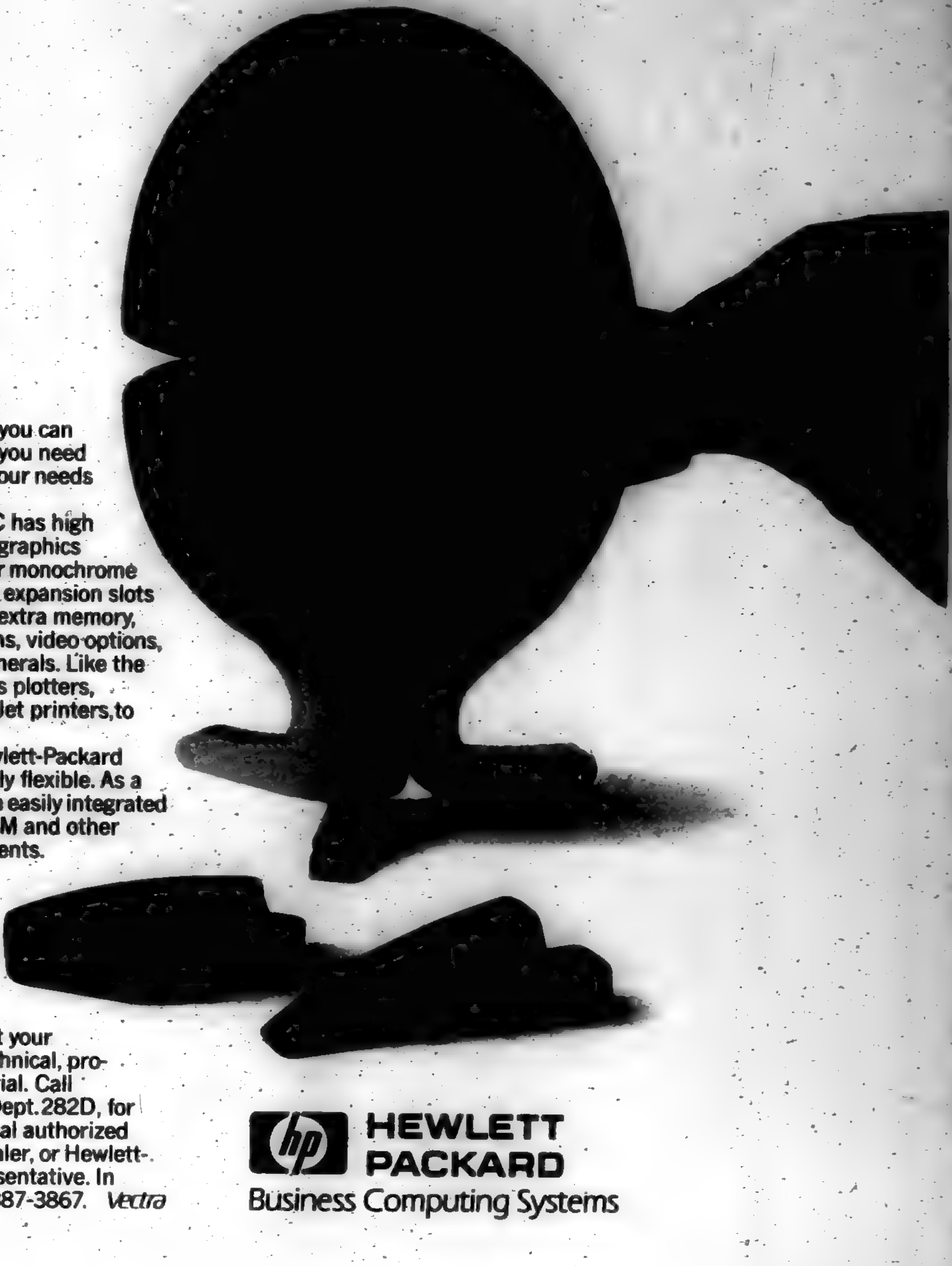
HP Vectra Specs:

MEMORY
256K expandable to 3.64MB

MICROPROCESSOR
Intel 80286; runs at 8MHZ
Optional: Intel 80287; co-processor runs at 5.33 MHZ

OPERATING SYSTEM
MS-DOS 3.1 (compatible with PC-DOS 3.1)

DATA STORAGE
5¼" internal flexible discs (360K or 1.2MB capacity)
20MB internal hard discs
3½" stand-alone flexible discs; 20MB stand-alone hard disc.



options, as well. So you can choose the storage you need now. Or expand as your needs change.

The Vectra PC has high resolution text and graphics capabilities. Color or monochrome displays. And seven expansion slots to add accessories, extra memory, data communications, video options, plus a host of peripherals. Like the popular HP graphics plotters, ThinkJet and LaserJet printers, to name a few.

In all, the Hewlett-Packard Vectra PC is superbly flexible. As a stand-alone, or as an easily integrated addition with HP, IBM and other computer environments. And, because it comes from Hewlett-Packard, you know you're getting a quality product.

Find out how the Vectra PC can fit your needs—whether technical, professional or secretarial. Call 1-800-FOR-HPPC, Dept. 282D, for the name of your local authorized Hewlett-Packard dealer, or Hewlett-Packard sales representative. In Canada, call 1-800-387-3867. *Vectra*

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Business Computing Systems

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TERMINALS

■ Applied Digital Data Systems, Inc. has released its Viewpoint/122, a top-of-the-line Digital Equipment Corp. VT220-compatible terminal.

The Viewpoint/122 also emulates DEC's VT100 and VT52 terminals, the company said. Features include variable smooth scrolling, a bidirectional printer port and a nonglare green screen (amber optional). All 16 of DEC's multinational character sets are accessible via a multilingual set-up mode. The terminal has a 12-in. diagonal screen with a 24-line by 80- or 132-col. display.

The Viewpoint/122 costs $795.

Applied Digital Data Systems, Display Products Division, 100 Marcus Blvd., Hauppauge, N.Y. 11788.

■ Tektronix, Inc. has announced a member of its 4100 series computer-aided design terminals tailored to electrical engineering, mechanical drafting and structural analysis tasks.

The system can be connected to any minicomputer with an RS-232 interface, the vendor said. The 4111 terminal features graphics functions such as multiple views, local picture segments, fast panel fill and patterning. It provides 256K bytes of local random-access memory for temporary storage of picture elements.

The terminal has a 19-in. color raster display with 1,024- by 768-pixel resolution. Sixteen colors can be simultaneously displayed from a palette of 4,096 separate shades, the vendor said.

The unit costs $12,950.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

■ Tab Products Co. has introduced a Digital Equipment Corp. VT220-compatible terminal.

The E-22 display terminal includes characters that are said to be 49% larger than the VT220s in the 80-col. mode and 47% larger in the 132-col. mode.

It features a 15-in. screen, 15 user-programmable function keys and eight soft function keys for terminal setup.

The unit costs $799, according to the vendor.

Tab Products, 1400 Page Mill Road, Palo Alto, Calif. 94304.

■ Tektronix, Inc. has released its 4100A series of computer display terminals.

The 4100A series is similar to its predecessor 4100 series but is said to have enhanced Digital Equipment Corp. VT100 compatibility. Those enhanced features include media copy and answerback and additional graphics manipulation capabilities, according to the vendor.

It also supports additional I/O devices such as Hewlett-Packard Co.'s Thinkjet printer, the Epson America, Inc. FX-80 printer and Centronics Data Computer Corp.-compatible copiers, the vendor said.

The series includes eight models that range in price from $2,995 to $9,995.

Three of the models are IBM 3270-compatible as well as DEC VT100-compatible.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

■ Graphon Corp. has introduced its GO-200 family of terminals that emulate Digital Equipment Corp. and Tektronix, Inc. terminals.

The GO-220 terminal emulates the DEC VT220 and VT100 terminals and is said to offer one display mode using DEC's 10- by 10-char. cell and a second mode using a denser 13- by 15-char. cell. It provides 24, 25 or 26 lines of display. The GO-220 costs $995.

The GO-230 is like the GO-220 but adds emulation of the Tektronix 4010 and 4015 graphics terminals with full Tektronix horizontal resolution and one-half the vertical resolution — 1,056 by 391 pixels. Alpha and graphics planes can be simultaneously displayed. It costs $1,295.

The GO-240, priced at $1,895, is said to be compatible with DEC's Regis graphics language. It supports mouse or digitizer pointing devices. Features include up- and downloading of the 2-bit map planes and pan and zoom functions, a third communications port and 90 programmable function keys. The top-of-the-line GO-250 is said to provide all of the above with full 1,056- by 782-pixel resolution. Up to 20 pages of text and four pages of graphics can be locally held. The GO-250 costs $2,495.

Graphon, Tower One, Fifth Floor, 1901 S. Bascom Ave., Campbell, Calif. 95008.

■ General Electric Co.'s Calma Co. has announced a 20% average price reduction for its Apollo Computer, Inc. DN660-based computer-aided engineering (CAE), design and manufacturing workstations.

The four Calma Apollo DN660-based systems are configured with design, drafting and manufacturing software for the mechanical market; Dimension III software for the architecture/engineering/construction market; Tegastation CAE/CAD software for electronics applications; and T-Boards software for printed-circuit board design.

The new price range is from $72,000 to $112,000.

Calma, 501 Sycamore Drive, Milpitas, Calif. 95035

■ Direct, Inc. has announced a Hewlett-Packard Co. 2392A-compatible terminal.

The Direct 6392 is said to offer 80- and 132-col. display and a 14-in. tilt-and-swivel monitor with a choice of green or amber display. It has an RS-

Continued on page 106

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Wang's J. Carl Masi on IBM and architectures

At the recent International Society of Wang Users meeting in Boston, Wang Laboratories, Inc. Executive Vice-President J. Carl Masi was interviewed by *Computerworld* Senior Editor James Connolly in connection with Wang's decisions to emphasize IBM connectivity and to open its architectures to other vendors.

What does IBM compatibility and open architecture mean to the user?

For the last two years, millions of personal computers, most of them IBM, were pumped into the offices of businesses large and small.

We were in a position before the Wang Office Center interfaced to the IBM Personal Computer where the IBM salesman would say to the customer, "You've got my IBM mainframe and my IBM Personal Computers; why not put in a System/36 to act as a departmental processor or a cluster controller and make those micros more productive?" Those very Personal Computers were sold without the need for a departmental processor; now [IBM] is coming in and saying, "Buy my System/36."

By Wang offering a local and a remote connection to that IBM Personal Computer, it allows us to say, "Wait a second, we've got a [Wang] VS computer here; compare it with your System/36. Go ahead, benchmark it, compare it. Look at its price/performance, look at its growth capability, look at the software that it has, the Wang Systems Network interface, and make your own decision as to which is the better departmental processor — the VS or the System/36." Without having that interface into the IBM micros, we were locked out of that market.

How did that decision come about?

Just a whole lot of customer demand. To be honest with you, it took us about a year and a half to make the decision.

What was actually involved in preparing for the announcement?

About two months of design engineering; that's all there was. The real resistance was impact on our own workstation product line. But let's face it, there are far more IBM Personal Computers out there on the desks than there are Wang workstations and Wang micros. So the strategic direction, the strategic effect, was to take a case where IBM had already captured the desk with an IBM Personal Computer and to make a Wang micro by tying into a Wang VS running Wang Word Processing, Wang Office and all of the other Wang functions.

Was the decision to open the architecture made at the same time?

It was a continuation of our stated direction to open the architecture to become less of a closed company and to open up our architecture to what was available in the industry.

What does that offer to the customer?

It offers him the ability to place Wang in his current environment in a way that allows all of those past investments in hardware technology and software technology to remain robust.

AN INTERVIEW

Wang's J. Carl Masi

I'll give you an example. In London there are many banks where we are selling our Wang VS with Wang Systems Networking as what we call our presentation services product. There you have [Prime Computer, Inc.] or [Data General Corp.] or [Digital Equipment Corp.] systems in the bank doing a number of different applications.

But the actual presentation of all those services to the end user is networked on a Wang screen with Wang VS 15s or Wang VS 65s acting as network process controllers tied into the Prime or DEC. We couldn't have done that had we not gone through the effort of opening up our networking and architecture to accommodate everyone else's product line.

So the role of Wang could end up in many situations as the middleman?

You use the word "the"; we say "a role." We sell to two different classes of users. One is the office environment where, generally, our users are nontechnical office workers, and that is our traditional market. That's where you take a technology and apply it very simply. That's where those 90,000 [Wang Office Information Systems] were placed. So part of our strategy is to continue to grow with that business, to make it happy, to expand it into more and more networked data processing applications and to attract other users.

At the same time, we must invest in the needs of the information system executive and the MIS organization managers both as end users of our products and as key decision makers.

In that MIS market, we sell our product four different ways. One is the way you suggest, as a middleman, as a network processor with excellent network control software called DMF. Second is as a departmental processor — that's the VS vs. System/36. Third is as a host processor in small and middle-size companies and in the departments, branches or subsidiaries of larger companies. Fourth is as an application software developer for the host computer as well as for the VS.

With respect to your traditional customer, you've made a point of saying that you are not abandoning that customer.

I said the office — we are not abandoning the office. The office is still the beginning and the end of each direction that we take.

How far away are you from tying that office into everything else, including that IBM world?

I think we are there. We have Profs [IBM Professional Office System]; we can demonstrate it. Disoss [IBM Distributed Office Support System] is a committed project which we will have. That is only one of the knits of the integration, of the networking, of the coexistence.

We have a tremendously rich array of road maps and paths. I think we are much more advanced than most in the integration of all four forms of information into our data base and in our networking. So, while we are continuing to integrate and increment the base technologies, we must focus on the areas where we can provide clear-cut and obvious market distinction, and in that area, we now are focusing on the imaging and the voice and the telephony products.

What other directions can we look for in open architecture or compatibility, looking six months or two years down the road?

Accepting as our premise the fact that data processing is moving into the office and we are there and accepting the fact that we never sell a straight word processing application any more — that we always sell an integration of data, word processing and

Continued on page 108

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Introducing The Honeywell Office

Honeywell is about to change the way you think about office automation.

Because standalone and non-compatible product lines aren't enough to provide the most dramatic increases in productivity and corporate profitability.

The biggest increases in performance can only come from office automation capabilities like integration and networking that allow all systems to "talk" to each other—which is why we designed The Honeywell Office.

The Honeywell Office integrates office processing, data processing, networking and communications, and distributes these resources across a single, compatible product line of micros, minis, and superminis.

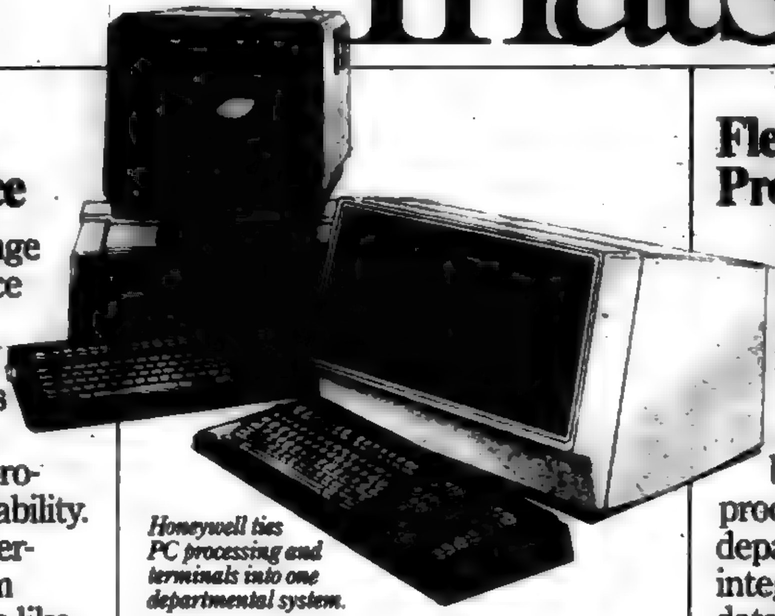
It's the reason why one customer credited our approach to office integration with helping to increase sales by 50%.

Here's how The Honeywell Office can help you manage and direct your information resources more efficiently.

Unsurpassed Office Processing

We started with competitive word processing in virtually every area and developed superiority in the crucial area of file management.

INFOCALC, our three dimensional spreadsheet, lets you merge financial data and text.



Honeywell ties PC processing and terminals into one departmental system.

But we didn't stop there.

We integrated decision support tools and distributed networking capabilities so that your departments can transfer, share, and combine office and data processing information with simple commands. Without unnecessary steps. Without costly duplication of efforts.

InfoCalc, our integrated spreadsheet, lets managers access information from the department across the country as easily as the sales office from across the corridor.

There is also a database management capability that allows professionals to set up their own departmental databases.

And that's only half of it.

The other half is how *well* it integrates the office side of your business with the data processing side.

Flexible Data Processing

No word processing vendor can integrate the extensive array of data processing products you'll find with The Honeywell Office.

The Honeywell Office provides unrivaled flexibility by combining office and data processing into one distributed, departmental system. It supplies integrated transaction processing, database management, program development tools, query and report, data entry and specialized industry applications.

So now your accounting, marketing, and other departments can access and control their information.

	The Honeywell Office*	OIS/VS	IBM 36/ IBM 5520
• Compatible Product Line	Yes	No	No
• Consistent User Interface	Yes	No	No
• Integrated Word & Data Processing	Yes	VS Only	Limited
• Full Office Processing Capabilities	Yes	VS Only	Limited
• Integrated Spread Sheet	Yes	No	No
• Easy to Use Programming Tools	Yes	VS Only	No
• Query & Report Facility	Yes	VS Only	Limited
• Data Entry Facility	Yes	Limited	Yes
• User Application Interface	Yes	Limited	Yes
• X.25 Networking	Yes	VS Only	Yes
• SNA Networking	Yes	VS Only	Yes
• Exceeds ISO Networking Standards	Yes	No	No
• Electronic Mail—Peer to Peer	Yes	Limited	No

*Over 2000 installations.

And when it comes to writing new applications, we offer a full complement of programming languages that include BASIC, COBOL, FORTRAN, ASSEMBLY, ADA, C, RPG, and PASCAL.

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Finally, The Honeywell Office lets you access network services such as CompuServe, Dow Jones, The Source and Westlaw right from your desktop.

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From the very beginning, The Honeywell Office was designed for complete compatibility from top to bottom. Compatible hardware. Compatible software. And compatible communications facilities.

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Together, we can find the answers.

Honeywell

From page 104

Wang's Masi on IBM and architectures

networking functions — and accepting the fact that nearly all of our installed base is upgrading the systems they bought originally, we are working in the areas I mentioned to provide clear-cut, unique distinctions, and we'll be adding more and more types of users to our repertoire.

What makes Wang the company that it is today is that we focus on a specific class of worker in an office, and we develop some proprietary software and hardware.

It's a complex technology, but we provide it in a simple-to-learn, easy-to-use way in an office environment, and our users just build the demand.

Our first product [a product to calculate logarithms] was aimed at a specific business problem that a particular user had. We went from there to bond traders to automobile dealers to accountants to secretaries to professionals, in each case understanding their job and understanding what we could do to provide improved productivity to their functions. In each case, the product had to be very simply applied so there wasn't a great learning curve and so it was accepted rather than taught.

Our future will involve picking out additional classes of users and doing the same thing. We are targeting this year two classes of users — the design engineer, who after all is just a professional office worker with serious productivity problems, and the software developer, another professional office worker with serious productivity problems.

When you say design engineers, you're not thinking of putting together an Apollo Computer, Inc.-type of workstation, are you?

It's not an Apollo workstation, but it's a workstation that does design engineering functions. It's not an announced product, but it is shown on the third floor. It's not a [computer-aided design and manufacturing] system.

So is it more of a workstation that will add some function for that engineer?

It integrates under Wang Office, so it provides a combination of the office-type functionality and the professional-type functionality in one system. It also drives our imaging technology.

What we are doing for that, we have to do for our other imaging products because of the resolution and size of the screen sort of thing. So, it is being used as a stimulus for further direction.

There is one other thing I would like to mention in terms of where I see this development going, at least within our own company, and this is blue sky. I said we focused on the particular types of users.

More and more, with the advent of artificial intelligence and expert technology, our systems will be learning about what the individual is doing as a particular type of user in that subset.

The systems will be adapting themselves over time not only to the class of user but to that individual's preferences and priorities. That is the real exciting stuff, because you can optimize and make the class more productive, but then you can really make some advantages if you can optimize for the individual.

Again, I must underline that it is blue sky and nothing you will see announcements on now, but we are doing a lot of development work on it.

Continued from page 103

232 serial port and optional RS-422, printer and RS-232C bidirectional interfaces. The keyboard is said to be fully enhanced.

The Direct 8392 costs $1195.

Direct, 4201 Burton Drive, Santa Clara, Calif. 95054.

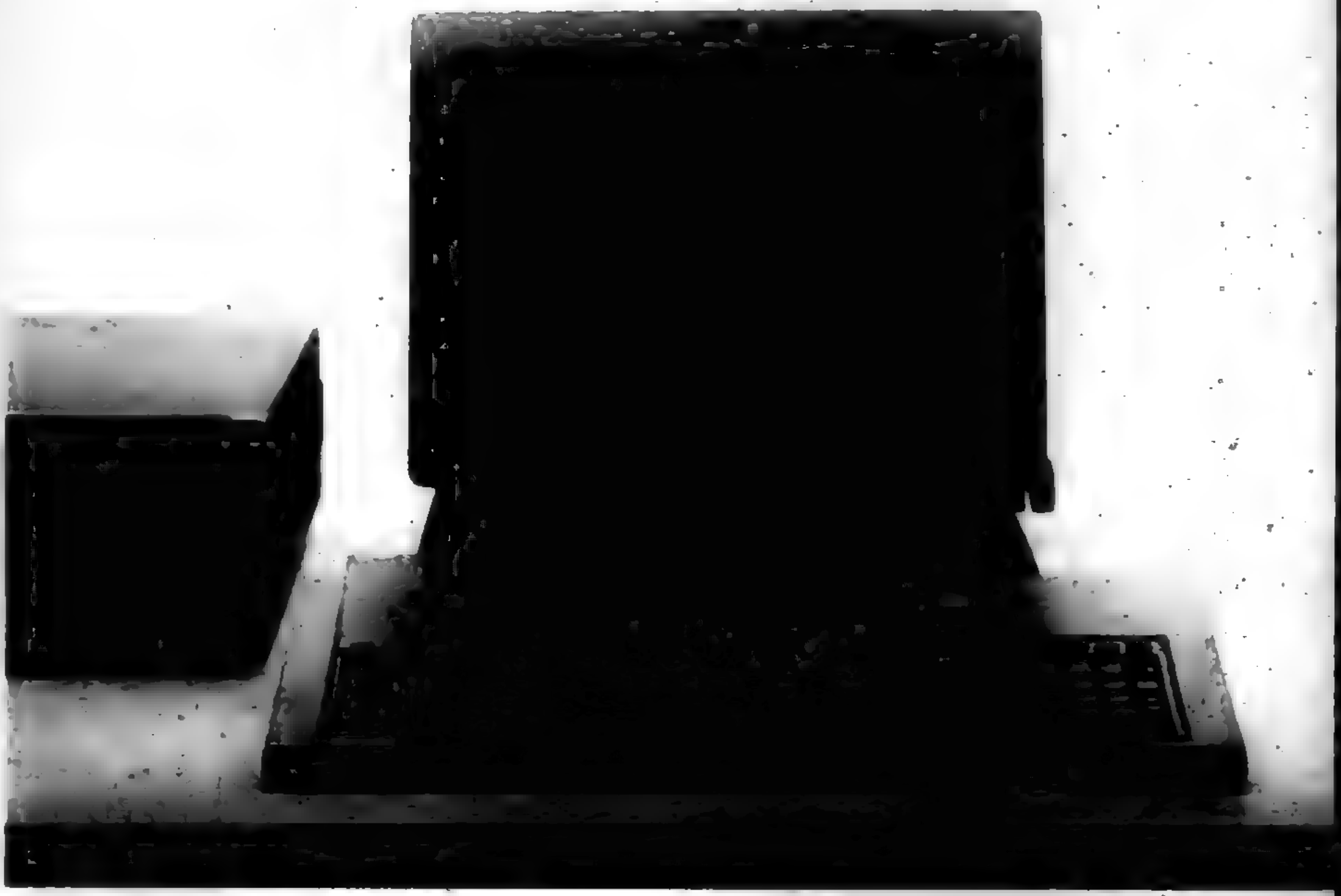
■ **Hi-Tek Corp. has announced the PC-122 keyboard, a 122-key low-profile keyboard that emulates the IBM 3270 Personal Computer keyboard and layout.**

Along with the IBM 3270 keyboard configuration, the DIN standard PC-122 adds LED indicators in the Num Lock, Scroll Lock and Caps Lock key switches and allots space for four extra keys.

The PC-122 keyboard with case and cable costs $85 in 10,000-unit quantities.

Hi-Tek, 7274 Lampson Ave., Garden Grove, Calif. 92641.

Where graphics



It isn't that today's executives lack information. Far from it.

Fact is, they are deluged with information.

The problem, of course, is getting through it all. To get at those relevant facts executives need.

Fortunately, there is a solution. The Smart Desk equipped with an IBM graphics workstation.

This kind of Smart Desk lets the user look at easily understandable pictures—such as graphs, charts and diagrams—instead of thousands of words. As a result, executives spend less time making their way through data and more time making decisions.

What's more, with a Smart Desk with graphics capabilities the time executives save isn't only their own. For they can easily translate the information they need to share into charts, graphs and the like.

The IBM graphics Smart Desk not only makes it all possible, it makes it all painless. Even if the user never used a computer before.

There's an IBM graphics workstation ready to make almost any desk a Smart Desk. The IBM 3270 Personal Computer AT/G, for example, lets the user interact with the host computer or work in the stand-alone mode. With

The Smart Desk from IBM

From page 87

Micros moving in engineering

ing engineering problems. A typical engineering problem might be the structural analysis of a high-rise office building. Although many engineering problems can be solved only on mainframes and minicomputers, engineers have found that microcomputers can solve a large class of small problems.

In the petrochemical and nuclear power industries, for example, analysis of piping systems is a task that long was restricted to the mainframe. Several programs are now available on microcomputers for analyzing small- to medium-size piping systems.

Many of the microcomputer engineering packages enable uploading and downloading to and from the mainframe for preprocessing and postprocessing of larger engineering problems.

By using microcomputers for some of their analysis work, engineers reduce their dependence on expensive mainframe hardware and can price their work competitively.

Project management and data tracking are two other areas where engineers are turning to microcomputers. With programs such as 1-2-3, engineers can estimate manpower requirements and costs. Data base management programs such as Dbase II are becoming popular for maintaining lists and project records.

Software and cost are the two major factors affecting the micro/mini battleground. Despite the power of 32-bit minicomputers, the software available on these machines is generally more difficult to use and less flexible than comparable microcomputer software. For example, spreadsheet and business graphics software advertised as comparable to the 3-year-old 1-2-3 recently became available on minicomputers.

A major reason for the discrepancy between microcomputer and minicomputer software is the lack of standards in the minicomputer market: Microcomputer software developers create their software for one operating system supporting a single user with a standard terminal. With IBM PC-DOS as the standard operating system, developers enjoy a market of millions of users.

Minicomputer software developers face a different operating system for each vendor. In addition, multiuser minicomputers generally support a variety of terminals, which complicates development. The user base for each type of minicomputer is far smaller than the PC-DOS microcomputer user base, making development more costly and more risky.

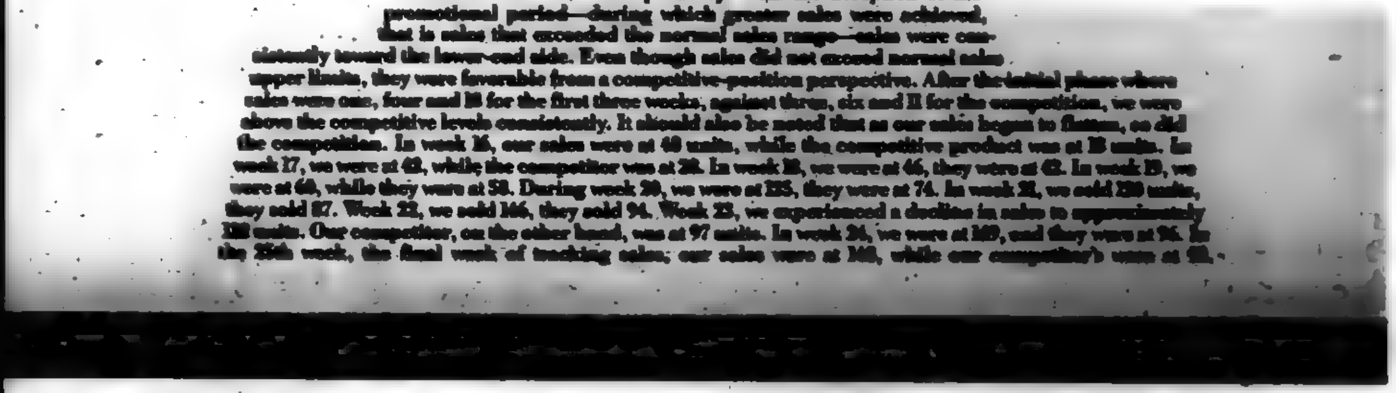
The cost per user on micros and minis is another major factor in the battle. Typical minicomputer systems for medium-size engineering firms are priced from $250,000 to $500,000. Such systems support 30 to 60 users but are generally used by about half that many at one time.

As minicomputer users know, performance can be slow when the number of users approaches the machine's limit. Factoring in the cost of maintenance — about 10% of the purchase price per year — and assuming that 50% of the maximum number of users are on the machine at one time, the cost per user comes to about $20,000. For $20,000, a firm can buy three hard-disk microcomputer systems with three printers. The cost per user on a microcomputer system is well under $10,000.

Another consideration is the price of software. Engineering software on minicomputers is generally leased with costs ranging from $1,000 to $5,000 per month. Microcomputer engineering software is generally purchased outright for $500 to $3,000.

The more advanced applications in engineering probably will stay in the domain of the mainframe and mini for years to come. Some of the problems in the aerospace and defense industries require significantly more power and memory than are available on micros and supermicros. On the other hand, a growing number of problems are solved readily on micros.

In addition, the business and project management software available on microcomputers is proving to be superior to comparable products on minicomputers. Engineering firms will gradually reduce their dependence on minis and mainframes and turn to microcomputers for solving their everyday tasks.



speak faster than words.

What you see here are some of the many, many words it would take to describe what's on the computer's screen. And even these aren't enough. Here's what we mean. Sales began on week 12 with one unit sold. During week 13, four units were sold. Week 14, 18 units sold. Week 15, 30 units sold. Week 16, 48 units sold. Week 17, 42 units sold. Week 18, 46 units sold. Week 19, 60 units sold. Week 20, 125 units sold. Week 21, 120 units sold. Week 22, 146 units sold. Week 23, 132 units sold. Week 24, 149 units sold. And week 25, 148 units sold. By the end of week 25, an upward trend was indicated. In order to boost sales performance a three-day promotion was run, beginning at week 16. This promotion resulted in actually lower sales figures, as they declined from 48 at week 16 to 42 at week 17, and rising slightly to 46 at the end of week 18. Following this period, another upward trend began with volumes up to about 125 in the next two weeks. However, from that point on sales became erratic. A study of sales performance during the last five weeks of this period indicates an approximate 27 unit-per-month increase to date. However, the erratic behavior of product sales (week 20: 125 units sold, week 21: 120 units sold, week 22: 146 units sold, week 23: 132, week 24: 142, and week 25: 148), coupled with the fact that volumes never hit the 150 unit sales point would indicate a leveling off of demand. Compared to expected normal sales ranges, a standard pattern was followed with at no point there being any exceptionally good indications. On the contrary, during weeks 18 and 19, it was about minus five to minus ten against the worst-case of 53 and 76 respectively. With the exception of the promotional period—during which greater sales were achieved, that is sales that exceeded the normal sales range—sales were consistently toward the lower-end side. Even though sales did not exceed normal sales upper limits, they were favorable from a competitive-position perspective. After the initial phase where sales were one, four and 18 for the first three weeks, against three, six and 11 for the competition, we were above the competitive levels consistently. It should also be noted that as our sales began to flatten, so did the competition. In week 16, our sales were at 48 units, while the competitive product was at 15 units. In week 17, we were at 42, while the competitor was at 28. In week 18, we were at 46, they were at 42. In week 19, we were at 60, while they were at 58. During week 20, we were at 125, they were at 74. In week 21, we sold 120 units, they sold 87. Week 22, we sold 146, they sold 94. Week 23, we experienced a decline in sales to approximately 132 units. Our competitor, on the other hand, was at 97 units. In week 24, we were at 149, and they were at 96. In the 25th week, the final week of tracking sales, our sales were at 148, while our competitor's were at 92.

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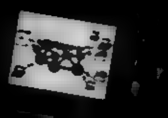

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Clinton Wilder
CW Staff Writer

Rebound may be on hold

The quarterly financial reporting season is upon us once again, and we do not expect a major third-quarter rebound in any industry segments — mainframes, minis, semiconductors or software. Preliminary indicators to this point have not augured well, and Herbert Hoover's legendary "corner" that prosperity was "just around" back in 1932 still seems to be a few quarters off for the computer industry.

The most encouraging sign for the major vendors in recent weeks has been the drop of the dollar abroad. The companies say the less lopsided exchange rate will keep their overseas sales growing as well as boost the fortunes of major U.S. exporters in other fields — that is, the companies that haven't been buying many computers lately. On the other hand, the dip in Hewlett-Packard Co.'s European revenue could be very troubling [CW, Aug. 26].

Everyone agrees that the less mature European market will eventually follow the pattern of that in the U.S., meaning a slump will strike at some point. The question is when. Few expect it to begin in 1985, but time will tell. If it does, the weakened dollar may only mean that another scapegoat for the industry's more deep-seated troubles — such as overexpansion, overcapacity and satiated demand — will no longer be valid.

As we anticipate third-quarter report cards from the mainframe makers this week, the Wall Street bulls still seem pretty restless in their pens. When Burroughs Corp. began the month by announcing that its quarter

Continued on page 125

Meeting spurs discussion between lessors, lessees

By Charles Babcock

NEW YORK — Computer leasing is a field in which few get an education except through experience, and the experience is not always pleasant, according to attendees of the first-user-oriented Computer Leasing Conference and Expo (Comlease) held earlier this month.

The 200 representatives of companies that lease rather than buy their equipment found much to discuss at the show, which targeted first users.

The most pressing issues were the pros and cons of leasing, the so-called "hell or high water" clause in leasing contracts and the proposed elimination of the investment tax credit.

"When you are isolated, you don't know if you are doing it right, I've been able to verify we're not way out on a limb," said Larry Corea, project analyst for leasing at Carolina Power & Light Co. in Raleigh, N.C.

"Leasing has not traditionally been the province of data processing. In the past, somebody in purchasing or accounting has handled it," said Frank Stairiker, computer systems analyst for National Liberty Life Insurance Co. in Valley Forge, Pa.

Both Stairiker and Corea are examples of people who have left more traditional data processing roles to become specialists in computer leasing, and they said they found the conference helpful. "It takes you out of the vacuum you're operating in," Stairiker noted.

The interest in leasing issues did not carry over to the thinly attended exhibition hall, however, where only 16 compa-

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From president to legislator

INTERVIEW

Rep. Ed Zschau from Silicon Valley

As trade and tax legislation take center stage in the U.S. Congress, Rep. Ed Zschau (R-Calif.) — the congressman from the Silicon Valley — is playing a key role on the Republican side. Zschau founded an electronics company, System Industries, Inc., and served as its president for 13 years before entering Congress in 1982.

During his business career, Zschau was a leader of the American Electronics Association and used that experience as a springboard to a political career.

In a recent interview with *Computerworld*'s Washington, D.C., correspondent Mitch Betts, Zschau discussed the high-technology trade and tax issues confronting Congress.

What prompted you to leave industry to run for Congress?

[I felt that] people who know where jobs come from and how they're created and how the process works and what it takes to create technology and exports — all these things that everybody wants — would be in a position to assess whether government policies were conducive to that or whether they were stifling it. So I felt I could make a difference.

Are you having the kind of influence you wanted to have?

Yes. I was given a lot of really good opportunities. I was, as a freshman, appointed to the Foreign Affairs Committee, . . . and one of the major bills before the com-

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- ■ Ashton-Tate and Multimate agreed to terms on their previously announced merger, creating the world's No. 2 micro applications software house 114
- ■ Borland International acquired Analytica and then slashed the price of Reflex software/115
- ■ Sperry and Martin Marietta Data Systems each named new presidents/121

Atex selects AT&T as vendor in open-ended OEM contract

BEDFORD, Mass. — AT&T won a major commercial OEM contract recently when Atex Corp., Eastman Kodak Co.'s electronic publishing systems subsidiary, selected AT&T's Computer Systems Division as its high-end CPU vendor.

The current Atex newspaper and magazine text processing systems are based on the Digital Equipment Corp. PDP-11 series of minicomputers, and many industry observers said they expected Atex to migrate to a larger DEC system, such as the VAX 8600.

But Atex's Frank Ingari, program manager for the Total Publishing Environment system, said Atex decided early in the 10-month selection process that it needed a fault-tolerant machine, which DEC does not produce.

"The VAX line is designed for high availability but not fault tolerance," Ingari said. "So much of newspaper and organization management is dependent on fault tolerance. The DEC front end will continue to handle the text and image processing, but the AT&T system will manage all the information on the status and location of each text or image file. The criticality of that data base requires fault tolerance."

The length of the multimillion-dollar contract is open ended, and Ingari estimated it at seven to 10 years. He called the deal "a sizable one" for AT&T.

Some of the AT&T hardware specified in the contract is still in the development stage, but, Ingari said,

Continued on page 125

CBEMA eyes 11.5% surge in 1985 high-tech sales

WASHINGTON, D.C. — Revenues from the sale of computer hardware, software and DP services will increase 11.5% to $141.7 billion this year, up from $127.1 billion in 1984, a computer trade group predicted recently.

But the statistical report from the Computer and Business Equipment Manufacturers Association (CBEMA) predicted that there will be no growth in sales revenue for mainframe computers this year.

In its report, CBEMA said sales of software and related services are expected to grow at a rate of 15.5%, from $35.3 billion in 1984 to $40.7 billion this year.

Revenue from computer hardware and from services is projected to increase 10%, from $91.8 billion to $101 billion, according to CBEMA.

Micro, mini sales expected to grow

A breakdown of the computer sales figures presented in the report showed that microcomputer sales will increase 10% to $8.5 billion this year; minicomputer sales will grow 11% to $4.7 billion; and mainframe sales will remain at the 1984 level of $10.5 billion.

The projections are drawn from CBEMA's "Computer and Business Equipment Marketing and Forecast Data Book," according to a CBEMA statement that was released last week.

CBEMA also projected that revenue for word processing workstations will increase 4% to $3.2 billion this year.

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[illegible]

Patenting software possible but tough to accomplish

SEVENTH IN A SERIES

By Jerome J. Roberts
and Michael P. Brownell
Special to CW

Patent protection enables a patent owner to prohibit others from making, using or selling a patented invention in the U.S. for a period of 17 years. This protection is available even against a person who, subsequent to the date a patent is issued, independently creates an infringing invention without knowledge of the previously patented invention. As such, a patent confers a statutory monopoly upon the patent owner.

To receive patent protection, a software owner must initially qualify its software as either a "process" or "machine" as those terms are defined by the Patent Act of 1952. Patent protection will not be awarded for ideas, algorithms, laws of nature, scientific principles or mental processes.

Because computer programs are essentially composed of logic, algorithms and mathematical formulas, the U.S. Patent & Trademark Office has characteristically received patent applications for computer programs with skepticism, if not hostility. Nevertheless, software does not constitute an inherently unpatentable subject matter, and patents have been issued for processes and machines consisting of or based upon computer programs.

Even though a software application may qualify as eligible subject matter, a patent will not be issued unless such software is "useful," "novel," "not obvious" and "adequately disclosed," as those terms are defined under patent law. Unlike the originality requirement of copyright law, meeting the aforementioned patent requirements, particularly the novelty and nonobviousness requirements, imposes a substantial burden on the patent applicant.

To date, patent law has not been widely embraced as a form of proprietary protection for computer software. Several reasons underlie such reluctance:

■ The eligibility of computer software for patent protection has been and will continue to be a topic of dispute, with the Patent & Trademark Office remaining generally opposed to such eligibility.

■ Filing a patent application and steering it through the Patent & Trademark Office is a demanding exercise, and the attendant costs can be quite high, almost always including the service of a patent lawyer.

■ The application process may consume several years. A software product may be well into its product life cycle, if not technically obsolete, by the time a patent is issued.

■ Issuance of a patent does not ensure certain patent protection against infringement. Defendants in patent infringement cases have the right to prove, and are very often successful in proving, that the relevant patent was improperly issued and, therefore, that no infringement has taken place.

■ Finally, patent protection for computer software may mean forgoing trade secret protection to the extent that the disclosure requirement of patent law requires disclosure of software elements otherwise eligible for trade secret protection.

Roberts and Brownell are attorneys with the law firm of Berman, Roberts and Kelly in Chicago. The firm's practice deals with legal issues related to procurement, distribution, management and protection of computer resources.

Ashton-Tate buys Multimate

CULVER CITY, Calif. — Ashton-Tate put the final wraps on the microcomputer software industry's largest acquisition to date last week, agreeing to final terms for the $20 million cash-and-stock purchase of software vendor Multimate International Corp.

Ashton-Tate expects to conclude the previously announced deal by the end of December. The terms call for Ashton-Tate to pay Multimate $8.5 million in cash and 983,530 shares of stock for the privately held East Hartford, Conn.-based vendor of micro word processing and other software. Ashton-Tate's stock was recently trading at approximately $12 per share on the national over-the-counter market.

Multimate Chairman Wilton H. Jones and Executive Vice-President Richard A. Lefebvre will be employed by Ashton-Tate for six months after the merger. They agreed to limited covenants prohibiting their competition against Ashton-Tate for a subsequent two-year period.

The merger, still subject to Multimate shareholder approval and other conditions, makes Ashton-Tate the second-largest micro applications software vendor behind Lotus Development Corp.

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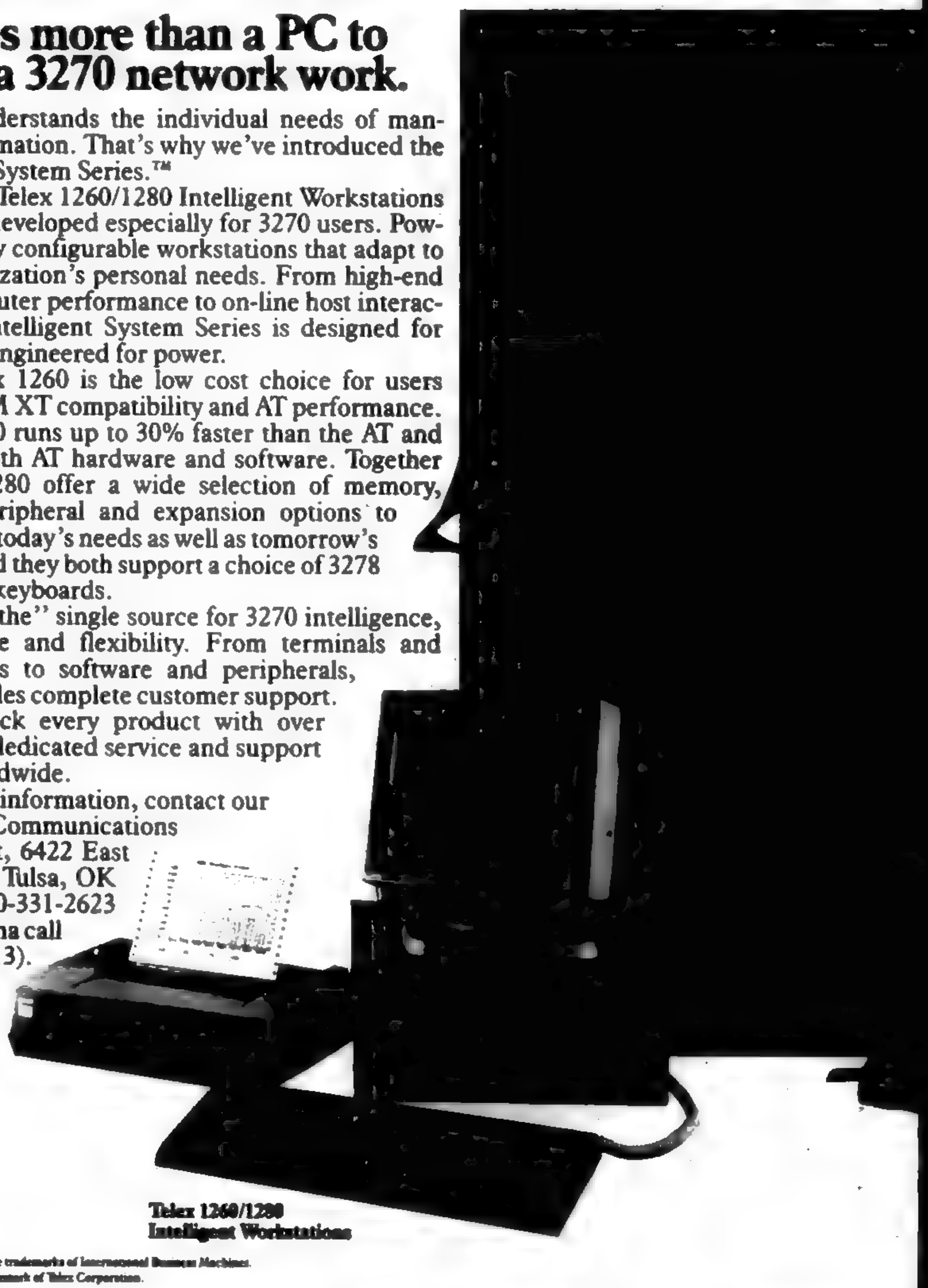

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Software maker Borland International buys Analytica

Borland/Analytica reduces Rexflex price

By Peggy Watt

SCOTTS VALLEY, Calif. — Borland International, trailblazer of inexpensive microcomputer business software, recently announced it has acquired Analytica Corp. of Fremont, Calif., the 2-year-old manufacturer of the data base analysis system Reflex.

The effects were immediate: Analytica now identifies itself as Borland/Analytica and sells a repackaged, non-copy-protected version of its data base, renamed Reflex: The Analyst, at a Borland-like price of $99.95. In addition, a Borland representative said that all current Reflex owners will receive a complimentary copy of Sidekick, its popular desktop management system, and customer discounts on other Borland products.

About a dozen of Analytica's 17 employees will join Borland, representatives of the firms said. Cofounder Adam Bosworth opted to join Borland; his colleague Eric Michelman did not. After the transferring employees move to Borland's Scotts Valley headquarters, a Borland spokeswoman said, "Analytica will no longer exist as a separate company."

Michelman said Borland's "marketing muscle" and development resources made it an attractive parent for Analytica. "Obviously, I'm sorry we didn't reach a huge level of success, but I feel good about Borland marketing the product." Michelman said he plans to start his own company to develop business productivity software, focusing on network applications.

Jim Anderson of Merrill, Pickard, Anderson & Eyre in San Francisco, the lead investors in Analytica and also Borland stockholders, said the $500 Reflex lagged in the market but that the data base is now "potentially the largest product line Borland's ever had."

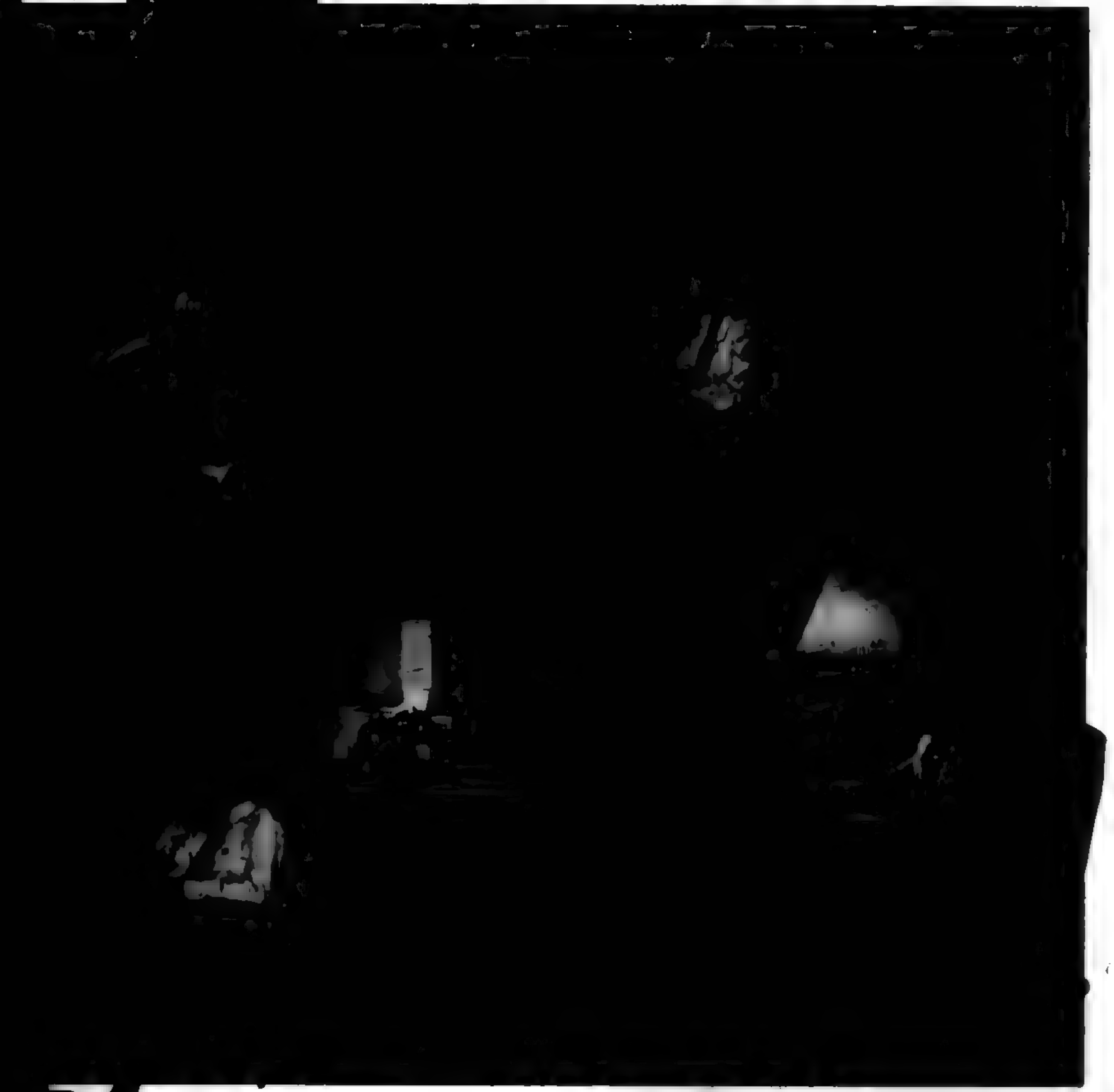
"A number of people approached us about joint marketing and cooperative ventures," Anderson said. "Borland was the best of all worlds." He said Analytica considered several types of mergers, including taking over smaller companies itself.

Industry speculation was that Analytica's investors had become impatient for return on their investments. Reflex, while lauded upon its introduction earlier this year for stretching filing cabinet data base concepts into analytical tools, nonetheless [illegible] the company's long-awaited and only product. Analytica recently had run into hard times, laying off about a dozen people in the past six months and dropping some from the payroll by voluntary early retirement.

Borland, on the other hand, rapidly gained acclaim for its high-quality, pragmatic inexpensive business software. Both the hallmark Sidekick and Borland's Turbo Pascal programming language sell for $69.95, the vendor said.

Borland dealers will sell Reflex at its new price through March 1986, after which the price will increase to $149.95, the company said.

CE AT WORK



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Firm collects in second suit

By James Connolly

OAKLAND, Calif. — Three years ago, the owners of a leather goods cleaning business walked out of a San Francisco federal courtroom with a shocking victory in hand, a $2.6 million win over NCR Corp., on a claim that NCR sold them a minicomputer that it knew would not work.

The Glovertorium, Inc., a wholesale leather and suede cleaner accepted NCR's payment of $2.6 million, including $2 million in punitive damages, and scrapped its faulty NCR System 8200. The award was, at the time, the largest ever assessed against a computer vendor in a fraud case.

At the time of the NCR verdict, The Glovertorium had replaced the NCR system with an MAI/Basic Four Model 410B and software supplied by Computer Systems Development, Inc. of Pleasant Hill, Calif.

Foiled again

But, once again, The Glovertorium found they had a system that did not work. The owners went back into court and recently came out with another win, this time a $130,000 judgment against Computer Systems Development.

In the latest case, presented before a jury in Alameda County Superior Court, Judge Richard Bancroft dismissed a fraud charge. The verdict came in after a 73-day trial on The Glovertorium's claims of breach of contract and negligence on the part of Computer Systems Development. MAI/Basic Four was not a defendant.

The Glovertorium's attorney maintained that Computer Systems Development officials were inexperienced and nonexperts in applications software development and that previously they had not provided such customized software for businesses such as The Glovertorium.

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From page 111

Interview with Rep. Ed Zschau

mittee was the [renewal of the] Export Administration Act — export controls on high-technology products being a major subject in that bill.

I was able to bring to the process some real-life experience and understanding of how the provisions really cut, rather than just thinking about it theoretically.

Second, the House Republican leadership asked me to chair the Task Force on High-Technology Initiatives ... [which] made 14 different legislative recommendations.

When I came to town, the debate was over industrial policy — that there ought to be some sort of competitiveness council and our government ought to decide where the opportunities are and then subsidize and provide special help in those areas, the so-called industrial targeting concept.

But the task force developed a new concept that we should target the process of innovation. That's where economic growth comes from, that's how you get productivity improvements and competitiveness.

We should be analyzing each government policy in terms of whether it enhances the environment for new ideas and R&D and technology advancement or stifles it. In areas where it stifles it, we should tear down the roadblocks, and in those areas where we could do more to provide incentives for the proper activities we should do more.

One example is in tax reform.

Simplicity and fairness are all good, but we ought to be looking at that tax reform proposal in terms of competitiveness.

In the area of tax reform, it seemed that the high-technology industry's effort to get a 25% research and development tax credit and a capital gains tax cut was going well, but recently the House Ways and Means Committee staff gave the industry a setback. Can you pick up the momentum again?

I don't know what the rationale of the staff is — whether they just don't like economic growth or they don't like R&D or whether they have a misconception that this is going to help them raise revenue and isn't going to affect economic growth. . . . But I think it is really dumb.

> *We should not tolerate unfair practices like dumping. . . . We should not tolerate barriers to our access to foreign markets. We should not tolerate subsidies that are in clear violation of our agreements and the principles of free trade.*
>
> — Rep. Ed Zschau

If in the interest of picking up extra revenue you destroy some of the engine for economic growth, you're going to lose economic growth rather than gain it.

So I don't know whether it's reversible. Frankly, I would not bet that we're going to get a tax reform bill this year because this is just one obstacle. If you make proposals that take a group that was at least lukewarm in its favor of tax reform and turn them against it, and then you do that to a whole lot of other groups, you may find that you just don't even have the support you had before.

And there wasn't a whole lot of support . . . before.

When you visit with the American Electronics Association (AEA), what do the executives tell you about tax reform?

The American Electronics Association has been one of those [groups] mildly supportive of the president's tax reform proposal. ... But I don't think the AEA feels a desperate need for tax reform.

I think they feel a desperate need for maintaining the R&D tax credits that are going to expire at the end of this year; they feel a desperate need to get the federal budget deficit down and relieve some of the upward pressure on the dollar; they feel a desperate need to make sure that this trade deficit issue is handled not to the detriment of exporting industries.

If we erect protectionist [trade] barriers, the possibility of retaliation against our exporters is great.

On the trade issue, what's the philosophical basis for your free-trade position?

It's very simple. If you have barriers to the market mechanism — whether they're price supports or quotas or whatever — it distorts the marketplace mechanism.

In international trade, we are very reliant on imports; we are also reliant on exports.

If we begin to erect barriers in various ways, we not only prevent dollars from getting into the hands of our customers ... but also we run the risk of retaliation and increasing prices to U.S. consumers.

That ultimately could cost us jobs.

On the other hand, we should not tolerate unfair practices like dumping. The semiconductor industry is pointing out that there is ample evidence of dumping going on in [the U.S. of] some memory chips. We should not tolerate barriers to our access to foreign markets. We should not tolerate subsidies that are in clear violation of our agreements and the principles of free trade.

How do you make sure the foreign competitor follows the fair rules? Ultimately, you have to play or threaten to play your trump card, which is access to the U.S. market.

The difference between a free trader or fair trader and a protectionist is that a protectionist seeks trade barriers as an end in themselves to [prevent] competition, whereas a free trader will use the threat, or perhaps the imposition, of a trade barrier in order to achieve a free-trade/fair-trade environment.

When it comes to trade issues, our government's actions should protect the ability of our companies to be treated fairly — like a policeman or referee. Our government hasn't done that in the past. . . . But the president recently has adopted a new attitude. He's appointed a new strike force, which is charged with finding unfair practices and going after them on their own initiative rather than waiting for the industries to come to them.

This is a new attitude that this large trade deficit has brought on, [a new attitude] that is very constructive.

But the bad thing that the large trade deficit has brought on is a series of purely protectionist measures. They're not designed to get fair trade, they're designed to keep out competition, and in my mind they are counterproductive.

Using your political crystal ball, what will happen in the House on trade legislation, and what form will trade sanctions take?

We will see a textile quota bill come up, and I will be fighting that because it is purely protectionist and arbitrary . . . and I hope to be able to get enough votes to sustain a veto.

[In semiconductor trade with Japan] last year, we eliminated the tariffs both ways, but there are nontariff barriers that prevent equal access to the Japanese marketplace to U.S. manufacturers. I'm hoping that we don't feel a need to go further legislatively.

What we really have to do is make sure our negotiators have the tools they need to apply pressure if pressure is necessary ... and the authority to take that action . . . and the sense of urgency to do something now.

But if we [in Congress] start getting into the negotiating process and we say arbitrarily that we're going to impose a 25% import surcharge on [Japan] until our trade balance is in line, that's not a negotiation. I think that kind of an action would have unintended, negative results.

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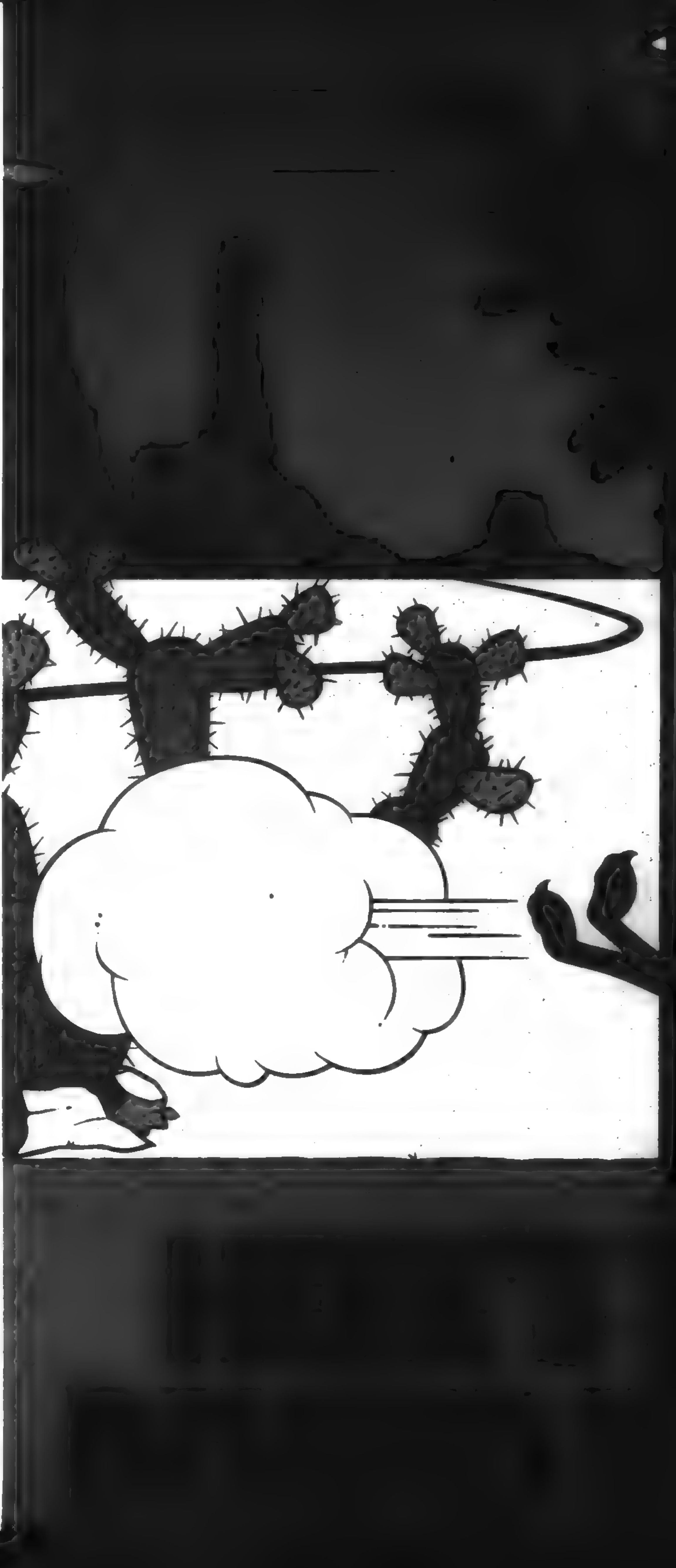

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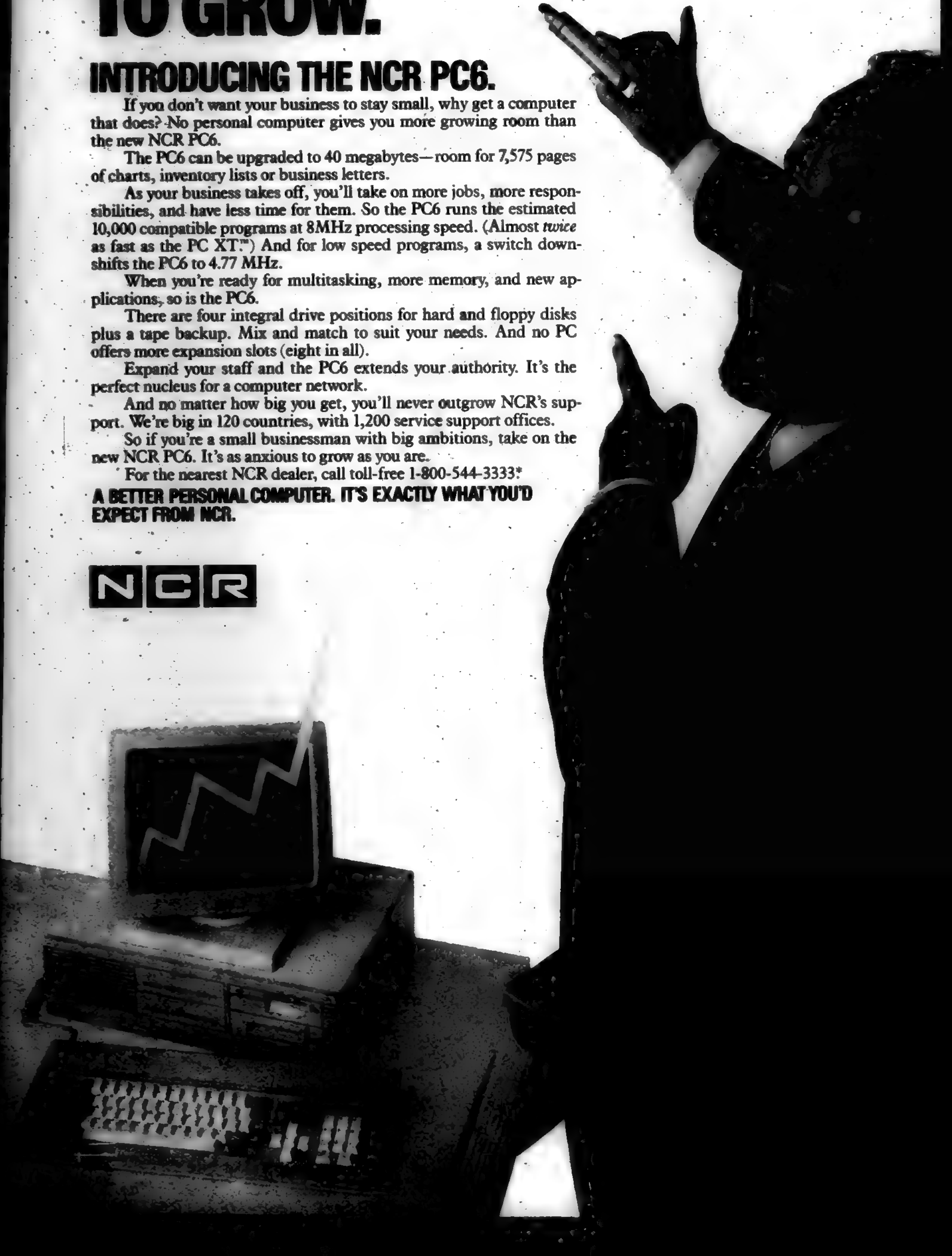

Sperry appoints chief

NEW YORK — Sperry Corp. Information Systems Group President Joseph J. Kroger was recently named president of the corporation. He is the first executive with a sales and marketing background to reach the No. 2 post of the computer, defense systems and farm equipment conglomerate.

Observers said they believe the promotion places Kroger, 51, in line to succeed Gerald G. Probst as chairman and chief executive officer. The president's chair had been vacant since 1982, when Probst was promoted to his current position formerly held by the late J. Paul Lyet.

Kroger, formerly also an executive vice-president of the corporation, has headed the Sperry computer group since 1981. Kroger was reported to have led the antitakeover contingent of Sperry executives that successfully thwarted the merger proposals of Burroughs Corp. earlier this year.

Kroger appears to have received the nod over Vincent R. McLean, Sperry's other executive vice-president and chief financial officer.

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Mohawk Data sells off service businesses

PARSIPPANY, N.J. — Beleaguered Mohawk Data Sciences, Inc. officially exited the computer service business recently, selling off all but one of its businesses to raise an estimated $180 million in needed capital.

The mainframe and minicomputer vendor retained only its Qantel Systems, Inc. computer hardware unit, announcing the sale of five divisions to a new, unnamed company to be formed jointly by two New York venture capital firms. The sale involved MDS Service, MDS Systems Division U.S., MDS Credit Corp., H. M. Storms Co. and Mohawk Data's manufacturing operation in Herkimer, N.Y.

Mohawk Data will retain a 10% interest in the buyer, which is being formed by J. H. Whitney & Co. and Welsh, Caron, Anderson & Stowe. MDS Service will continue to be the exclusive maintenance provider for Qantel systems, and Mohawk Data will receive royalties from its current base of MDS Service customers.

Mohawk Data had previously sold its five European units for approximately $22 million.

Zilvitis named chief

BETHESDA, Md. — Patrick J. Zilvitis, a vice-president of Perkin-Elmer Corp. for the past two years and a 17-year IBM veteran, was recently named president of Martin Marietta Data Systems.

Zilvitis, 42, succeeds Richard J. Walters, who resigned in July. He will report to Norman R. Augustine, executive vice-president of parent firm Martin Marietta Corp.

Zilvitis most recently was vice-president of marketing for Perkin-Elmer's Data Systems Group. He left IBM in 1983 from the position of general manager of personal computer marketing, which he attained in 1981.

CAI posts quarter loss

IRVINE, Calif. — Computer Automation, Inc. (CAI) announced it will report a loss of $12 million to $15 million for the second quarter ended June 30 and further losses for the third quarter.

The vendor of automatic test equipment and industrial OEM computers also announced a consolidation move, including the sale of its commercial systems division and the appointment of Douglas L. Cutsforth as president and chief operating officer.

Cutsforth had previously served as vice-president and general manager of the company's industrial products division.

Other new assignments in the consolidation are Irwin W. Pfister to vice-president of marketing and product development, James R. Keener to director of OEM marketing and Gary R. Watson to director of operations.

Dataquest president leaves for Pyramid

MOUNTAIN VIEW, Calif. — Dataquest, Inc. President and Chief Executive Officer E. David Crockett has returned to the vendor side of the industry.

He recently became president of Pyramid Technology Corp., a Mountain View corporation that develops and markets superminicomputers based on the AT&T Unix operating system.

Ed Dolinar, who cofounded Pyramid in 1981, relinquished the president's seat for the chairmanship. Dolinar said Pyramid would benefit from Crockett's "high level of strategic and operational expertise."

Crockett joined San Jose, Calif.-based Dataquest in 1981 and became president in 1983. Before going into the market research business, Crockett spent nine years each at Hewlett-Packard Co. and IBM. He rose to computer strategy manager at HP.

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NBI doesn't offer you total capabilities without total security. Through a unique system of passwords, only authorized users can access company information. To give you maximum flexibility and convenience without worrying about the integrity of confidential data.

With millions of personal computers being used outside the office, Remote Link now extends your information capabilities as far as you and your imagination can go.

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COMPUTER INDUSTRY

MERGERS AND ACQUISITIONS

Docutel/Olivetti Corp., headquartered in Irving, Texas, announced that it had completed its previously announced merger with a subsidiary of **Ing. C. Olivetti & Co.** As a result of the merger, Docutel/Olivetti has become a wholly owned subsidiary of Olivetti. Also, all of Docutel/Olivetti's publicly held stock has been converted into a right to receive $5.50/share in cash.

■

Mentor Systems, Inc. of Lexington, Ky., has acquired **Annray Computer Systems** of Wichita and Hays, Kan. The acquisition makes Mentor one of the largest companies in the nation to specialize in accounting software for schools, governments and not-for-profit groups.

■

Equatorial Communications Co., located in Mountain View, Calif., and **Martin Marietta Corp.**, of Bethesda, Md., said that Martin Marietta has completed a previously announced $50 million purchase of an equity position in Equatorial, a provider of satellite-based data communications networks.

■

Corporate Software, Inc. of Denver has been acquired by **Integrated Management Systems**, also headquartered in Denver, and will operate in the future under the name of **Integrated Management Systems Micro Distribution Division.**

■

Gould, Inc. of Rolling Meadows, Ill., has acquired **International Cybernetics Corp.**, a Canoga Park, Calif., manufacturer of advanced computerized controls for factory and machine automation. The acquisition is part of Gould's Factory Automation Group.

■

Bishop Graphics, Inc., headquartered in Westlake Village, Calif., announced that merger discussions with **Perfectdata Corp.**, Chatsworth, Calif., have been terminated. Bishop Graphics does not intend to pursue the proposed acquisition of Perfectdata at this time.

■

Scientific Computers, Inc., based in Minnetonka, Minn., has announced the acquisition of **St. John's Data Systems, Inc.**, a supplier of integrated data collection systems. The acquisition price and terms were not disclosed.

■

Minneapolis-based **Control Data Corp.** will not acquire **Applied Information Memories**, a computer disk storage manufacturer in Milpitas, Calif., and Round Rock, Texas. The decision comes after CDC thoroughly reviewed the potential costs and benefits of the acquisition.

■

Eastman Kodak Co. has acquired the assets of **Xertronix, Inc.**, a maker of semiconductor cleaning equipment. Kodak has acquired equipment, patents and technology relating to Xertronix's line of wafer cleaning and inspection equipment. Both companies are based in Rochester, N.Y.

■

Automatix, Inc., Billerica, Mass., and **General Motors Corp.**, Detroit, have agreed on the principles of a $3 million applications development contract to be signed in the near future. Upon the signing of the agreement, Automatix has further agreed to grant GM the option to purchase up to 5% equity by Jan. 1, 1986, at a price equal to the lesser of $10/share or an average market price, with warrants to purchase up to 10% more at a formula price.

■

United Computer Systems, Inc., located in Cypress, Calif., has acquired the assets of **California Minicomputer Systems, Inc.** from **Wespercorp, Inc.** for an undisclosed amount. The acquisition includes all rights, title and interest in California Minicomputer's Utilis product line.

■

Automatic Data Processing, Inc. of Roseland, N.J., has acquired the New York-based Brokerage Transaction Services Division of **Control Data Corp.** for an undisclosed amount of cash plus contingent payments based on the next year's business results.

■

Boulder, Colo.-based **NBI, Inc.** and **Peninsula Office Supply, Inc.** of Redwood City, Calif., announced the completion of the acquisition of Peninsula by NBI. Peninsula is the third office supplies company NBI has acquired.

SUPERSHORTS

Sperry Corp. has announced that it has established a new International Banking Center in Belgium. The center will support each Sperry subsidiary in the financial marketing sector.

■

Tandem Computers, Inc. has signed a cooperative agreement with **Integrated Technologies, Inc.** to develop and market advanced toll-free telephone service software for the telecommunications industry.

■

Hewlett-Packard Co. has established three new business units within its Design Systems Group to facilitate closer strategic collaboration among the 10 divisions, operations and laboratories within the group.

■

Xebec Corp. has reported that it is reorganizing its management to direct its operation toward and exploit the problems and opportunities of the current market environment in the microcomputer field. Owing to the scaling down of the company's operations and the consolidation of Xebec's facilities, Marcia Glow is resigning as the executive vice-president of operations.

■

The owner of **Computer Educational Center**, Shirley Dyer, has been elected president of the Independent Computer Consultants Association for the 1985-1986 term.

■

General Automation, Inc. has contracted the Customer Services Group of **Diebold Group, Inc.** to provide quality care third-party maintenance service for its Zebra line of computer systems throughout the U.S. and Puerto Rico.

■

Widcom, Inc. and **AT&T** announced they have entered into a joint marketing agreement for videoteleconferencing applications. The agreement includes the placement of Widcom equiment in seven AT&T sites for customer demonstrations and other joint sales activities.

■

Infotron Systems Corp. has created a separate division aimed at the data communications market. Itron, the new division, will sell through independent distributors to small and mid-size companies.

■

Digital Equipment Corp. has announced plans to construct a semiconductor manufacturing facility in Butlaw, Scotland. The construction of the 86-acre site is expected to begin in mid-1986 and be completed in early 1988.

■

Dataproducts Corp. and **3M Corp.** have signed a three-year agreement for 3M's Equipment Service and Support Division to service Dataproducts' LZR-2600 family of laser printers.

■

Honeywell, Inc. and **Zilog, Inc.** have signed a three-year third-party service agreement. Honeywell will be Zilog's subcontractor for maintenance service.

■

Honeywell, Inc. has signed a five-year third-party service agreement with **OSM Computer Corp.** Honeywell's Customer Services Division will install and maintain OSM's complete line of personal computers and associated products.

■

Fujitsu America, Inc. has announced the signing of a multimillion dollar contract to supply **Bell Atlantic Management Services, Inc.** with its advanced optical fiber transmission systems.

■

Intelogic Trace, Inc. and **Teknekron Infoswitch Corp.** have signed an agreement that provides for maintenance and intallation services on a series of new products produced by Teknekron.

■

Centronics Data Computer Corp. has entered into a multiyear agreement with **International Computers Ltd.**, a British computer systems supplier.

■

Centronics Data Computer Corp. has signed a multiyear contract with **Pacific Bell**. Centronics will provide Pacific Bell with a complete line of dot matrix and band line printers to be used in internal applications.

■

Altos Computer Systems, Inc. has created a Federal Sales Division office in Vienna, Va. Altos will serve U.S. government customers including the Department of Defense, General Services Administration and civil agencies.

■

Lexidata Corp. has signed a two-year agreement with **Analogic Corp.** for the joint marketing of Lexidata's LEX 90 graphics display systems and Analogic's AP500 floating-point array processor.

■

Thomas C. Cain, vice-president of federal systems and government relations for **Computervision Corp.**, will take office as president of the **National Computer Graphics Association (NCGA).**

Dr. Phillip S. Mittelman, chairman of **MAGI**, has been selected president-elect of NCGA.

Richard A. Peters, vice-president of business development for **Calcomp, Inc.**, has been chosen as NCGA vice-president.

Carole A. Aldrich has been selected as the new NCGA treasurer. She directs strategic planning and business development for **Genigraphics Corp.**

Leland Rust, director of operations for **Markhard Corp.**, has been elected secretary of the association.

■

Comdisco Disaster Recovery Services, Inc. is planning construction of a recovery center. The facility will be located in San Ramon, Calif.

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NBI's Multinet Office-Link can save you thousands of dollars by cabling office workstations as simply and inexpensively as plugging in a desk phone.

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So, if you want to save thousands of dollars and avoid having to re-wire your office —call NBI, and let's talk facts.

NBI

For more information, contact your local NBI representative or call 1 800/255-5550 extension 709

EXECUTIVE CORNER

Storage Technology Corp. has announced the appointment of **Richard R. Douglas** as corporate senior vice-president of marketing and services. Prior to joining Storage Technology, Douglas was with Honeywell, Inc.

■

Cary Hobbs has been named managing director for the UK at Ashton-Tate. Previously, Hobbs had worked for IBM in marketing and management positions.

■

Eagle Computer, Inc. has announced the following executive appointments: **Richard Sergo**, hired as executive vice-president and chief operating officer; **John Harwer**, hired as vice-president, marketing; **Edmund Hornby** has been hired to the newly created position of vice-president, international sales; **Richard Thunen** has been promoted to senior vice-president, strategic planning; and **Shelley Valk** has been named vice-president, finance and chief financial officer.

■

Carterfone Communications Corp., a subsidiary of Cable & Wireless North America, announced that it has named **Paul Holeman** vice-president and general manager of its distribution products division.

■

Nelson L. Hanks has been appointed senior vice-president, operations, at QMS, Inc. Prior to joining QMS, Hanks was production manager for Boeing Electronics, a subsidiary of Boeing Co.

■

Digital Equipment Corp. has announced the following promotions of engineering managers to the position of vice-president: **Robert M. Glorioso**, former group engineering manager, high-performance systems and clusters; **William J. Heffner**, former group manager of systems software; and **William D. Strecker**, previously manager of engineering product strategy and architecture.

■

The Network Services Division of Automatic Data Processing, Inc. announced the promotion of **Harold Rogers** to vice-president of the hardware engineering group.

From page 111

Meet spurs talk about leasing

nies occupied booths. Some of the biggest names in leasing were absent from the hall: IBM Credit Corp., Comdisco, Inc. and Greyhound Leasing and Financial Corp.

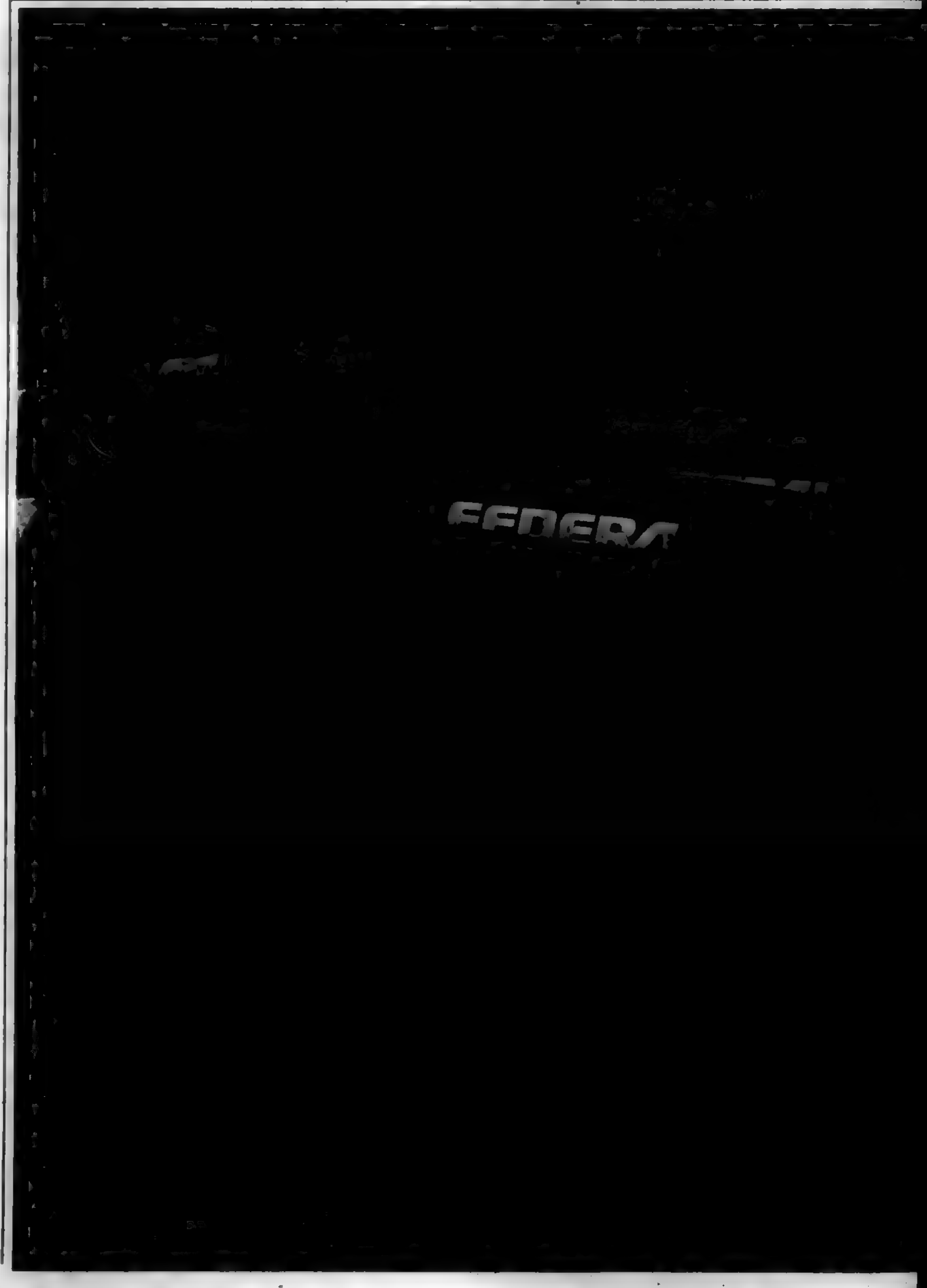
Off the exhibition floor, one of the favorite topics was the residual value of computer equipment. Royal Insurance Co. of America owns an IBM 3084 mainframe, and one 3084 owner was surprised when a speaker, Robert T. Fertig of Enterprise Information Systems, Inc. of Stamford, Conn., predicted that IBM will ship 500 Sierra 3090 Series 200 mainframes by the end of the year.

The residual value of 3084s will plummet if the 3090 line catches on that quickly, said James P. Quinn, assistant manager of computer operations for Royal Insurance in New York, the U.S. subsidiary of Royal Group, Inc. in London. Quinn questioned whether buyers appreciated the small initial performance difference between the two machines.

Conference speaker Donald E. Russell, principal analyst of the Kansas City Power & Light Co. in Kansas City, Mo., said his company was able to lease a package of equipment for only $3 million that would have cost $4.2 million through the vendor by using multiple sources of lease financing.

Lessees typically sign a three- to five-year contract that contains a "hell-or-high-water" clause specifying that they will make their monthly payments for the equipment, regardless of changes in their needs or technology. The clause has been frequently upheld in court, said Richard M. Contino, senior partner in Contino, Ross & Benedict, a New York law firm specializing in equipment financing.

In some cases, a lessor finds the computer manufacturer refusing to maintain the equipment because the leasing company encounters financial difficulty and fails to pay the vendor, Corea said. The lessor is then stuck with the hell-or-high-water clause and must continue paying on the equipment, he said.



Execs form antiapartheid panel

DETROIT — IBM President and Chief Executive Officer John Akers and Burroughs Corp. Chairman and Chief Executive Officer W. Michael Blumenthal are among those who will serve on a panel of U.S. executives working toward the elimination of apartheid in South Africa.

Blumenthal and General Motors Corp. Chairman Roger B. Smith jointly announced the U.S. Corporate Council on South Africa Sept. 20. The 10-member panel proposes to meet with top South African business leaders to discuss the situation and to promote steps to end the government's segregationist policies.

"Council members as corporate citizens of South Africa are deeply concerned about present conditions in that country," Blumenthal said. "They share the viewpoint of a growing number of senior South African business leaders who see an urgent need for changes and reform of the apartheid system, which will lead to its ultimate elimination."

From page 111

Rebound may be on hold

will be down substantially, almost all major computer stocks fell faster than autumn leaves during Hurricane Gloria.

The leading Burroughs culprit was Memorex Corp. 3680 disk drives, but calmer analysts apparently failed to convince investors that Burroughs will be alone in the bad news department. The Detroit-based vendor also pointed out that its domestic computer shipments in the quarter were lower than expected.

Any disk drive troubles are magnified 10 times at Control Data Corp., where the situation is starting to exhaust *Roget's Thesaurus* entries under "bleak." CDC's stock has dropped to bargain-basement levels, but any soundings in the financial community about a possible takeover inevitably meet the response, "Who would want it?"

The Minneapolis mainframe maker recently announced a four-day furlough for its 40,000 employees by the end of November. That's a fairly uneventful measure in the computer industry this year, except that CDC's current cash woes have some observers wondering whether the extended unpaid vacation is simply a cost-cutting move or an indication that the firm might have trouble meeting its payroll.

Other signs

A couple of other recent signs that the industry is not yet on the upswing exist. Ericsson, Inc., the Swedish communications leader, will close its Anaheim, Calif., plant that makes private branch exchanges and other switching equipment, resulting in 500 layoffs. Ericsson will also pull out of the U.S. microcomputer market at the end of the year.

In software, Ask Computer Systems, Inc. of Los Altos, Calif., said its sales and profits for the quarter ended Sept. 30 will be substantially below those of last year, when the minicomputer applications vendor posted $18 million in revenue.

Down the coast in Cupertino, Calif., however, Tandem Computers, Inc. came in with brighter news last week. The fault-tolerant pioneer announced another quarter of revenue growth, but President and Chief Executive Officer James Treybig warned, "Given the present conditions in the computer industry, we remain cautious about the near-term outlook."

From page 111

Atex selects AT&T in OEM contract

AT&T represented the "high-water mark" in fault-tolerant computing, even compared with better known commercial vendors such as Tandem Computers, Inc. and Stratus Computer, Inc.

"It's not as if AT&T is starting from scratch," he said. "[It is] actually the world's largest producer of fault-tolerant machines for internal use. [Its] 3B20 represents the best of the Stratus hardware approach and the Tandem software approach."

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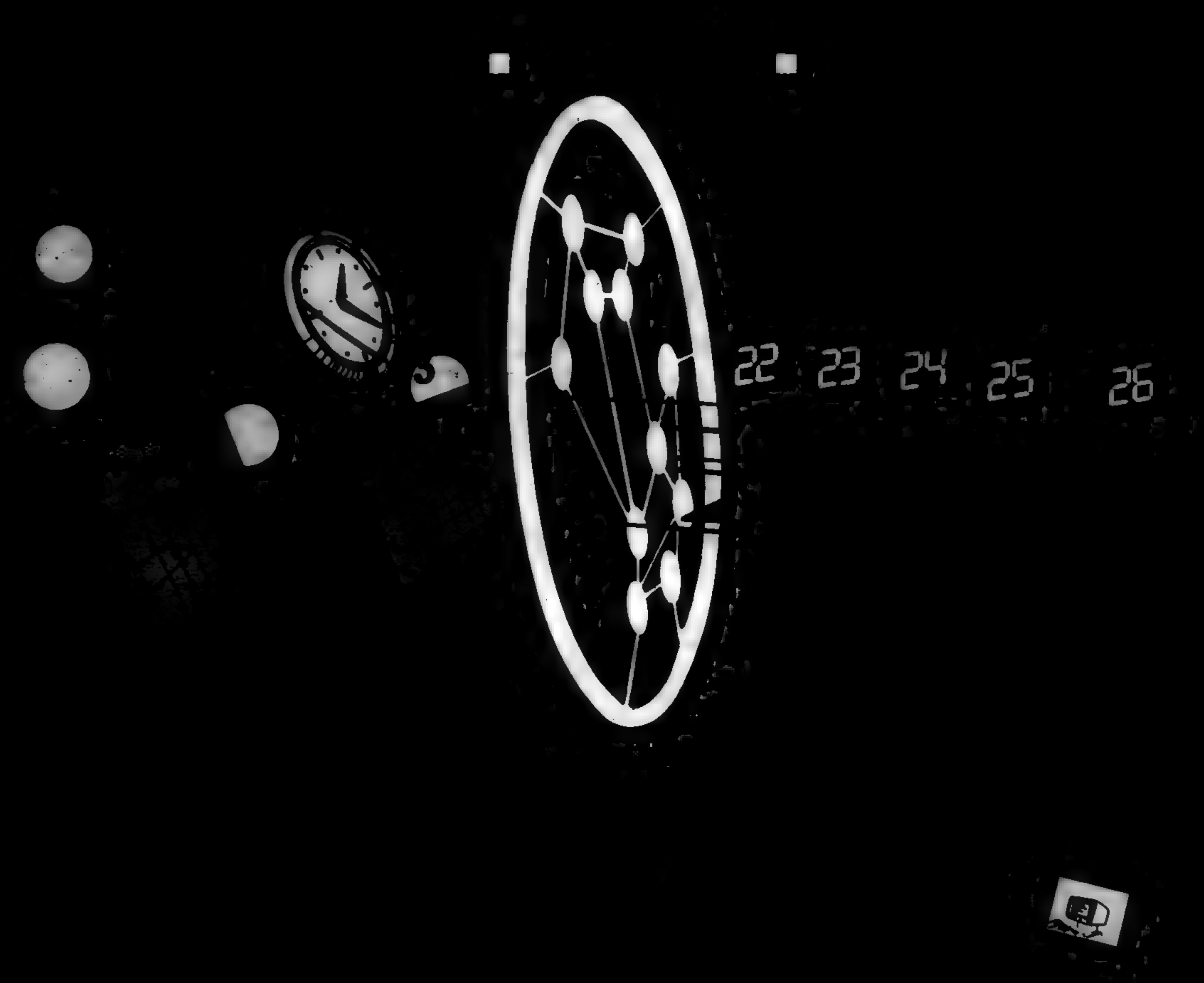
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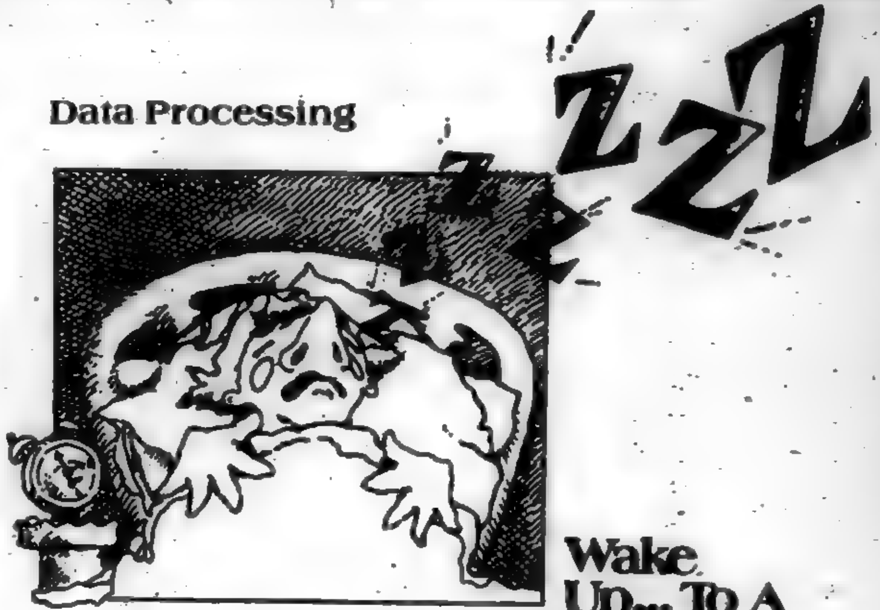

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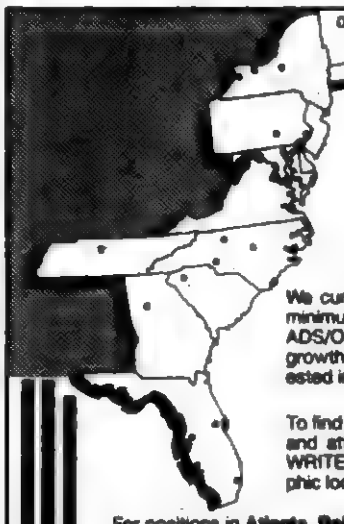

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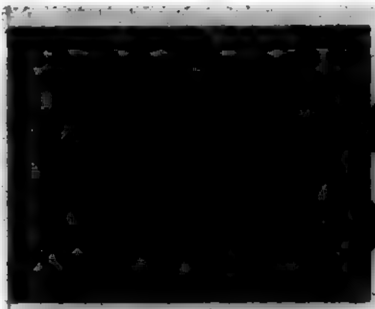

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Will direct Project Management team responsible for the development of strategic computer systems for enhanced utilization of emerging technologies. Qualified candidates will have prior computer system development project management experience directing multi-disciplined teams of computer and business professionals. Previous experience in the management of high volume, real-time application development in the airline industry or with a large financial institution would be considered a plus. Strong business orientation and knowledge of advanced project management methodologies and planning tools are essential. An MBA or equivalent and prior consulting experience preferred.

COMPUTER SYSTEMS PLANNING SPECIALIST

This senior level position requires an individual with several years of experience in business requirement definition, application development planning, cost/benefit analysis and resource estimation for large-scale computer projects. Qualified candidate will play an integral part in our planning group, taking leadership role in problem definition, project scope and estimating requirements. Degree in Computer Science, Operations Research, Business or equivalent and at least 3 years of systems planning experience essential.

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Will conduct analysis of business process requirements to identify opportunities for computer application. As a member of project teams, or working with user representatives, will participate in all phases of applications development. At least 2 years experience with state-of-the-art technology, distributed processing and desired career path in MIS required. Experience in high volume, real-time application development in the airline industry or other large transaction environments a plus.

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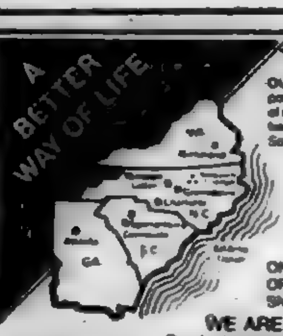

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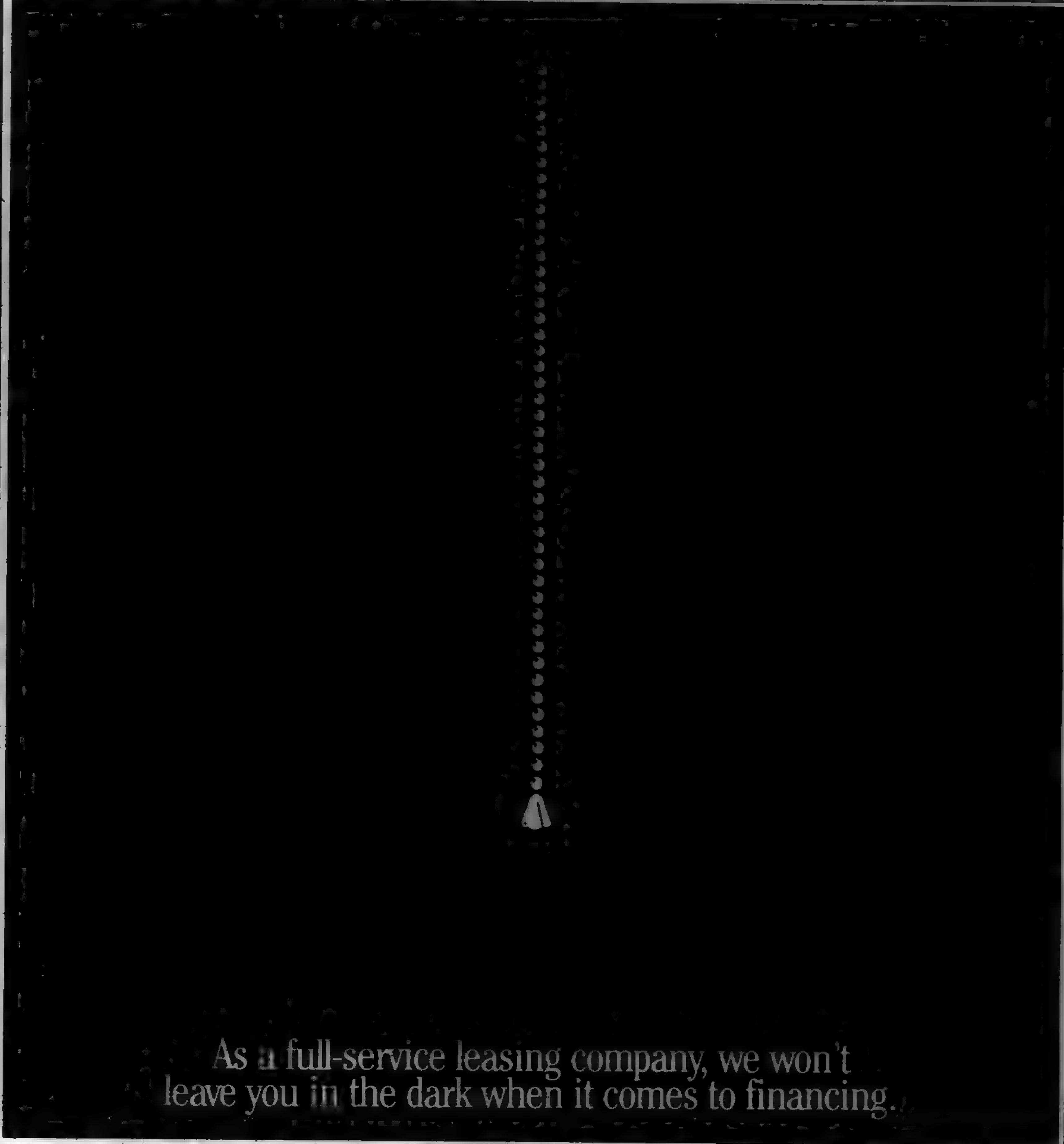
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REQUEST FOR PROPOSAL
REFERENCE: RFP [illegible]
Department on Aging
Connecticut Pharmaceutical
Assistance Contract to the Elderly
(Conn PACE)

To design, install, operate and maintain the claims processing and certain eligibility determination functions.

Anticipated issue date: October 21, 1985
Interested vendors must contact:
Gordon L. Partridge, Director
State of Connecticut
Resources & Facilities Planning
340 Capitol Avenue, 1st Floor
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(203) 566-3304

John W. Oberlein
Deputy Commissioner

A REQUEST FOR PROPOSALS
WILL BE ISSUED BY:

The State of Wyoming on October 15, 1985 for Computer Hardware and software for three County Courts. Software required will be for tracking criminal histories, docking, caseload scheduling, reporting, telecommunications and word processing. A turnkey system is desired. Copies of the RFP may be requested from:

Office of the Court Coordinator
Attention: Mr. Robert Duncan
Wyoming Supreme Court Building
Cheyenne, WY 82002.

Requestors must supply list of previous clients.

NOTICE OF PUBLIC SALE OF COLLATERAL

Notice is hereby given that pursuant to the Uniform Commercial Code of Oregon, a public sale of collateral will be held on October 29, 1985 at 10:00 a.m., standard of time as established by Oregon Revised Statute 187.110, at 7180 S.W. Fir Loop, Portland, Oregon 97223.

The collateral consists of Computer Source Code and manuals related to individual and corporate tax return preparation, tax planning, inheritance tax and depreciation, and related computer equipment, office machines, furniture and miscellaneous supplies. Some of the collateral will be sold subject to a security interest which is prior to the security interest being foreclosed.

For additional information or to make arrangements for inspection of the collateral contact Beth King at (503) 241-5615.

STATE OF CONNECTICUT
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REQUEST FOR PROPOSAL
REFERENCE: RFP [illegible]
UNIVERSITY OF CONNECTICUT
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Proposals will be requested for the delivery and installation of a comprehensive automated Payroll/Personnel System over the next two years. A Payroll System is needed immediately followed by and integrated with a Personnel System. Related modules to complete specific user requirements will be scheduled over a two year period. Other systems such as Accounting may be scheduled after Payroll and Personnel are complete.

Anticipated issue date: October 24, 1985
Interested vendors must contact:
Gordon L. Partridge, Director
State of Connecticut
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(203) 566-3304

John W. Oberlein
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NOTICE IS GIVEN that Kinetics Technology International Corporation, a Delaware corporation ("KTI"), as Secured Party, will offer for public sale all assets of Cascade Graphics Development ("CGD"), a California corporation engaged in the development, manufacture and sale of computer software and a micro computer-based computer aided drafting workstation. The assets to be sold include, without limitation, computer software and hardware, cash, accounts receivable, inventory, equipment, furniture, contract rights, copyrights, trademarks, trade names, and other general intangibles.

The sale will occur at CGD's offices located at 1000 South Grand Avenue, Santa Ana, California, on December 2, 1985 at 10:00 A.M.

The winning bidder must, at the time and place of sale, pay the purchase price in full by either certified or cashier's check or by satisfaction of debt owed by CGD to the Secured Party or by any combination.

This sale is without warranty or representation by KTI and without recourse to KTI.

Interested bidders can obtain a list of assets and inspect them by writing to the undersigned.

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1. Title of Publication: *Computerworld*
2. Date of filing: October 7, 1985
3. Frequency of issue: weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues). December (5 issues) and a single combined issue for the last week of December and the first week of January
3a. No. of issues published annually: 51
3b. Annual subscription price: $44.00
4. Location of known office of publication: 375 Cochituate Road, Box 880, Framingham, MA 01701 (Middlesex County).
5. Location of the headquarters of general business offices of the publishers: 375 Cochituate Road, Box 880, Framingham, MA 01701 (Middlesex County).
6. Names and addresses of the publisher, editor and managing editor: Publisher, Donald E. Fagan, 375 Cochituate Road, Box 880, Framingham, MA 01701. Editor, Terry Catchpole, 375 Cochituate Road, Box 880, Framingham, MA 01701. Executive Editor, Sharon Frederick, 375 Cochituate Road, Box 880, Framingham, MA 01701.
7. Owner: International Data Group, 5 Speen St., Framingham, MA 01701.
8. Known bondholders, mortgages and other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities: International Data Group, 5 Speen St., Framingham, MA 01701.
9. For completion by nonprofit organizations authorized to mail at special rates: Not applicable
10. Extent and nature of circulation:

	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
A. Total number of copies printed (net press run)	138,589	139,400
B. Paid circulation		
1. Sales through dealers and carriers, street vendors and counter sales	None	None
2. Mail subscriptions	128,005	129,176
C. Total paid circulation	128,005	129,176
D. Free distribution by mail, carrier or other means, samples, complimentary and other free copies	7,945	7,640
E. Total distribution (Sum of C and D)	135,950	136,816
F. Copies not distributed		
1. Office use, left over, unaccounted, spoiled after printing	2,649	2,584
2. Returns from news agents	None	None
G. Total (Sum of E, F1 and 2 — should equal net press run shown in A)	138,589	139,400

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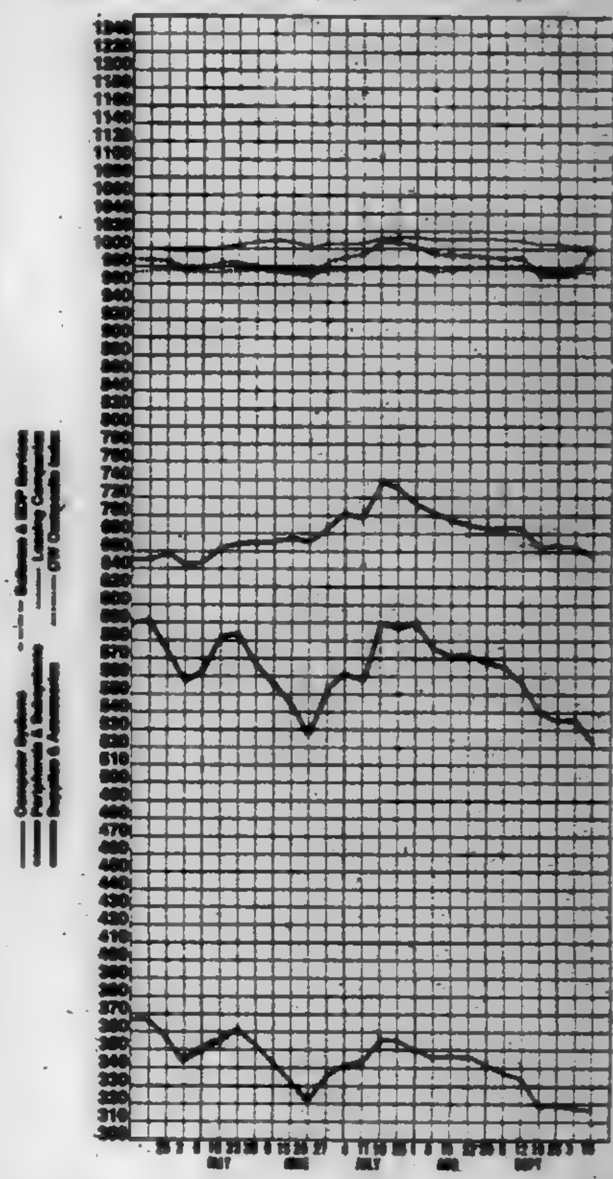
Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 9, 1985

All statistics compiled, computed and formatted by TRADE QUOTES INC, Cambridge, Mass. 02139

EXCH		1985 RANGE (1)	CLOSE OCT 9 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	5- 12	5 1/8	- 1/4	-4.6
O	ALTOS COMPUTER SYST	7- 14	8 7/8	- 1/8	-1.2
A	AMDAHL CORP	10- 18	11 1/8	- 1/8	-1.1
O	APPLE COMPUTER INC	14- 31	15	- 5/8	-4.0
N	AT&T	19- 23	21 3/8	+ 1/8	+0.5
N	BURROUGHS CORP	51- 66	58	-11 1/8	-17.3
O	COMPAQ COMPUTER CP	4- 12	8 1/8	- 1/4	-2.9
O	COMPUTER AUTOMATION	3- 8	5 1/2	0	0.0
A	COMPUTER CONSOLES	5- 10	6 3/4	+ 1/8	+1.8
N	CONTROL DATA CORP	15- 38	18 3/8	+2 3/4	+17.5
O	CONVERGENT TECHNOL	5- 17	7 1/4	- 7/8	-10.7
O	CPT CORP	3- 12	5 1/8	- 1/2	-8.8
N	CRAY RESEARCH INC	39- 61	48 3/4	-2	-4.1
O	DAISY SYSTEMS CORP	21- 38	21 3/4	- 1/4	-1.1
N	DATA GENERAL CORP	31- 70	35	-6 1/2	-14.2
N	DATAPOINT CORP	5- 8	[illegible]	0	0.0
N	DIGITAL EQUIPMENT	89-130	104	-5 3/4	-5.2
A	DECO INC	12- 16	14 3/8	0	0.0
O	ELECTRONIC ASSOC.	3- 5	4 1/8	- 1/8	-2.7
O	FLOATING POINT SYST	19- 38	28 5/8	- 5/8	-2.3
N	FOXBORO	28- 34	29	0	0.0
N	GOULD INC	20- 34	24	+2 3/8	+11.0
N	HARRIS CORP	23- 35	22 7/8	- 7/8	-3.8
N	HEWLETT-PACKARD CO	30- 46	28 3/4	+2 3/4	-8.4
N	HONEYWELL INC	53- 67	60 1/8	-1 3/8	-2.2
N	IBM	118-138	124 1/8	+ 1/8	+0.1
O	IPL SYSTEMS INC	1- 4	1 5/8	+ 1/16	+3.8
N	ITT CORP	26- 37	34 3/8	+ 3/8	+1.0
N	M/A-COM INC	10- 20	10	-1 1/8	-9.9
N	MANAGEMENT ASSIST	2- 20	3	0	0.0
N	MATSUSHITA ELEC(ADR)	40- 60	54 3/8	+2 7/8	+5.5
N	MODULAR COMPUTER SYS	6- 10	6	+ 1/8	+2.0
N	MOHAWK DATA SCI	2- 13	3	+ 1/8	+10.2
N	MOTOROLA INC	29- 44	31 1/2	-2 1/2	-7.3
N	NAT'L SEMICONDUCTOR	10- 17	11 3/8	- 1/2	-4.2
N	NBI INC	12- 21	12 1/8	-1 3/8	-11.0
N	NCR	23- 35	28 1/8	-1 3/4	-5.1
N	PERKIN-ELMER	22- 30	23 5/8	- 1/2	-2.0
N	PRIME COMPUTER INC	13- 20	15 1/2	-1 1/4	-7.5
N	SPERRY CORP	38- 55	48 1/8	-2 5/8	-5.1
O	STRATUS COMPUTER INC	8- 18	12 3/4	-1	-5.8
O	TANDEM COMPUTERS INC	14- 28	12 7/8	- 7/8	-6.8
N	TANDY CORP	24- 37	30 3/8	+ 3/8	+1.1
O	TELEVIDEO SYSTEMS	1- 7	1 7/8	- 1/8	-6.3
O	TELXON CORP	7- 18	14 1/2	- 3/4	-4.9
N	TEXAS INSTRUMENTS	88-140	88 3/8	-4 7/8	-5.2
A	ULTIMATE CORP	6- 24	11 1/4	- 3/8	-3.2
O	VECTOR GRAPHICS INC	0- 1	1/4	0	+14.3
A	WANG LABS "B"	15- 32	18 3/4	- 5/8	-3.2
A	WANG LABS "C"	15- 32	18 7/8	+ 1/8	+0.7
N	XEROX CORP	37- 58	47 1/4	+1 1/8	+2.3
	LEASING COMPANIES				
N	COMDISCO INC	8- 20	18 1/2	- 3/4	-3.9
O	CONTINENTAL INFO SYS	9- 12	10 5/8	+ 1/2	+4.9
O	FINALCO GROUP INC	3- 7	4	- 1/2	-11.1
O	PHOENIX AMERICAN INC	2- 8	2 1/8	- 1/8	-5.5
O	SELECTERM INC	8- 14	7 3/4	0	0.0
N	U.S. LEASING	32- 43	33 3/8	+ 1/4	+0.7
	COMPONENTS				
N	ADVANCED MICRO DEV	22- 41	23 1/4	-1	-4.1
O	ADV'D SEMICONDUCTOR	8- 26	8 3/4	+ 1/8	+1.4
N	ANALOG DEVICES INC	18- 25	19 7/8	- 1/2	-2.4
O	ANALOGIC CORP	8- 16	11 3/8	- 3/8	-3.2
N	APPLIED MAGNETICS CP	8- 16	12 1/8	0	0.0
O	HADCO CORP	3- 10	4 1/8	0	0.0
O	MICRO MASK INC	5- 10	5 7/8	+ 1/8	+2.4
N	TERADYNE	16- 30	16	-1 3/4	-9.9

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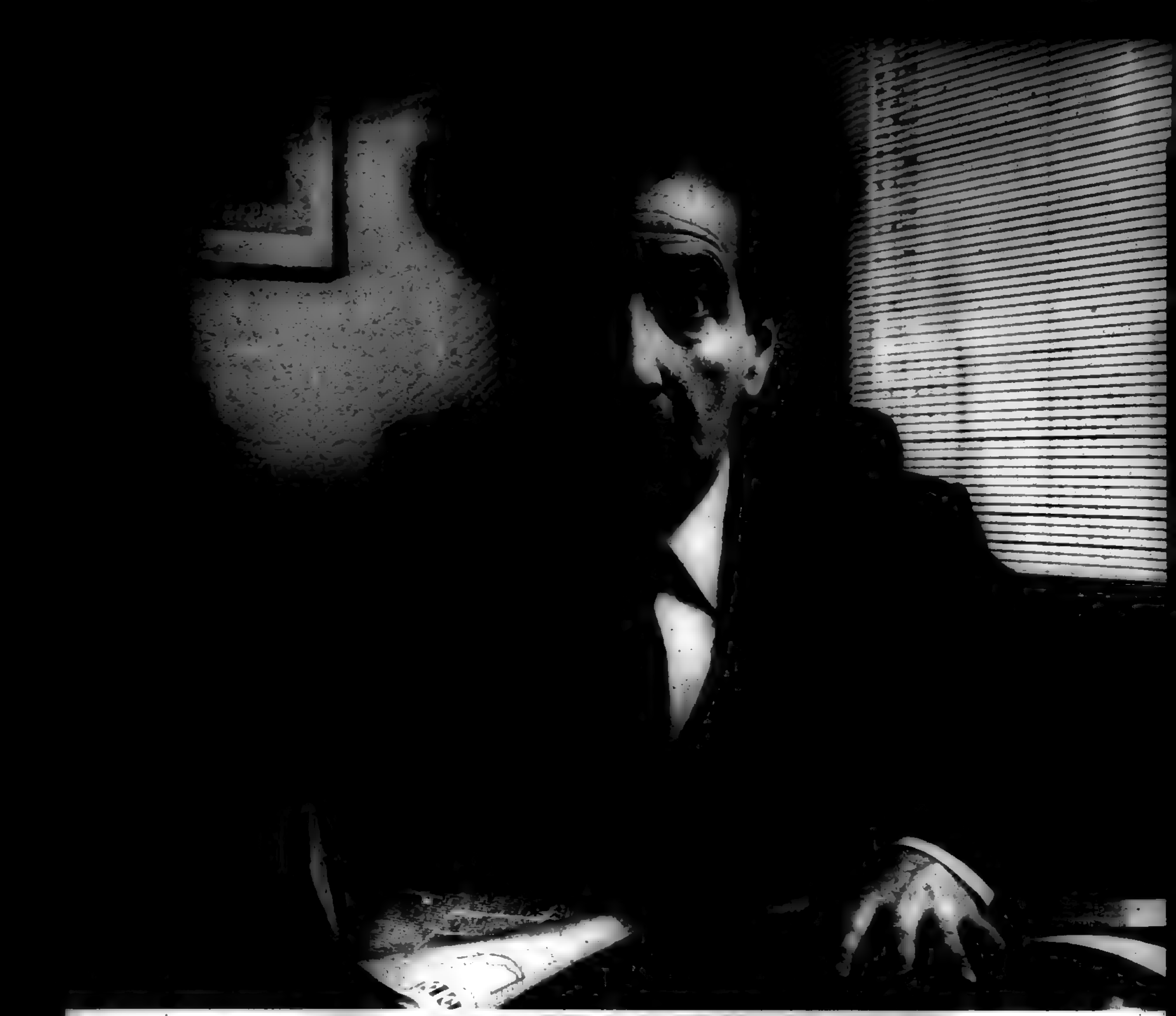
EXCH		1985 RANGE (1)	CLOSE OCT 9 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 4	3 3/4	+ 1/2	+15.3
O	ADVANCED SYSTEMS INC	9- 20	13 7/8	+ 3/8	+2.7
N	AGS COMPUTERS INC	10- 17	14 5/8	- 3/4	-4.8
O	AMERICAN SOFTWARE	7- 18	8 1/2	- 1/2	-5.5
N	ANACOMP INC	1- 4	2 3/4	- 1/8	-4.3
O	ANALYSTS INTL CORP	8- 11	7 7/8	- 3/8	-4.5
N	APPLIED DATA RES	18- 40	12 7/8	-1 7/8	-8.4
O	ASHTON TATE	6- 13	10 3/8	-1 5/8	-13.5
O	ASK COMPUTER SYSTEMS	8- 20	7 3/4	-3 1/2	-31.1
O	AUTOMATED COMP INC	1- 7	1 3/4	0	0.0
N	AUTOMATIC DATA PROC	30- 50	40 1/2	-1 3/4	-4.1
O	COMPUTER ASSOC INT'L	16- 30	21	-3	-12.5
O	COMPUTER HORIZONS	9- 11	11 1/2	+ 3/8	+3.3
O	COMPUTER NETWORK	5- 10	7	- 1/4	-3.4
N	COMPUTER SCIENCES	17- 26	23 7/8	- 1/2	-2.0
O	COMPUTER TASK GROUP	10- 20	18 1/8	0	0.0
O	COMPUTER USAGE	2- 3	2 1/4	0	0.0
O	COMPUTONE SYSTEMS	4- 11	5 3/8	- 1/8	-2.2
O	COMSERV CORP	1- 6	2 7/8	0	0.0
O	COMSHARE	8- 10	8 7/8	0	0.0
O	CULLINET SOFTWARE	14- 33	14	+2 1/2	+15.1
O	CYCARE SYSTEMS INC	18- 27	20 1/2	- 3/4	-3.5
O	HOGAN SYSTEM INC	6- 15	5 1/4	- 1/8	-2.3
N	GENERAL ELECTRIC CO	53- 65	57 3/4	- 1/4	-0.4
N	GEN. MOTORS E (EDS)	17- 47	33 1/8	-3 7/8	-10.5
N	GTE CORP	38- 48	38 7/8	- 3/8	-0.9
O	INFORMATION SCIENCE	1- 6	2 3/8	+ 3/8	+20.7
O	INFOTRON SYSTEMS CP	10- 30	15 1/4	-1 3/4	-10.3
O	KEANE ASSOCIATES	8- 18	17 3/4	- 1/4	-1.4
N	LOGICON	26- 38	33 1/2	0	0.0
O	LOTUS DEVELOPMENT CP	16- 30	18 3/4	+ 1/2	+2.8
O	MCI COMMUNICATIONS	7- 11	8 3/8	- 1/8	-2.8
O	MGMT SCI AMER INC	8- 15	8 1/4	- 5/8	-7.0
O	MATHEMATICAL APP GRP	2- 5	1 7/8	+ 1/8	+7.1
O	MICOM SYSTEMS INC	10- 42	14	-1 1/2	-9.8
O	MICROPRO INT'L CP	2- 6	2 1/4	- 1/8	-5.2
O	NATIONAL DATA CORP	7- 18	13 1/2	+ 1/8	+0.8
O	ON-LINE SOFTWARE INT	6- 10	8	0	0.0
O	PANSOPHIC SYSTEMS	11- 25	18	- 1/2	-2.7
N	PLANNING RESEARCH	9- 17	18 1/2	+ 1/4	+1.4
O	POLICY MGMT SYSTS CP	18- 30	18	- 1/2	-2.7
O	PROGRAMMING & SYS	4- 6	5 3/4	0	0.0
N	REYNOLDS & REYNOLDS	28- 44	37 1/8	- 1/4	-0.8
O	SEI CORP	11- 18	18	+ 1/2	+2.7
O	SHARED MEDICAL SYST	20- 30	23 3/4	+1 1/8	+5.0
O	SCIENTIFIC COMPUTERS	3- 12	5 5/8	- 1/4	-4.3
O	SOFTWARE AG	11- 22	13 1/4	- 5/8	-4.5
N	URS CORP	10- 14	11 1/2	+ 1/8	+1.0
N	UCCEL	8- 17	10	- 3/8	-3.6
	PERIPHERALS & SUBSYSTEMS				
A	AM INTERNATIONAL	5- 8	6	+ 3/8	+16.9
A	ANDERSEN JACOBSON	2- 11	2 3/8	+ 1/8	+5.5
O	AST RESEARCH INC	7- 23	14 1/2	- 3/8	-2.5
O	AUTO-TROL TECHNOLOGY	5- 10	4 7/8	- 3/8	-7.1
O	AVANT-GARDE COMPUTNG	5- 20	7 5/8	- 7/8	-10.3
O	BANCTEC INC	5- 12	8 1/2	- 1/8	-1.4
O	BEEHIVE INT'L	1- 3	3/8	0	0.0
N	BOLT,BERANEK & NEW	10- 31	29	- 1/4	-0.8
O	CAMBEX CORP	1- 3	7/8	- 1/8	-12.5
N	CENTRONICS DATA COMP	3- 12	4 3/4	+ 1/4	+5.5
O	CETEC CORP	5- 10	6 7/8	- 1/4	-3.5
O	COGNITRONICS	4- 7	5 1/2	- 1/4	-4.2

EXCH		1985 RANGE (1)	CLOSE OCT 9 1985	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUGRAPHIC CORP	14- 33	24 7/8	+ 1/8	+0.5
O	COMPUTER TRANSCEIVER	1- 4	3/8	0	-0.0
O	COMPUTERVISION CORP	29- 46	8 1/2	-2 3/8	-20.4
O	CONRAC CORP	13- 18	13	- 1/8	-0.9
O	DATAPRODUCTS CORP	11- 24	11 1/2	- 1/2	-4.1
A	DATARAM CORP	3- 7	5 3/4	0	0.0
O	DATA SWITCH CORP	4- 8	3 7/8	- 1/4	-6.0
O	DATUM INC	5- 8	5 1/4	+ 1/8	+2.4
O	DECISION DATA COMPUT	8- 18	11 1/4	- 3/8	-3.2
O	ENDATA INC	3- 29	3 1/2	+ 1/4	+7.6
O	EVANS & SUTHERLAND	8- 18	17	+1	+6.3
O	GANDALF TECHNOLOGIES	5- 20	8 7/8	+ 1/2	+6.3
O	GEN'L DATA COMM IND	8- 30	8 1/4	-2 7/8	-25.8
N	HAZELTINE CORP	3- 20	15 1/8	+ 3/8	+2.4
O	ICOT CORP	5- 17	5	+ 1/8	+2.6
O	INFORMATION INTL INC	4- 15	13 3/8	+ 1/8	+0.9
O	INTECOM INC	9- 30	4 7/8	- 3/8	-7.1
O	INTEL CORP	7- 28	25	-1 3/4	-7.0
A	LUNDY ELECTRONICS	6- 14	11 1/4	+ 1/8	+1.1
O	MEGADATA CORP	4- 12	4 1/4	0	0.0
A	MSI DATA CORP	8- 30	8 7/8	- 1/8	-1.3
O	NASHUA CORP	19- 29	22 3/4	- 1/8	-0.5
O	NETWORK SYSTEMS CORP	20- 45	20 1/8	-4 3/8	-17.8
O	NO AMERICAN PHILIPS	30- 42	38 1/2	-1 3/8	-3.4
N	NORTHERN TELECOM LTD	1- 38	31 7/8	-1 1/2	-4.5
O	OMEX	1- 3	1/2	0	0.0
O	PARADYNE CORP	7- 16	7 3/8	- 1/8	-1.6
O	PENRIL CORP	5- 20	7 7/8	+1 1/8	+16.7
O	PLESSEY CO (ADR)	8- 23	10 1/2	- 7/8	-8.3
O	PRINTRONIX INC	6- 17	11 1/2	0	0.0
O	QMS INC	5- 11	5 5/8	- 1/8	-1.9
O	RAMTEK CORP	3- 17	2 3/4	+ 1/8	+4.8
N	RECOGNITION EQUIP	8- 25	8	- 1/8	-1.5
N	SANDERS ASSOCIATES	11- 37	33 1/2	-2 3/4	-8.2
O	SCAN-OPTICS CORP	5- 18	13 1/8	0	0.0
N	SCIENTIFIC ATLANTA	8- 20	11 1/4	- 7/8	-7.2
O	SEAGATE TECHNOLOGY	2- 12	9 1/2	- 5/8	-6.2
N	STORAGE TECHNOLOGY	1- 3	1 7/8	0	0.0
O	SYKES DATATRONICS	0- 11	1/4	+ 1/8	+100.0
O	T BAR INC	5- 20	9 5/8	- 3/8	-3.8
N	TAB PRODUCTS CO	6- 20	15 3/8	+ 1/8	+0.7
O	TANDON CORP	2- 13	3	0	0.0
A	TEC INC	6- 20	7 3/4	- 1/4	-3.1
N	TEKTRONIX INC	20- 60	47 3/8	-2 1/2	-5.0
N	TELEX	1- 60	42 3/4	-1 7/8	-4.2
O	TERADATA SYSTEMS CP	1- 20	3/4	+ 1/4	+50.0
O	TIMEPLEX INC	9- 21	10	- 3/4	-6.7
O	TITAN CORP	3- 8	5 3/4	- 3/8	-6.1
O	VISUAL TECHNOLOGY	1- 10	7/8	- 1/16	-6.7
	SUPPLIES & ACCESSORIES				
O	AMERICAN BUS PRODS	21- 30	25 1/2	- 3/8	-1.4
N	BARRY WRIGHT	17- 30	17 1/8	+ 1/8	+0.7
N	DUPLEX PRODUCTS INC	13- 30	17 1/8	-1	-5.5
N	ENNIS BUS. FORMS	10- 30	15 5/8	-1 1/8	-6.7
N	3M COMPANY	74- 90	78 1/2	+ 1/8	+0.1
N	MOORE CORP LTD	13- 22	19 1/8	- 1/8	-0.6
O	STANDARD REGISTER	18- 30	24	0	0.0
N	WALLACE BUS FORMS	20- 40	30 3/4	+ 3/8	+1.2



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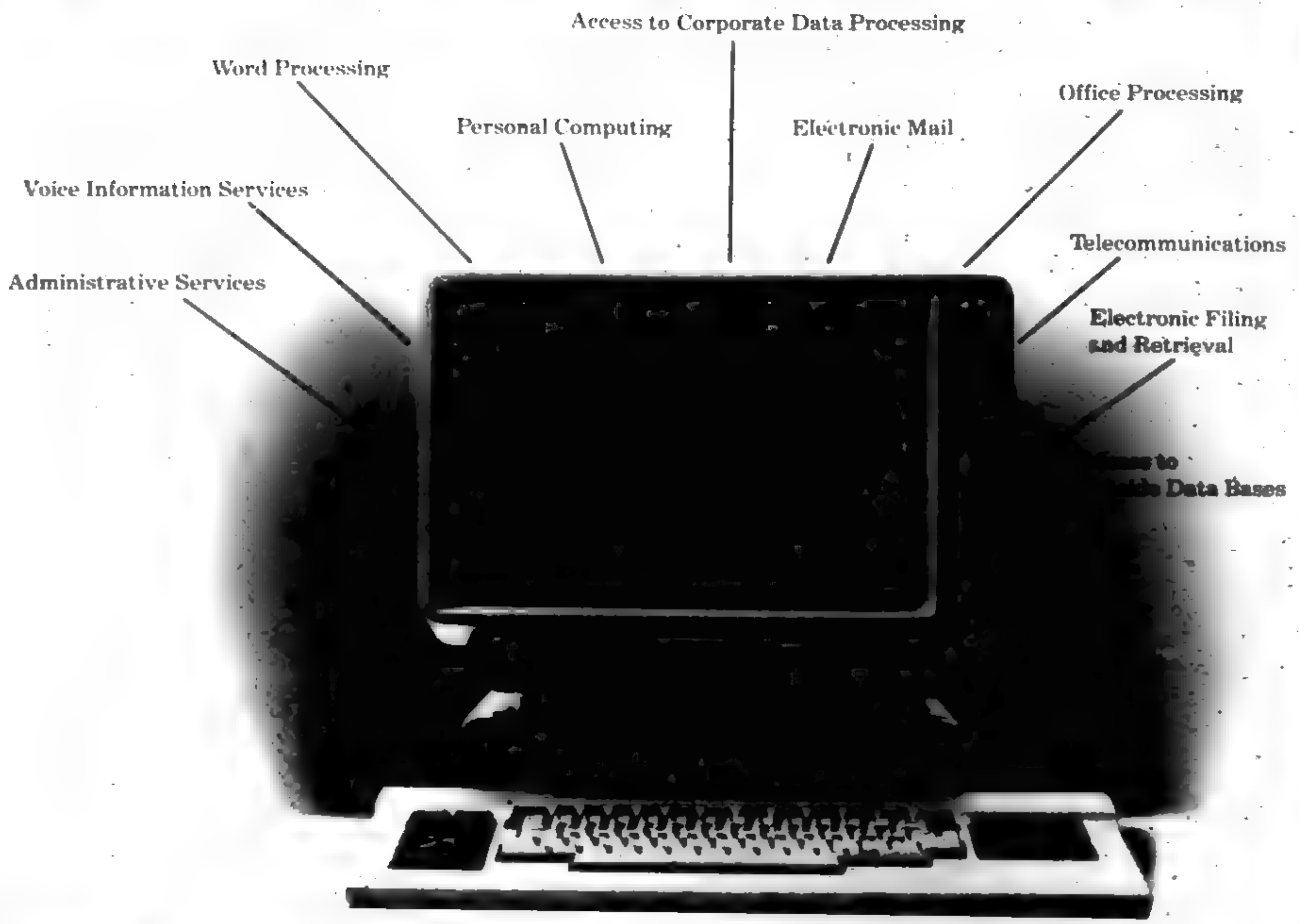

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Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue the last week in December and the first week in January by CW Communications/Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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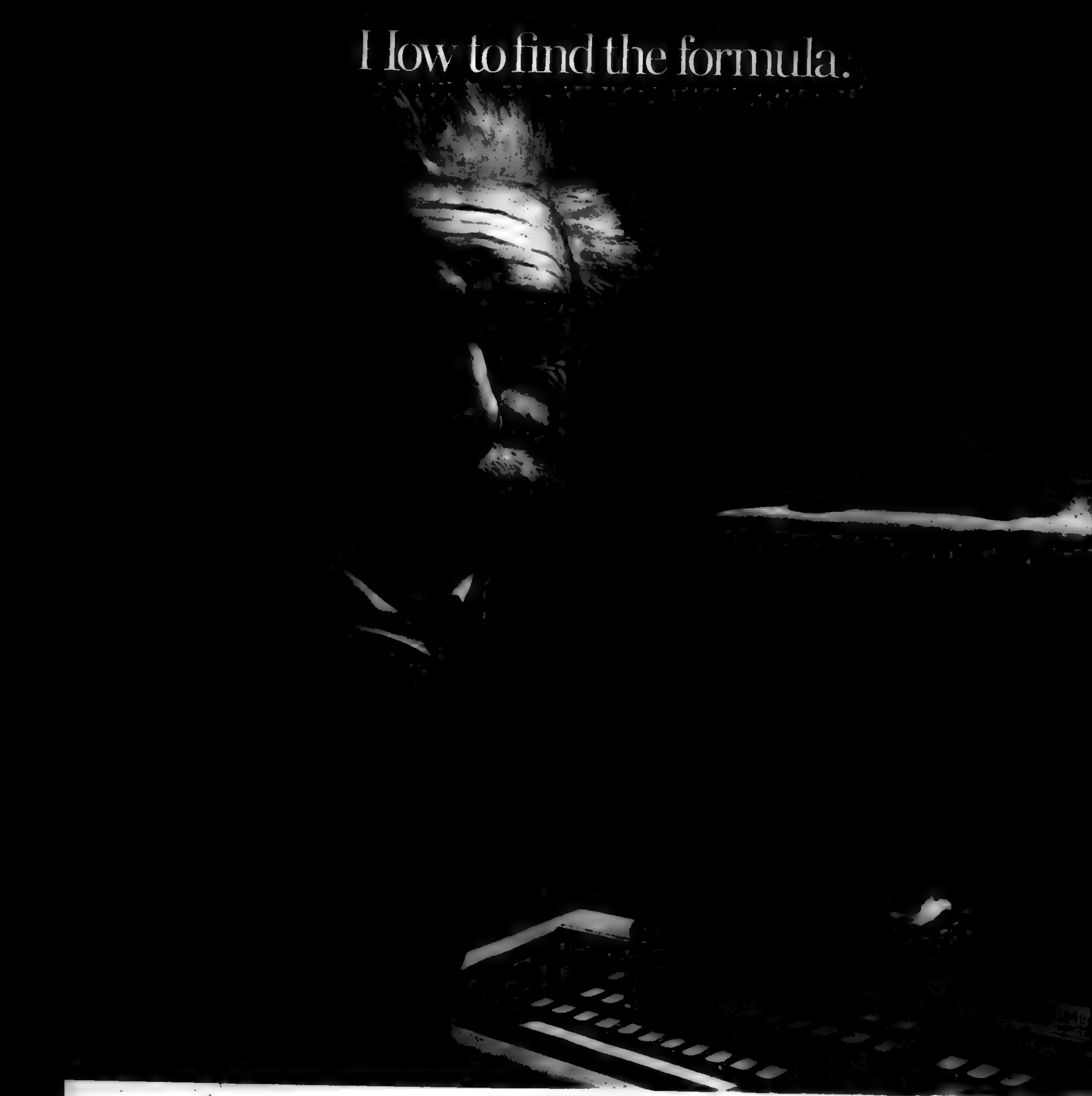
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Editorial

Where's the Glitz?

The ballyhoo of office automation has died. The glitz and the glamor never materialized. Instead, what has surfaced through the rubble of broken dreams and empty promises is some very down-to-earth functionality for office workers. Nothing too exciting, nothing that has revolutionized the working world, yet. The big bang theory of technology has never related to OA, which is as much an education and training process as a technological phenomenon.

But right in the middle of this steady evolutionary growth, the industry hit a slump, slowing the overall process. The microcomputer, the focal point of OA in most installations, is experiencing a momentary bottoming out after its dramatic rise.

In addition to the other evidence — vendors going out of business or drops in sales — a recent study by International Data Corp. of Framingham, Mass., has revealed that, for the second year in a row, the overall rate of DP/MIS spending has slowed. From the halcyon days of 15% annual growth, the rate dropped to an overall growth of 13% for 1983-84. And this year's study now shows only a 10.9% overall growth. Many industries would kill for that kind of growth rate, of course, but it's not what this industry have come to expect.

MIS itself may have to accept some of the responsibility for the current state of affairs. In the excitement over the microcomputer, in this age of instant gratification, MIS managers have in many instances been too eager to push technology into their companies. Some MIS managers have, in their desire to keep current and implement all the exciting new technologies being introduced, caused their companies to buy equipment they did not need and to abandon equipment that might have handled the job. Or, as was the case in the initial stages of the microcomputer, end users did the buying before MIS was able to get a handle on it. Too many micros now sit on desks and gather dust for executives not to feel burned or at least more cautious about investing in new technologies.

More and better business planning is the key. We have to look at how we can incorporate technology into the business strategy of the company, instead of buying technology in a vacuum. If MIS can convince top management that the technology will in fact help their bottom line and make them more competitive, the purse strings could open up again.

Office automation has frustrated many of its early proponents in its evolutionary approach. Nevertheless, through commitment, realistic expectations and ability to integrate the technologies and functions only if they match the business need, OA can eventually produce some pretty big changes in how we work.

Insider

"The Standard Mongers"

By Timothy J. Caffrey

The call for wide-ranging technical standards comes from all quarters of our industry. A quick perusal of the current trade press indicates that graphics and communication network arenas are the latest target of the standard mongers. Those who note the absence of standards claim that standards add legitimacy to new technologies and markets, make acquisition and installation of computer systems more cost-effective and diminish the decision-making burdens of those involved in selection and acquisition of computer systems. Despite the rhetoric, considerable effort and some progress, our evolution is littered with more failures than successes. A look at some drives for standardization helps to illustrate the nature of the beast.

In recent history, the success of IBM's Intel Corp./Microsoft Corp.-based Personal Computer architecture gave way to claims that a de facto market standard had emerged. Relieved personal computer purchasers in hundreds of large organizations authored planning documents that proclaimed 8088 and MS-DOS as the standard from which microcomputer purchasers could not deviate. While IBM (and quickly Compaq Computer Corp.) may have been pleased, few other market participants had much to cheer about. Other vendors were locked out of lucrative sales because they had designed faster or more flexible personal computers that did not meet the IBM standard head-on. Users continue to suffer the pains of distinguishing hardware compatibles from software compatibles from those that will run Lotus Development Corp.'s 1-2-3, but not Flight Simulator. As the IBM PC family expanded and new versions of MS-DOS emerged, users abandoned strident calls for compliance and ran to catch up. The de facto conclusion is that de facto market standards are anything but.

More recently, AT&T has claimed the Unix System V operating system as an industry standard. What IBM accomplished through brute force, AT&T attempted through full page adds in *The Wall Street Journal*. A standard Unix with the promise of architecture independence and protected investments attracted the attention of a large and often strident group of users, vendors and industry observers. In 1984, 1985 was proclaimed as the year when the Unix standard would gain a substantial following. In 1985, some are saying the same about 1986. All bets are off for 1987. Potential software developers and users grew skeptical as persistent hybrids like Digital Equipment Corp.'s Ultrix; Bell Laboratories' System III, IBM/Interactive Systems' PC IX and Microsoft Corp.'s Xenix cluttered and competed in the marketplace. AT&T's plans for a successor to System V do little to allay suspicion that another industry standard has come and gone.

Significant efforts to develop technical standards have come from other than marketing geniuses. Organizations like Institute of Electric & Electronics Engineers (IEEE) and International Standards Organization (ISO) have moved center stage in the standards drama.

Accumulated evidence begs the question of whether or not conscious pursuit of standards is a viable objective in the computer industry. When you dig behind the rhetoric, three significant hurdles become apparent. The first is that vendors are not too thrilled with the perceived demand for standards. Most vendor strategies call for meeting subsets of standard guidelines while reserving major portions of their architectures for proprietary solutions. A standardized market, after all, means ease of substitution, plug-compatibility and the potential of an unpleasant price war.

Another hurdle is that technology continues to change at a tremendous rate. However worn this proclamation; there is no arguing that technological progress is the single most important contributor to industry growth. In such an environment, the quest for standardization can easily be construed as a threat to innovation and a portent of stagnation.

A third more subtle hurdle is an apparent case of user schizophrenia. In particular, the quest for stability of standard technology conflicts with the fear of being left behind with old systems and stagnant job descriptions.

Thus, while vendors and users pay lip service and the ISO plods toward promulgation, effective standards in most segments of the computer industry remain elusive. Perhaps that's OK. Standards are signs of an equilibrium found in well-established, often staid industries. We still have a few good years left.

≡

Caffrey is director, strategies for microcomputers and office systems, for International Date Corp. in Framingham, Mass.

dB
BY RICH TENNANT
VENDORS, VENDORS, VENDORS. I DON'T KNOW HOW YOU KEEP UP WITH THE TECHNOLOGY, dB. INTEGRATING OUR OFFICE SYSTEM ISN'T GOING TO BE EASY.
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Q&A

Amy Wohl, president of Amy Wohl Associates of Bala Cynwyd, Pa., has been active in the office automation field for many years. When Wohl is a featured speaker at a conference, she plays to a standing-room-only crowd. She spoke to Computerworld Focus *on the current status of OA and where it is headed.*

Aren't most Fortune 500 or 1000 companies already automated?

No. In many cases when they say OA, they mean they have word processing systems. If you're talking about significant penetration of OA, there is no company in which the majority of departments already has OA.

So they really have a long way to go.

Yes, but that's not surprising. We began installing this stuff for real in 1982, so it's very early in terms of technology.

Some managers are worried that people on the other side of the bell-shaped user's curve will resist using OA tools.

I hope that means they're worried that it will be harder to compete as companies and the resisters will find it harder to compete for employment as more and more OA skills are demanded. I think they mean that people who were easiest to convince have now been convinced. The early adaptors have, in many cases, done their early adapting. But what happens, after a while, is you feel left out if you haven't learned a technology; then there is pressure on the technology-givers. The people who have been left behind feel bad about it and say, 'When am I getting mine?'

According to the September 16, 1985 issue of Computerworld, data processing spending is still down. Is this going to affect the ability of companies to provide the equipment and support?

I suspect there are two reasons DP spending is down. The first is large manufacturing companies have cut back slightly on capital spending. The second reason is that in many companies people are sitting on money that has been appropriated. One reason might be they're afraid to spend the money; they think something bad is going to happen and they ought to save it up. Another reason is that they're not yet ready to spend it. The selection and discussion cycle is very long. Either of those reasons will show up as lessened purchases. But if you're talking about money being there but not being spent, suddenly a lot of that money is going to come out and there is going to be a big bulge of purchases. We have seen lots of customers who have money to spend, but aren't ready to spend it.

In the meantime, are the users getting impatient?

Some are and some aren't. That varies from company to company and within companies. You'll have departments where everybody is ready and they're impatient. And you'll have other departments where nobody wants to hear about it.

Within companies, are there some departments with money to spend and others with none?

Absolutely. I have found the department that gets the most equipment is accounting and after that, research and development. R&D typically gets anything it wants in computer hardware unless the company is temporarily mad at R&D. I think marketing in most companies tends to be fairly unsophisticated about the use of computers and tends not to demand a lot of computing.

Typically, the marketing person got into marketing partly because of lack of interest in using technology or bean counting of any kind. That's antimarketing, remember? So their interest in computers, until we get them computers that don't require them to have those skills, is probably fairly minimal.

Will this push for OA happen quickly?

The politics of getting a big decision approved and the amount of coordination it takes within the user community in terms of getting people ready to make a decision are fairly significant. So however much time they allow and whatever they told the vendor, it is usually longer than that.

Vendors are usually disappointed because they need to sell stuff now. They're always pushing and unhappy, and you can't ever satisfy them. We have to understand that and say, 'OK, we know that it is going to take, on average, a year to a year and a half to go from deciding we want some OA to being ready to buy something.' To get from that point to deciding what you want to do as a company is going to take significantly longer.

So you're talking about a strategic plan.

Yes. Once the plans are in place, even then it takes time to figure out what you're going to do. And a lot of people tend to wait for all that to happen before deciding anything.

— *Lee White*

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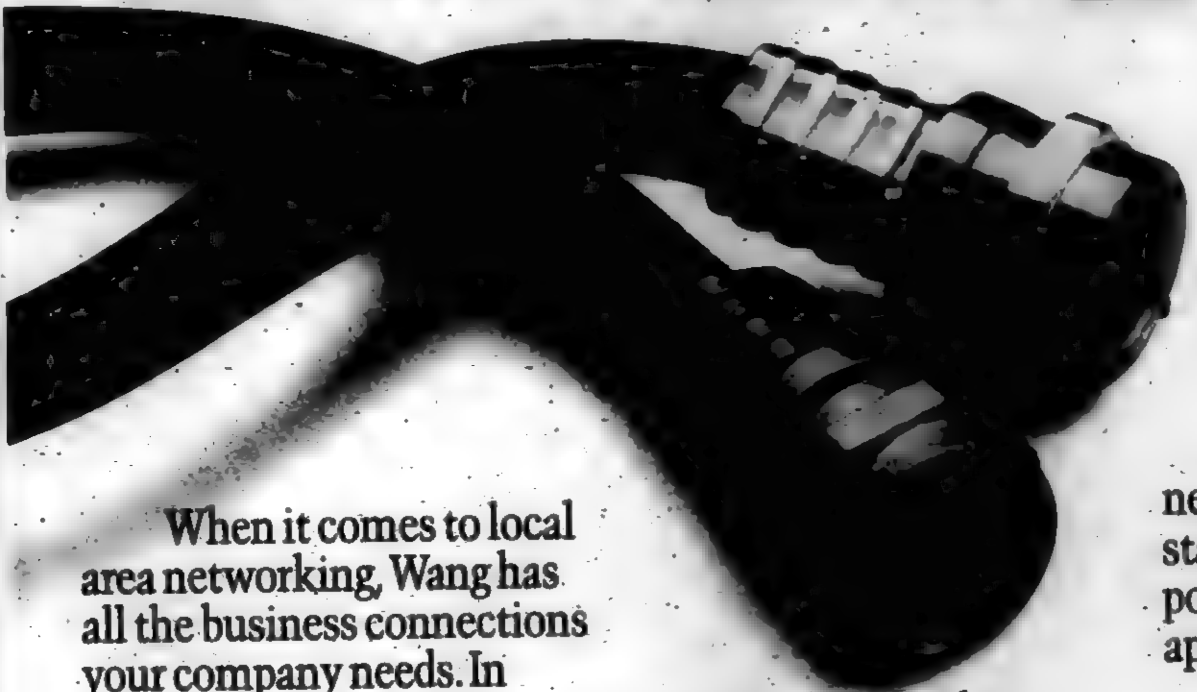

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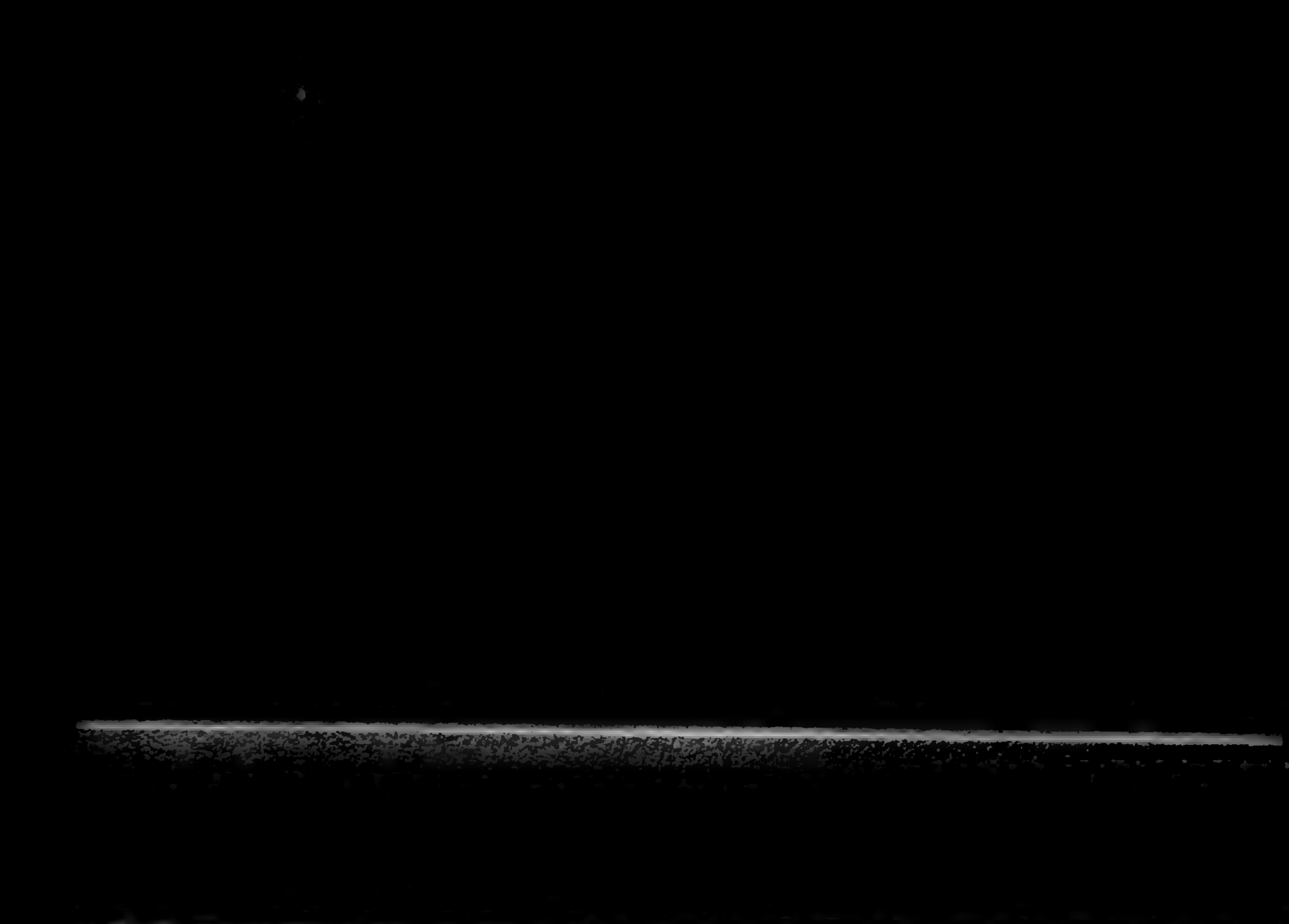

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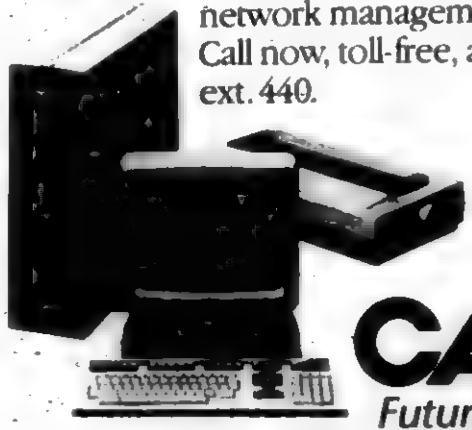

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Manager's Corner

Jim Young

Is data processing ready for the major leagues? Are DP executives ready to take their places beside corporate leaders and guide the destiny of their companies?

A measure of this may be how we handle the challenge of office automation. It is a fertile area that offers some important paybacks, but if DP sees this area as just another system, we may have already lost the battle. There are some important differences that make this area a special challenge. As such, it can highlight our adaptability and user orientation or be a showcase for a failure.

Unlike other DP projects, OA offers a broader area to address. To some companies, it may mean clustered word processing with electronic mail. In other companies, it may mostly be voice-over data communication. It may or may not include integrated copying, presentation graphics, in-house printing and in rare, sophisticated exceptions, specialized functions like teleconferencing, electronic document management, records management and so on. It all depends on what is suitable for each company. The challenge to DP is to select an OA solution that is in keeping with the business goals and opportunities of the company.

Once the areas of leverage are identified, an additional concern is getting the company to admit there is, indeed, a problem. In many cases, nothing seems to be broken. DP's challenge is to focus on the opportunities for cost savings, performance improvement and revenue generation that are available by implementing selected programs, while at the same time, avoid the many entrapping political pitfalls.

After evaluation of several alternatives, DP will want to suggest a solution to the problem areas identified. Be careful this is not just a vendor choice or a technical answer to business situations. The proper solution usually involves more than just hardware. Management processes to install and to manage OA might be needed. In some cases, staffing changes within the organization or within DP are necessary. This will allow the necessary infusion of specialized skills like WP, telecommunications or records management. But shun the temptation to build a DP empire. Advise the company, but don't try to control it.

As you might expect, these solutions have political overtones because we're changing the way people fundamentally work. As such, collaborative efforts to analyze problems and pick solutions are necessary, but it is a skillful DP manager who maintains progress despite the broad involvement. The DP manager can reinforce the image of being a reasonable but clever manager of a support function and not a rigid hidebound technician.

The most treacherous time for the OA project is when all plans begin becoming reality. One key to success is finding out just who the users are. This may be most of the work force spread over all functional areas and in all corners of the company. Getting in touch and getting their support is very ticklish. It is for this reason that a process, dedicated attention and specialized training management are necessary. Make sure you're getting some feedback to ensure the changes proceed smoothly.

The ultimate success of the OA project may be in DP's blooming relationship with top management. Despite interviewing, analyzing, implementing and working at the grass-roots level, the OA project will have to originate with top management. It can only succeed companywide with their blessings. Have they been convinced of the benefits of OA? Do they actively support DP's sponsorship? Do they even trust DP?

If you have shown management that you understand their concerns and are targeting bottom-line benefits from such programs, then you may well receive some active backing. But you may privately be on trial. Management may attempt to see if you use their patronage wisely.

If you can show that DP can make thoughtful changes smoothly and if you can deliver results, top management may then be persuaded that DP can effectively carry out companywide programs and be trusted with corporate leadership.

OA has unique facets and is notably different in some ways from traditional DP projects. The opportunities for a company are great, but the implications for the role of DP are even greater. If DP can adjust to this new challenge, it will show that it is a department that belongs in the major functional ranks of the company and can help formulate the strategic direction of the company.

On the other hand, DP could resort to canned solutions and cookie-cutter methods. It could try to pound the round peg in a square hole and find it has caused a problem, not fixed one. That failure will be highly visible and the consequences far-reaching.

For years DP has complained like Rodney Dangerfield, that we get no respect. A strong show of capable leadership backed by our results-oriented approach should put this complaint to rest. OA is the ideal project to demonstrate this potential

Young is management information systems director and responsible for user technology at Wright Line, Inc., Worcester, Mass. He has worked in the industry for 15 years.

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In the News

Federal Micro Buying in '84 Up by 400%

The federal government's purchase of small computers increased during the fiscal year of 1984 to 37,277 units. This was more than a 400% increase over the 8,000 units purchased during the fiscal year of 1983.

These figures are taken from a report entitled *FY '84 Microcomputer Procurement Survey*, undertaken by the Office of Information Resources Management (Oirm), part of the General Services Administration (GSA), located in Washington, D.C.

The second annual survey from Oirm dealt with information provided by federal agencies on the make, model, vendor, quantity and total purchase price of those computers acquired between October 1, 1983 and September 30, 1984, and those computers costing less than $10,000 per unit.

The federal agencies reported that expenditures for these desktop computers increased from $34 million in 1983 to $137 million in 1984. The largest buyer was the Department of Defense, purchasing over 17,000 in 1984. IBM was the largest supplier, with over 10,000 units purchased from the company by the government.

"The survey indicates a rapid adoption of this new technology to achieve greater efficiency in the workplace," Grafton Biglow, GSA marketing specialist, explained. "The results may even be understated considering the difficulty in identifying all such equipment in light of the trend toward micro decentralization and management."

Further information is available from the Federal Equipment Data Center, General Services Administration — KHEE, Room 2008, 18th & F Sts., N.W., Washington, D.C. 20405.

Small Firms Accelerate Micro Buying

By 1988, 58% of small businesses in California will be using computers in their work, according to *The Pacific Bell Survey: California Small Businesses and Information Age Issues*, a 1985 survey conducted by San Francisco research firm Elrick and Lavidge, Inc. for Pacific Bell, also of San Francisco.

To arrive at the above figure, 35% of the respondents said they currently use

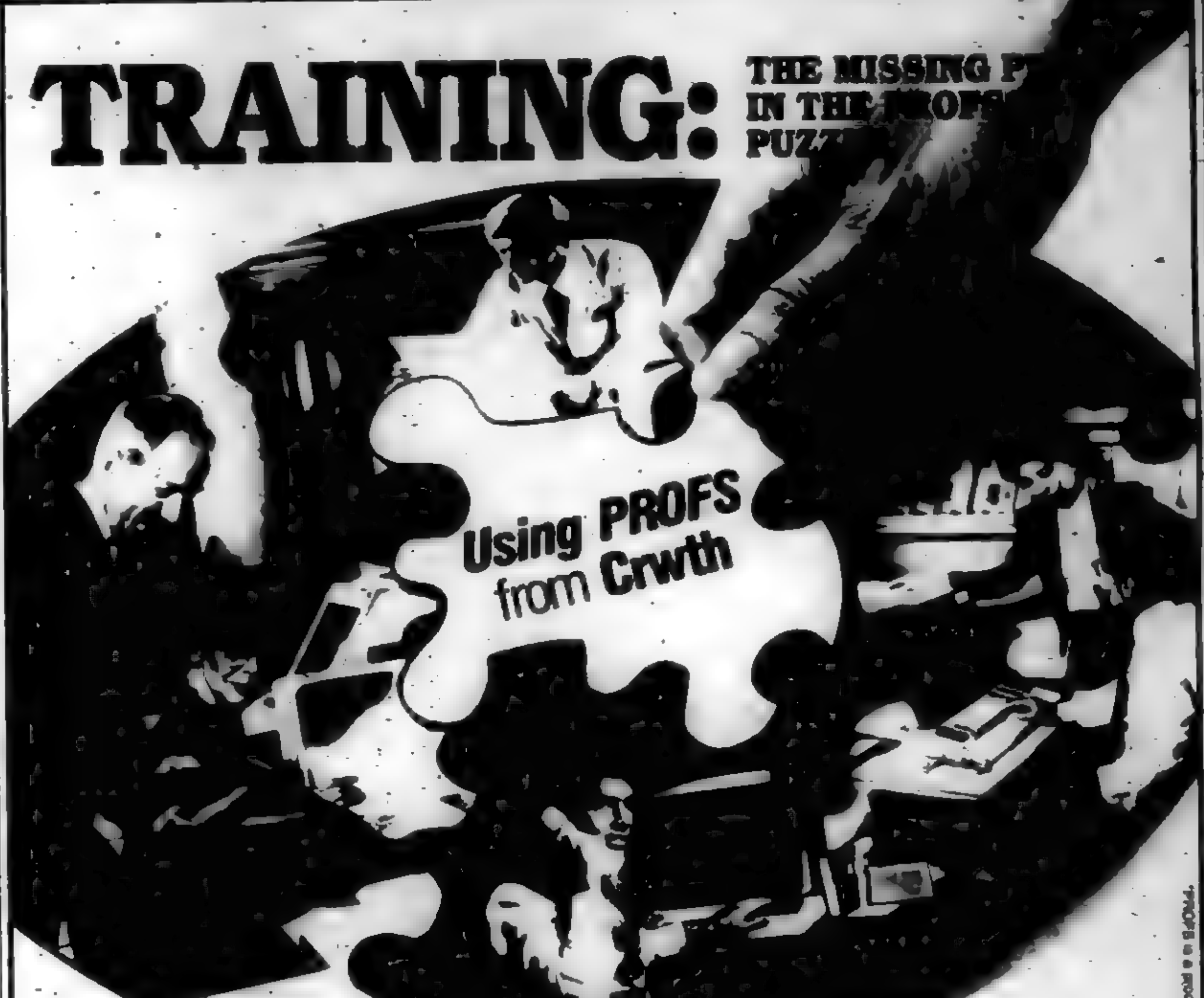
A Workout A Day Keeps Doctor Away

It may seem reminiscent of the exercise programs with which Chinese workers begin each day, but the operations center of American Express Co., Inc. in Phoenix, Ariz., is pure capitalistic Americana. Nevertheless, for five minutes twice each day, volunteers accompanied by music, lead data entry clerks and telephone operators in desk-side exercises that are said to release the stress and tension caused by constant work at computer terminals.

Tone Up at the Terminals was developed two years ago by Verbatim Corp., after the company sponsored a survey designed to determine office workers' views regarding technology in the workplace. The sample of 1,263 secretaries, word processing operators and administrative assistants showed that a substantial number of respondents had health concerns about the WP and data processing equipment they used, especially regarding eyestrain and back strain. The exercises, designed and demonstrated by exercise physiologist Denise Austin and endorsed by the American College of Sports Medicine, resulted in the distribution of more than 500,000 brochures. (*Tone Up at the Terminals* has now been expanded and is available as a four-component unit: a new 30-exercise booklet, a bimonthly newsletter about fitness and health, personal appearances by Austin and a video tape of the fitness program.)

While those polled by *Computerworld Focus* thought stress was relieved by *Tone Up at the Terminals*, they thought the booklet itself was a stress reliever. Liz Braczyk, WP operator at Wright Line, Inc. in Worcester, Mass., liked the pectoral stretch. "It sure has increased the number of word processing customers," she said. Sue Warren, also a WP operator at Wright Line, said her boss approved of the exercises, "as long as my fingers keep moving on the keyboard."

However, the last laugh may be Austin's. American Express conducted a follow-up study three months after the exercise program was instituted to measure the affects of the program. The study found operators averaged 5.5% more keystrokes per day and morale had improved.



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In the News

computers in their businesses, and an additional 23% plan to purchase computers within the next three years.

Following the computer, the researchers found that audio three-way conferencing is the most widely-adopted technology among small businesses in California, with nearly 16% currently using the technology and expected to climb to 23% by 1988.

The report also noted that although a high percentage of small businesses have or plan to buy computers, only 11% said they currently used a modem, while another 11% indicated they expected to add a modem within the next three years. And voice mail, used by a very small percentage of small California businesses, is slated to rise slowly during the next three years.

Another finding noted in the report was that computerization in California's small businesses has happened only very recently, with 62% of those currently owning a computer having acquired the equipment within the last two years, while another 37% reported that modems and/or data transmission were added less than a year ago.

Almost 42% said that computers are used mostly in sales and marketing departments

Further information about the report is available from Pacific Bell, Room 1221, 140 New Montgomery St., San Francisco 94105.

Clerical Jobs On Decline 9 to 5 Reports

A report released by 9 to 5, The National Association of Working Women, entitled *Hidden Victims: Clerical Work, Automation and the Changing Economy* said clerical jobs are beginning to decline in the midwest and stagnate in the rest of the country. Since 1980, the national growth rate for clerical jobs has slowed to 2% less than the growth rate for all employment. And in the largest group of clerical workers (secretaries, stenographers and typists), the number of jobs has declined by 100,000.

This data contradicts assumptions made by policy makers, employers and economic analysts, Karen Nussbaum, executive director of 9 to 5, said. "The loss of clerical jobs is largely hidden from public view, coming mostly through attrition and internal reorganization rather than layoffs. [But] the end result is the same. There will be fewer clerical jobs to fill," Nussbaum said.

Although it was not clear that automation was the definitive factor in the clerical job market decline, the report described the way office work has changed with automation.

According to questionnaires filled out by clerical workers across the country, automation has its pros (increased skills, responsibility and productivity) and cons (decreased job opportunities, wages and autonomy).

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Packet Switching Insight

I recently read your article titled, "Packet Switching: What's Down the Line?" in *Computerworld Focus*. I would like to correct some obvious miscommunication and provide some insight to new technology from Uninet.

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   - 50 Business Service (except DP)
   - 60 Government—State/Federal/Local
   - 65 Public Utility/Communication Systems/Transportation
   - 70 Mining/Construction/Petroleum/Refining
   - 75 Other User________

   Vendors
   - 80 Manufacturer of Computers, Computer-related Systems or Peripherals
   - 85 Computer Service Bureau/Software/Planning/Consulting
   - 90 Computer/Peripheral Dealer/Distributor/Retailer
   - 95 Other Vendor________
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   - 12 VP/Assistant VP
   - 13 Treasurer/Controller/Financial Officer
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   - 22 Director/Manager of Operations/Planning/Administrative Services
   - 23 Systems Manager/Systems Analyst
   - 31 Manager/Supervisor Programming
   - 32 Programmer/Methods Analyst
   - 35 OA/WP Director/Manager/Supervisor
   - 38 Data Comm Network/Systems Mgmt
   - 41 Engr/Scientific/R&D/Tech Mgmt
   - 51 Mfg Sales Reps/Sales/Marketing Mgmt
   - 60 Consulting Mgmt
   - 70 Medical/Legal/Accounting Mgmt
   - 80 Educator/Journalist/Librarian/Student
   - 90 Other________
3. **COMPUTER INVOLVEMENT (Circle all that apply)**
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   - D. Communications Systems
   - E. Office Automation Systems

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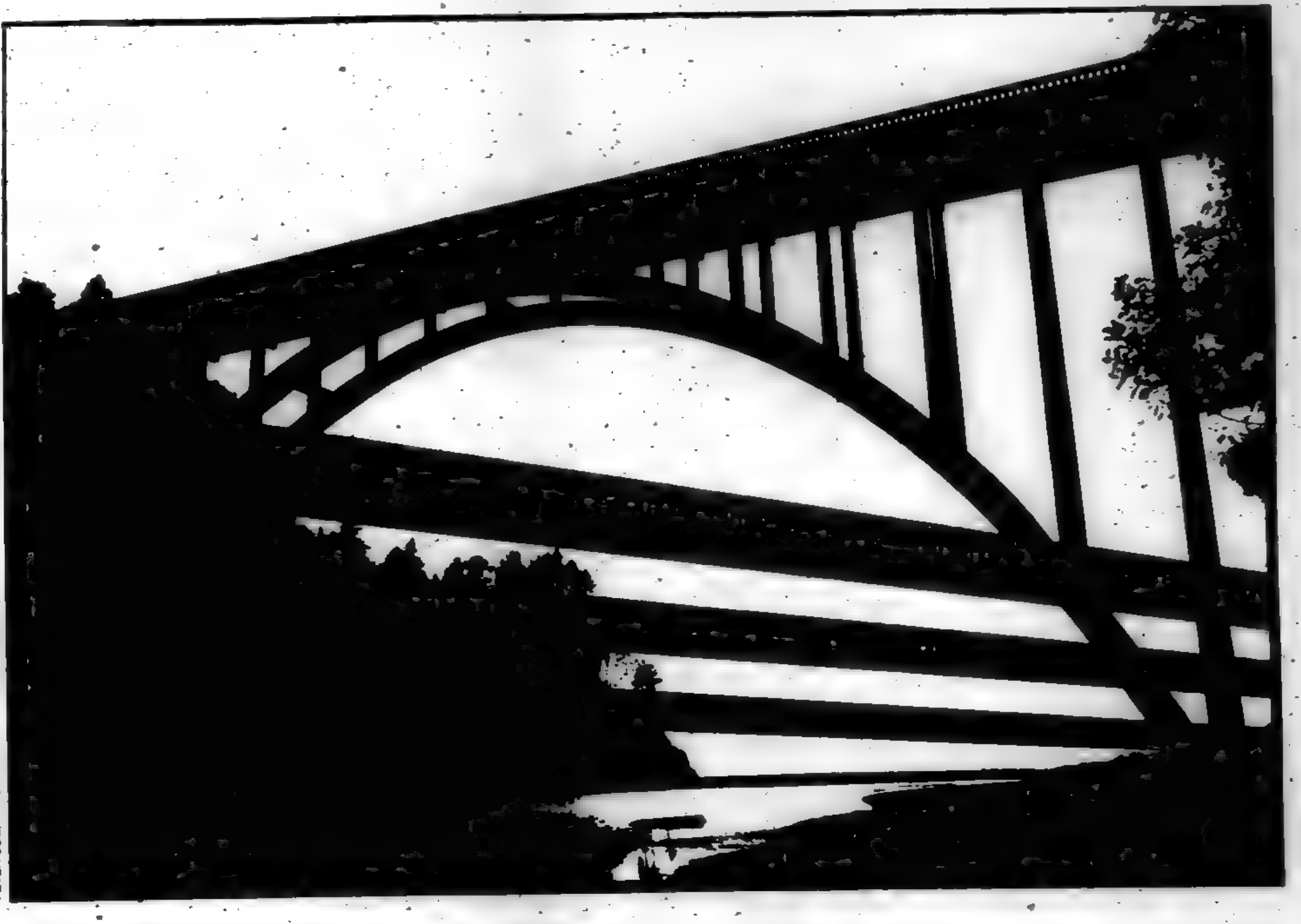

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IBM's Disoss Links Office Architectures

By Paul D. Morris

Office systems integration is currently a very active topic. The computer industry has focused a great deal of attention on IBM's Distributed Office Support System (Disoss), which is IBM's document library and distribution software product. There is, however, a great deal of confusion and misunderstanding surrounding the role of Disoss. Many people believe the role of Disoss is format translation, but this is only by default. The true role of Disoss is to provide an integrated office environment for all IBM office products across a standard set of architectures.

We must first examine the factors that made format translation necessary in order to understand the role of Disoss in format translation. This entails tracing the history of Disoss, how it has matured and where it is going.

Disoss was first introduced in late 1978, in support of IBM's 3730 Distributed Office Communication System. In the summer of 1980, however, the real Disoss emerged in support of the IBM 8100 Information System. This implementation allowed text documents that were created by the Distributed Office Systems Facility (DOSF) on the 8100 to be stored in a Disoss host-based library. Disoss allowed for the archiving and retrieval of these documents as well as the automatic distribution (sending) of these documents to other 8100s in the network. During this period, format translation was unnecessary because all the text documents were created by the same word processing application (DOSF) and displayed in a single presentation format.

At the end of 1982, the first version of Disoss Release 3 was introduced along with two sets of protocols to support IBM's office architectures: Document Content Architecture (DCA) and Document Interchange Architecture (DIA). DCA defines the structure under which all IBM documents will be stored. DIA defines the rules to be used by all IBM office systems when sending documents to and from one another. This release, in addition to supporting the 8100 with DOSF, also included support of IBM's 6580 Displaywriter with Textpack, IBM's 8815 Scanmaster and IBM's 5520 Administrative System. Incorporating various office system and software products into the Disoss network created the need for translation or transformation of documents from one product format to another.

> **The hodge-podge integration plan of IBM in its OA product line and the enormity of the task of standardizing its product lines has forced Disoss into the role of format translator.**

Three types of format translation were identified: translation due to software restrictions, translation due to hardware restrictions and translation due to information structure restrictions.

Software Translation: The various office automation software products included in the Disoss network (such as DOSF and Textpack) were created by different groups within IBM to address separate and distinct needs, with little concern for total system integration. Therefore, wide discrepancies existed in the capabilities of each software product. For instance, the capability to set margin widths or tabs may drastically vary from one OA software product to another.

DCA was developed by IBM to overcome this problem by defining the standards for specifying the contents of a document at two different levels: DCA Level 3 (revisable form) defines the formats to be used by all IBM document editing software applications, thus resolving translation conflicts and DCA Level 2 (presentation form) defines the formats to be used for the presentation of documents in noneditable form on printer or display devices. However, not all current implementations of IBM OA software products use DCA, nor have all products been upgraded to full DCA capability. Therefore, discrepancies exist and Disoss's role by default has been to take care of these discrepancies (for instance, by translating DOSF formatted documents to Textpack formatted documents).

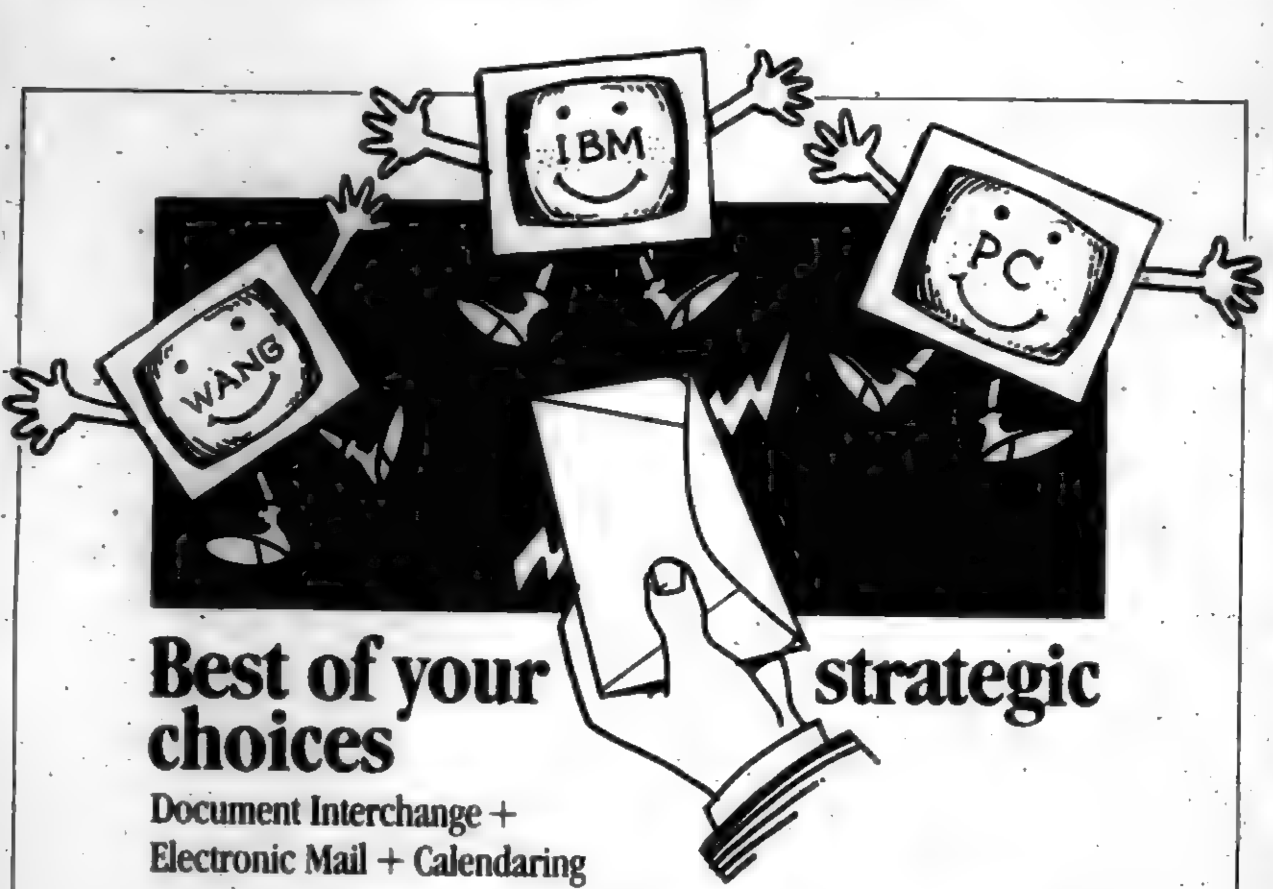
Hardware Translation: Hardware and software translation normally go hand in hand, as most IBM OA software products are designed with the hardware in mind. However, as product independence is becoming more prevalent, this can cause problems that require translation. For example, an accountant could create a document on a color terminal with red indicating a loss. When distributing that document to a noncolor terminal, the highlighting effect would be lost unless a translation was performed to convert red areas to highlighted areas. Disoss's role would be to perform such translations.

Information Structure Translations: Within a compound document, data, text, image, graphics and voice can all be combined as a total document entity. However, certain devices cannot handle certain information structures. In the future, therefore, a voice message will have to be translated to a text message when distributing from IBM's Audio Distribution System (ADS on a Series 1) to a Displaywriter. Disoss could fulfill this role, although it is also possible that IBM will decide to handle these differences at each office system product because they will all recognize a common DCA structure.

So, as we can see, the hodge-podge integration plan of IBM in its OA product line and the enormity of the task of standardizing its product lines has forced Disoss into the role of format translator. Will this continue? Certainly, over the next few years. However, as IBM's overall OA strategy unfolds, the role of Disoss in format translation will cease to exist.

There are a number of reasons for this. First, IBM appears to be standardizing on one OA software product line, Displaywrite. Displaywrite software was first introduced for the IBM PC and closely resembles Textpack, which runs on the Displaywriter. In October 1984, IBM also announced Displaywrite support for the IBM System/36 as well as Displaywrite support for host System/370 systems both under the MVS and VM operating systems. By standardizing on one product with one set of presentation services, the anomalies between different IBM OA software products are resolved, thereby eliminating the need for Disoss-based software translation. An integral part of this strategy, however, is still the full implementation of DCA across all Displaywrite software.

Second, the strategic implementation of IBM's Office System family is based upon Systems Network Architecture (SNA) L.U. 6.2 session protocols, which allow for peer to peer communication and document distribution across dissimilar IBM OA hardware products. This implementation improves network efficiency by alleviating the requirement that document distribution go through a centralized host system running Disoss. Hardware translation can therefore no longer be performed at the host system (for



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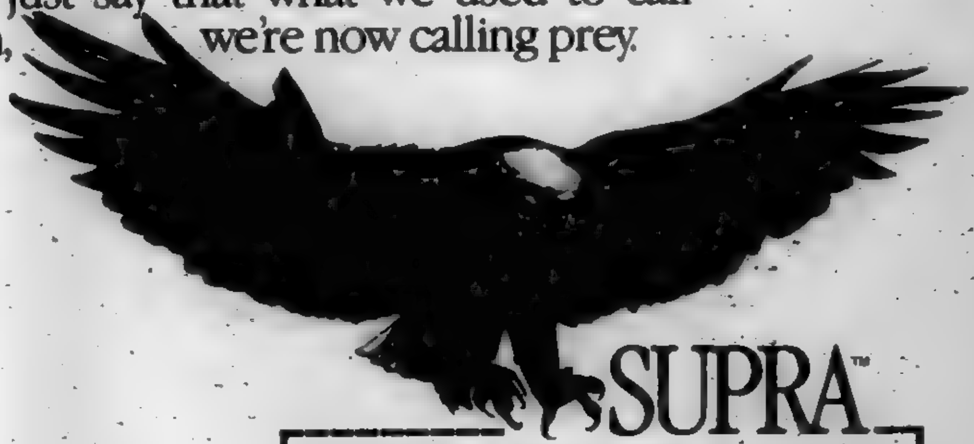

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example, within Disoss), but must be performed at the remote system, eliminating the need for Disoss-based hardware translation.

Third, full implementation of DCA takes into account voice, data, graphics, image and text, thereby eliminating a future need for Disoss to perform information structure translation.

A further role of Disoss is to support a marketing strategy intended to make IBM OA products the de facto standard in a corporations's integrated office approach.

It becomes obvious that the role of Disoss in format translation, a feature it was not originally designed to perform, will cease to exist. What then is the true role of Disoss? Essentially, the original goal of Disoss still prevails: to integrate the office environment by supporting all IBM's office products through a standard set of architectural rules (protocols). This integration consolidates both the logical and the physical characteristics of the office environment. Logically, a compound document format will integrate all five logical entities of human expression — voice, data, text, graphics and image — while physically supporting the hardware characteristics of the incoming generation of integrated voice and data terminal/personal computer (IVDT/PC) workstations. This integration is already becoming a reality through the IBM/Rolm Corp. connection with new add-on voice boards such as Juniper and Cedar. Disoss's role in this integrated office environment will be to provide a standardized software solution to large-scale storage (archiving) of compound documents and the distribution (mailing) of messages and compound documents across all network users.

In its current form, however, Disoss is too cumbersome and centralized to fulfill this role. Certain enhancements need to be considered. These include the following:

- A Disoss-type of functionality needs to be implemented by all vendors of departmental office systems, including IBM, in order to provide archival and distribution services at the departmental level similar to that which is currently provided by Disoss at the host level.
- A more efficient data base management system (DBMS) — especially on the host (probably DB2), but also on the remote — needs to be implemented to satisfy document archiving functions.
- A more efficient operating environment is needed for Disoss, essentially a leaner CICS configured specifically for the asynchronous batch flavor of Disoss. Such a system would allow higher performance through separation from the interactive nature of terminal-driven transaction environments.
- Full integration of Systems Network Architecture Distribution Services (Snads) across all Disoss supported products to ensure resolution of today's chaotic user directory maintenance function.
- A tag system to facilitate movement of an individual's or department's documents from one system to another without an impossible administrative update task.

A further role of Disoss is to support a marketing strategy intended to make IBM OA products the de facto standard in a corporation's integrated office approach. Although Disoss has been available for four years, not one non-IBM OA vendor has succeeded in integrating office products with Disoss. The task of integrating to Disoss is monumental, with IBM utilizing three new architectures (Snads, DCA and DIA) over and above SNA, which has been the major focus for non-IBM vendors in the past. Additionally, the rate of change — architecturally and productwise — within IBM's Office System family will only continue to complicate this task. For instance, in order to achieve their compound document strategy, IBM will have to publish a substantially revised DCA, which will severely impact the DCA development that non-IBM vendors are currently implementing. DIA requires the SNA LU6.2 session protocol, which potentially is as large a development task for the non-IBM vendor as the development task IBM encountered for its own Network Control Pro (NCP) on its front-end processors.

It is therefore unlikely that within the next two years non-IBM vendors can adequately interface directly to Disoss. Unless they pursue tactical solutions from third-party software vendors, their ability to compete in the integrated office environment will be negatively impacted.

Morris is national sales vice-president of Software Research Corp., a network software product and consulting company in Natick, Mass.

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The Impact of Unix In the Office

By John Butler

During the last decade, the demand for new technologies that will improve the productivity of office workers has significantly increased. But these new technologies must provide certain benefits in order to serve the needs of end users as well as to be successful in the marketplace. Recently, Unix has emerged as a potential operating system for office software systems.

Let's take a look at the benefits to end users of transportable Unix-based office systems and emerging trends in application software.

Transportable Unix-based office systems will benefit the user in several major ways. First, the user will ultimately be able to run a single office system across a wide range of different hardware in the same facility. For example, Digital Equipment Corp. VAX and IBM Personal Computer AT and 4300 series systems will all be connected to a local network running the same office system. This is significant because very few users are able to have all their needs met by a single hardware supplier. Due to the nontransportable nature of previous office software systems, the flexibility of being able to provide users with a wide range of hardware solutions and a common software environment has not been available. Transportable office systems will allow companies to use the most cost-effective hardware solutions while maintaining a uniform user interface to the system.

Transportable office systems allow close organizational integration across divergent hardware by running the same software on all systems. Although software-to-software gateways and interchange formats will be important to future office systems, they are not a substitute for a single integrated system. The professionals who use these systems require a single user interface and smooth seamless methods of working in groups, which can only be provided by truly transportable systems.

A second major benefit of transportable Unix-based office systems is that they separate the office software decision from the office hardware decision, thereby reducing the risk of either decision. Transportable software ensures that the company is not tied to a single hardware vendor.

Transportability also stimulates the development of better software by creating a market for third party suppliers.

PHOTO ©1985 GEOFF O'CONNELL

The number of companies currently developing software for Unix makes this evident.

Another advantage is the reduction in hardware prices to end users. Because hardware can be substituted more easily, it will be priced in a more commodity-like manner. As a result, low-cost hardware suppliers should increase their market shares.

The next generation of office software is ironically being developed for Unix precisely because this operating system has seriously lacked applications software in the past.

There are three important areas of new technology rapidly emerging. The first involves greater use of computer intelligence. This will not be a dramatic jump into artificial intelligence, but rather a longer trend of assigning the mundane to the computer and more creative tasks to humans. Examples of this change will be seen in the way text is edited and in the unification of all graphics and image editing.

Text will be edited using a much more advanced approach than that available from contemporary word processors. Documents will be formatted automatically as the user enters text. This will be accomplished by applying rules captured in a reusable style description. These style descriptions will be shared among users so that all documents produced in an organization automatically have the same look. Managers and professionals can create documents that meet the organization's standards without the need to master word processing commands and concepts. Graphics and image editing will be unified under a graphics editor that will provide a freestyle drawing capability and will be an automatic drawing agent for all graphical output. The user can directly edit both graphics and images at any time using this universal graphics editor.

A second change that will take place in software technology will occur as office systems move from passive to active agents. This change will allow the system to monitor information to which a user has access and, upon recognizing a user-described condition, take a user-requested action. For example, all changes that are made to a shared document (a project plan) can trigger the system to mail the modified document to the project team members.

New technology will also allow the user to mix and edit arbitrary kinds of information in a document. Most current office software permits a single document to contain just one kind of information such as spreadsheet or graphics, but not several kinds in combination. Some software permits the user to add a preexisting graph to a text document, but in most, once a graph is added it cannot be graphically edited without returning to the source document, which has a separate location in the filing system.

The new technology will allow the user to combine text, graphics, spreadsheet and any other kind of information in one document and yet edit them in their native mode. The user can draft and edit documents in a natural way. As ideas are drafted, the user will be able to see the entire document take shape at once, knowing any part can be easily edited.

Unlike today's personal computer-based information support tools, the new generation of OA will provide for network-based information sharing.

One of the major motivations behind the spread of office automation systems is the efficient and effective information sharing they can provide. Unlike the present generation of personal computer-based information support tools, the new generation of OA will provide for network-based information sharing. This includes the basic mail and calendaring facilities, but will also include the ability to mail any type of information in its native form. This will allow the recipient to readily modify, expand or replace any part of the information and reply to or forward the changes to other members of the work group. Thus, effective work group and intergroup functions are naturally available, even if the groups are spread across multiple locations.

A final trend being observed in the new generation of OA software has been dubbed open architecture. This is a software design that is open to the addition of new applications while providing consistent usage and integration with existing applications. This will allow the easy integration of diverse applications from multiple sources while preserving the overall user interface and system integrity.

Advanced applications software such as that discussed above can greatly improve the productivity of office workers. When such technology is available on a transportable system, the benefits are even more dramatic.

Butler is vice-president of marketing for Applix, Inc., a company that has completed the development of a Unix-based office software system called Alis.

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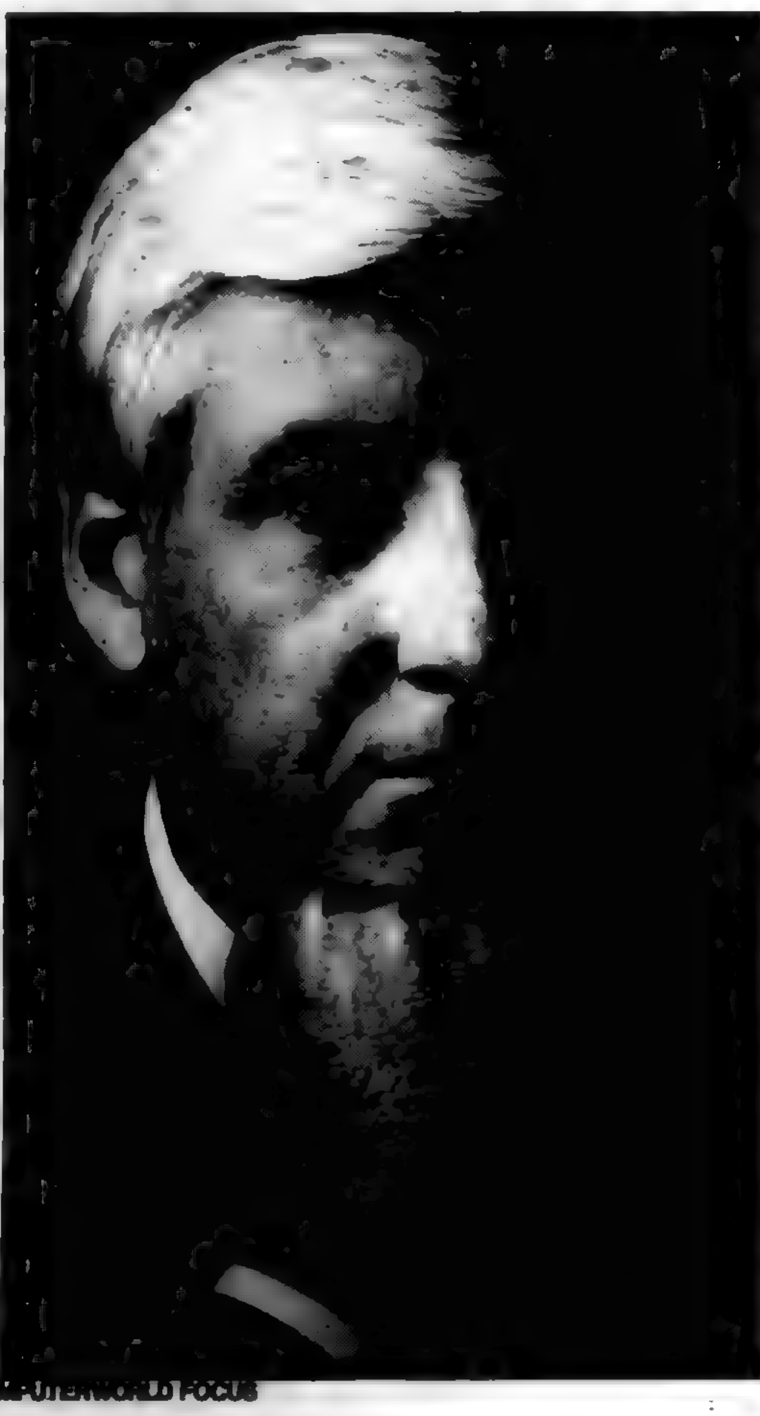

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Where Is The Electronic Messaging Explosion?

The technology has been ready and waiting for some time. Are messaging systems finally going to happen for large groups of users? Only if the office workers receive education as well as the technology.

By Stan Kolodziej

Since its introduction in 1980, electronic messaging has shown respectable if not spectacular growth in U.S. offices. Installations of electronic mail in the U.S. have climbed to 300,000, according to Venture Development Corp. (VDC), a Wellesley, Mass., research firm. Respectable, but certainly not the kind of figures vendors of electronic messaging were touting a few years ago.

Though part of a varied set of transmission media including facsimile and Telex, electronic messaging has gained market penetration in two areas: computer-based messaging systems and subscriber services from communications and time-sharing companies. Computer-based messaging systems are increasingly used as value-added products on private branch exchanges (PBX) and computer systems. A good part of this market is made up of the many electronic mail software packages sold through microcomputer retail stores. The second market consists of companies such as MCI Communications Corp. of Washington, D.C.; Western Union Telegraph Co. of Upper Saddle River, N.J.; and ITT Dialcom, Inc. of Silver Spring, Md.

Electronic messaging is simple to use (a few keyboard commands and modem or telephone are the usual requirements), reliable and reasonably cost-effective — for those reasons endearing itself to its corporate users and corporate budgets. In fact, recent studies indicate a mini groundswell in electronic messaging sales might now actually be underway.

A recent report from VDC stated that "despite uncertainty as to exactly what type of computer-based message system is most appropriate for their needs, close to 60% of current nonowners [of electronic messaging systems] contacted in our sample indicated they plan to acquire a system within the next two years."

Similar projections bolster the immediate outlook of electronic mail subscriber services. A report from the Omni Group Ltd., a New York consulting firm, pointed to the fact that while 62% of the Fortune 1000 corporate respondents already have long-distance messaging in place in 1985, that figure is expected to jump to 71% in 1986. Of the remaining 3,000 largest service and manufacturing companies, while only 39% currently subscribe to electronic messaging services, fully 66% indicated they would have services in place by the end of 1986.

A 1984 survey conducted by consultants Eastern Management Group in Parsippany, N.J., found 83% of the largest U.S. business communications users will require extensive electronic mail capabilities by 1987.

"Electronic mail is a natural for large companies. They are geographically dispersed and have long-distance lines already in place," David Cushing, associate director at the Omni Group, explained. "The brunt of the new demand is from smaller companies that see electronic mail as a way of squeezing more use from the rash of recently installed personal computers."

Once installed, however, electronic messaging is rarely used as much as it could be. Analysts agree it is more a marketing problem than any inherent limits in the technology.

"The responsibility of educating users [of electronic messaging] lies with the vendors and corporate data processing departments," said David Dell, director of research at the Diebold Group, Inc., N.Y. "It's not just educating the user, however, it's bringing out new uses of the service. The same computer system handling electronic messaging, for example, can also be used to keep users up-to-date on corporate policy and resources such as disposal of planes and cars, create in-house bulletin boards and monthly expense reports. Sending memorandums and letters are not enough. Users should be able to create their own uses and add-ons."

According to Leone Pease, a market research analyst with VDC, "the major subscriber companies have done a good job at raising the number of people who have electronic mailboxes, but a bad job at defining the role of electronic messaging in user sales forces and other groups."

There are some technical hurdles to overcome. Electronic messaging is often installed on a departmental rather than an organizationwide basis. This can lead to some incompatibility problems involving installed computer equipment from different vendors. Terminal-to-terminal communication requirements vary per vendor. Until the wide acceptance of communications standards for electronic messaging such as the X.400 from the Consultative Committee on International Telephony and Telegraphy (CCITT), the spread of corporate electronic mail will be slower than its potential.

Despite these problems, computer-based message systems are expected to climb to nearly two million installations by 1990. Packet-switched subscriber services are also expected to fair well during the next five years. After a predicted small hiatus in growth during 1985-86 (caused by a market adjustment following the sales success of vendors of subscriber services in the 1982-84 period), the Boston-based research firm, Yankee Group, posits an annual growth of between 30% and 35% until 1990.

When should a company choose computer-based systems over subscriber services? Both have advantages and drawbacks.

Computer-based system vendors offer the advantages associated with a fixed cost solution. Once a system is installed, no additional cost per transmission will be incurred.

Subscriber services, on the other hand, are well-suited to communication outside the company and relieve the user company of the burden of network administration and maintenance. Most subscriber services also provide hard-copy delivery options. A message can be sent electronically and delivered to an electronic mailbox in a computer, terminal or word processor or that same message can be transmitted to a printing facility close to the recipient, then hand-delivered by courier.

"With computer-based electronic mail becoming cheaper and easier to use," Dell said, "it's like a car option that has suddenly become a value-added necessity."

Large systems vendors such as Digital Equipment Corp. of Maynard, Mass., and Data General Corp. of Westboro, Mass., have provided electronic mail for years. It could be said, in fact, that almost no major large systems vendor would be viable in the market today without an electronic mail offering. Many companies use it as a key entry point for reluctant managers cutting their computer teeth.

In the field of business personal computers, electronic messaging packages have been an intensely competitive industry for over three years. Some of the front runners include Access from Microsoft Corp. of Bellevue, Wash.; Crosstalk from Microstuf, Inc. of Roswell, Ga.; Smartcom from Hayes Microcomputer Products, Inc., Atlanta, Ga.; and Personal Communications Manager from IBM, Armonk, N.Y. Most of these electronic messaging/communications packages have come down in price during the past year and have settled in the $100 to $200 range.

Packet-switched subscriber services are also becoming competitively priced due in part to price pressures caused by new vendors such as Echo of Marina del Ray, Calif., and time-sharing company GTE Telenet Communications Corp. of Reston, Va.

MCI Mail, for example, has recently introduced MCI Link, an interface product designed to join a customer's internal mail services with the outside world, providing access to other internal and packet-switched electronic mail networks. "Users now expect more than just simple electronic mail," Bill Stern, MCI Mail's public relations director, explained.

Western Union has also been intensifying efforts to provide customers with interfaces to computer vendors' systems, including DEC's All-In-1, Sperrylink from Sperry Corp. of Blue Bell, Pa., and IBM's Distributed Office Support System (Disoss) and Professional Office System (Profs) environments. It has also introduced a software package for microcomputers called Instant Mail Manager, which provides the interface with the Easylink electronic mail service and information data base retrieval services, along with handling word processing.

Western Union is also planning a big splash for the press in late October to introduce a product that Roy Andersen, vice-president of Easylink, has termed a "friendly front end" for hundreds of outside data base retrieval services.

"The user will log onto Easylink at a terminal or computer and then key into the data base services function," Andersen explained. "If users know what sort of information they want but don't know where it is, the new service will automatically scan several data bases to find it." This new service will cost about $10 a search, Andersen noted.

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keeping pace with its new communication bridge between IBM's Profs and GE's Quick-comm electronic mailbox service.

One study predicts the number of managers using installed electronic mail facilities could increase to 43% in 1986, indicating at least a verbal nod (if not capital commitment) to the importance of electronic mail in the managerial work force.

Who uses electronic messaging? "Everyone from the big corporations to mom-and-pop shops, " MCI's Stern said.

At Computer Communications Associates (CCA), a Cambridge, Mass., software company, employees from executives to support staff use a variety of Ascii terminals to send electronic messages to each other and to customers. The system, called Comet 11, was developed at CCA in the late 1970s. Tied into long-distance lines, CCA has extended its electronic mail to customers around the world.

Chris Stone, product manager of DG's Comprehensive Electronic Office (CEO), said the primary reason for electronic mail was "not to exchange short messages, not to decrease telephone tag, but to move documents between terminals." And that, Stone added, is a clerical and middle-management function.

The Omni Group's research found that a majority of its clients use electronic mail once a day, though some use it several times daily. It also found that while only 19% of these managers use installed electronic mail facilities today, that number could increase to 43% in 1986, indicating at least a verbal nod (if not capital commitment) to the importance of electronic mail in the managerial work force.

Another messaging technology also gaining corporate business is voice store-and-forward (VSAF). Recent advances in digitizing and compression of voice have analysts at least cautiously optimistic that VSAF might finally take off in the office. "Voice mail has two distinct advantages over electronic mail," Kenneth Bosomworth, president of International Resource Development, Inc. (IRD), a research firm in Norwalk, Conn., explained. "Keyboarding is not necessary, and the installed base of telephones is massive." VSAF is being marketed in three areas: integrated with PBX, as stand-alone workstations or terminals and as add-on board options.

Bosomworth also said that decreases in computer storage costs along with gains in voice compression technology have offset some of the disadvantages of VSAF, enough to now make it a viable means of office communication, "especially for the exchange of short messages requiring a minimum of interactivity."

Voice messaging is not cheap. Though prices are dropping, most small VSAF systems cost over $50,000, and larger systems run much higher. One corporate user of IBM's Audio Distribution System (ADS) recently paid nearly $200,000 for the installation of a system and the setting up of an ADS training program.

There are exceptions. For under $1,000, for example, Natural Microsystems, Inc. of Natick, Mass., will provide a plug-in board for IBM Personal Computers, which provides minimal voice mail capabilities (a hard disk is recommended). Most vendors agree with DG's Stone, however, that the high costs associated with voice messaging make vendors target upper-level management users, whose legendary wariness of keyboards might be a plus for VSAF systems. "A good deal of voice messaging's appeal to executives," Stone said, "will rest on the fact that most user interfaces are the same as those currently being employed . . . namely push-button telephones."

Weathering a slow start, VSAF has begun piquing the competitive interest of computer and PBX vendors. To win over some of the entrenched base of business electronic mail users, however, most analysts agree that voice messaging in itself will not be enough. To make inroads, VSAF systems will have to combine voice messaging with text and data applications in an integrated office environment. Features such as voice annotation (automatically embedding voice messages within documents) and the ability to create master directories for both text and voice messages are part of this necessary emphasis on integration.

To accomplish this, however, required VSAF vendors to expand into areas outside their expertise, usually with poor results. Witness the good voice messaging but poor DP abilities of Northern Telecom, Inc.'s Displayphone and the rocky start of Wang Laboratories, Inc.'s Digital Voice Exchange (DVX) system.

The DVX system was introduced in 1981 by Wang Laboratories of Lowell, Mass. Wang, along with IBM (with its ADS) was the first office system vendor to offer a voice messaging system as an extension to its office products. Though it has been continually enhanced, DVX still only has about 200 installations.

That does not seem to discourage Bill French, product manager at Wang. "The spectrum of voice messaging users is opening up," French claimed, adding that the market is like an inverted pyramid, with the middle of the pyramid representing corporate management — the major market for VSAF.

Hinting that Wang has both barrels pointed to future advanced VSAF products integrating the company's WP expertise, French said the company has been busy bolstering its engineering staff and working on voice recognition products that would turn voice not only into text, but "text into voice."

DG has already come out firing, however, with its own integrated VSAF product. The Dasher D555, an integrated voice data terminal, modeled after the company's Dasher D460 data terminal, is slated for introduction in late October and will operate within the company's CEO office automation environment.

John Purcell, DG's product manager of terminals, said the D555 comes with a 9-in. screen, eight user-definable soft function keys, an integrated telephone and half- or full-duplex speakerphone. Purcell stressed the D555 can handle all DP and WP functions available on CEO and will also include one RS-232C port for data communications and a separate X.25 port for analog connection with PBX, effectively remedying the security problems of having voice and data sent out over the same lines. "If the CPU goes down," Purcell explained, "you'll still have voice capabilities."

DG has made its voice messaging easy enough for its slated target market of executives. To add a voice annotated message to a text message, for example, the user presses a voice key to activate the voice editor for input. A pop-up menu prompts the user through the creation, reply or forwarding of voice annotated messages.

PBX-maker Northern Telecom of Minneapolis, Minn., is one of the few communications companies offering switch capabilities, voice annotation and voice store-and-forward functions within an integrated PBX and OA environment.

Its Displayphone pointed out the early problems of some communications companies trying to integrate data and text with their communications skills. That might also be changing. Northern Telecom's Meridian SL-1 and Meridian PTE, its transport system, are still in development and not slated for commercial shipment until early 1986. A preview, however, shows a system promising some sophisticated voice annotation and store-and-forward capabilities combined with Northern Telecom's Q-Office WP environment.

Under IBM's monetary umbrella, Rolm Corp. of Santa Clara, Calif., will be selling many more of its Phonemail systems, especially in light of IBM's recent dropping of its ADS voice messaging system in the U.S. market in favor of the Rolm system. Though the Phonemail system interfaces with Rolm's computerized branch exchange (CBX) and can be attached to other PBX through the company's PBX Interface, the real question will be the company's ability to tie the Phonemail to prevalent IBM office environments such as Disoss and Profs. Doing this would greatly expand Rolm's VSAF market and market share.

In fact, this same strategy will no doubt be applied by other VSAF vendors as they come on the scene. As with most areas of the computer and communications industries, companies quickly learn that tying into the huge processing environment IBM has put in place is also a good way of tapping into huge profits.

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Kolodziej is a senior writer at Computerworld Focus.

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XI
LA FORCE

Does MIS Hold All The Cards?

Detente between office automation and DP factions is critical if true automation is the corporate goal. But no one ever said peaceful coexistence would be easy to accomplish.

By Lee White

It doesn't take a seer and a pack of tarot cards to predict the direction in which office automation is heading.

The absorption of the office automation function, its people, its hardware and its systems, is no longer an isolated incident. Nor is it a trend. It is, according to consultants, users and surveys, a fait accompli.

"As recently as five years ago, MIS [management information systems] had little clout in buying office computers. But MIS flexed its muscles and wrested control away from user areas," said Randy J. Goldfield, president of Omni Group Ltd., a Butler Cox company specializing in information technology research and consulting issues.

Warren Waldbrand, Omni's director of research, conducted a major study of office technology planning and purchasing in Fortune 1000 companies. The resulting report, "Techtrends '85: Inside the American Office," found that MIS departments have gained control in the majority of the surveyed organizations. Waldbrand found that 39% of the surveyed companies have standing OA committees which have OA policy-setting authority. And while representation on the committees is made up of many departments, MIS is not only disproportionately represented, but its influence is even greater than its representation.

Wresting of control of OA from the administrative (read: *word processing*) area has been and will continue to be difficult

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but Amy Wohl, president of Amy Wohl Associates, stated that the transition was necessary. "Both the MIS departments and the companies realized that OA is very intimately connected with getting information out of data bases, riding the same networks and using the same workstations. At that point, it is not particularly surprising that people would say, 'OK, MIS, if you have to figure out how this all fits together, why don't you just be in charge of it?' "

> **It is not particularly surprising that people would say, 'OK, MIS, if you have to figure out how this all fits together, why don't you just be in charge of it?' "**

Some organizations have managed the restructuring with little pain. Carolyn Giovannini, manager of operations for the 900-person Department of Community Affairs for the state of New Jersey, spoke with pride of the manner in which her department effected change. In her department, she heads up the OA function and another manager has responsibility for the data processing systems group. Each position reports on an equal basis to a director who has responsibilities beyond the OA and more traditional DP groups. "We have chosen to keep them [OA and DP] separate yet together. Integrate all that we're doing together, yet not have an MIS group so that office automation gets lost in the data processing world," Giovannini explained.

Giovannini thinks part of the success is due to the equipment chosen. Because there were overlaps with data bases that both groups needed, but did not need to reside on the mainframe computer, they looked for equipment for a particular application with the understanding that not too far down the road, the system would also be used for DP and WP, true information management. They chose the Wang Laboratories, Inc. VS system.

Because of the versatility of the equipment and its proprietary software, Pace, Giovannini's staff is as involved with the applications side as the systems people. "Our staff, which is the information center staff, will develop all the applications. We put together a staff, a person from the operations side and a person from the systems side, who will work together. When the documentation is finished and the training completed, the applications will be given to the user to maintain. Operations and Systems will be the consultants, the handholders, the troubleshooters for the users," Giovannini said.

However, the Three-Musketeerish experience that Giovannini recounted was not echoed by Richard Struense, who until recently was manager of the Information Center for Federal Express Corp. in Memphis, Tenn. During his 6½ years at Federal Express, he saw the separate function of OA become part of his information center. The process was a painful one, although Struense said that personality conflicts and internal politics made it more difficult than it had to be.

There were two opposing factions (OA and information center) that were very strong and very separate, Struense said. Each chose the vendor which was strongest in its field — Wang for OA and IBM for the information center's mainframe and end-user computing tools. Each group went on its own very successful tangential way.

The problems really began as users became more sophisticated and began to want to do things with the available tools. Many of the users had Wang terminals, and the 3270 emulation process didn't seem to work. "Things were working on the IBM side, but they weren't working on the Wang side," Struense explained. As the information center gained credibility because of the number of satisfied users, the OA side, with the limited functionality of the Wang workstation, lost ground. Complicating the situation was the fact that there were huge numbers of Wang workstations, including 11 Wang VS systems, all of which had been purchased outright. Resentment and conflict continued to build.

In time, members of the two functions came to realize that many users were common to the two groups and a decision was made to break the OA function into two groups, support and engineering. Support moved into the information center. Engineering stayed behind. "That split was perceived [by the engineering group] as a reduction of power. They had a hard time relinquishing some functions. They were not experienced with any of the other [than Wang] products. They didn't know how to consult or offer alternatives. Sometimes their

"...DEC is currently the market le
in integrated office systems."

Office System Industry Service
Dataquest, Inc., June 1985

George F. Colony
Forrester Research, Inc.
Professional Automation Report, June 1985

"There's no point in pretending that (IBM's) DISOSS plus Personal Services are equal in service to, say, All-In-1."

Office Products Analyst, February 19

THE EXPERTS?

digital

recommendations were in direct conflict with the goals or the corporate approach that had been established by the information center," Struense claimed.

Struense is now director of end-user computing at Hahnemann University Medical Center in Philadelphia. But much has happened since he left Federal Express. According to Struense, management at Federal Express has gone back on the road from whence it came and taken the OA support function out of the information center. Once again, there are two separate groups. Struense, from a distant standpoint, does not think the return to the old way will make anyone happier. At greatest risk is the user, he said. "[The two functions] will continue to develop within two networks and the particular vendor that was chosen for the office automation side will have as many technical difficulties as it did in the past."

While Federal Express jumped into the OA/information center arena and called it a day rather quickly, other companies are formulating complex organizational plans based on well thought out corporate goals. Bill DeRosa, Information Center manager for the Chrysler Corp. in Detroit, said his mega-company is within a couple of months of resolving the issue. "The user community is starting to cross over," DeRosa explained. "The analyst that the office automation folks deal with is the same one that the information center and applications development staff needs. [The user] doesn't care who he's talking to. So now we, the information center and the office automation group, are faced with the concept of one-stop shopping."

DeRosa's information center presently has 30 people who support over 2,000 users with mainframe tools. The OA function presently supports about 500 secretarial word processors and about 1,000 personal computers. OA reports to end-user computing, which reports into MIS. Although he could not comment on definite plans that might hook OA to the information center, he said the primary thrust was to bring the support together with realignment so that individuals would have multiple responsibilities for both personal computer and mainframe tools.

Although most OA and information center or MIS staffers talk along the lines of peaceful coexistence, Ronald B. Bleiberg, manager of Advanced Office Systems for Emery Worldwide in Wilton, Conn., said the place for OA at Emery is most certainly not in the information center. At Emery, the information center staff evaluates personal computer software, trains people on personal computers and helps users with applications on mainframe software.

Bleiberg stated that five years down the line, the mainframe computer will basically be "a large diskette, a file server and communications traffic cop." As for the future of the information center, Bleiberg sees it merely as a subset of the larger end-user computing function. "Over the next few years, end-user computing will be substantial enough in size that it will represent 50% of all computing done in a corporation. The office of manager of that function will be equally important to the classical current data processing directorship," Bleiberg concluded.

Although most of the users who have been involved with the integration of OA and DP in their own companies talk primarily of the hardware/software/network connectivity issues, the people issues are equally important. As in the case of Federal Express, personality conflicts and fuzzy lines of authority can spell failure to a concept that, if implemented correctly, cannot help but benefit the end user and the corporation.

While people in positions of authority have the rank to make arbitrary and unilateral decisions, it is no secret that projects have a higher potential for success if all participants "buy in" to the implementation and eventual goals.

On the DP/MIS side of the coin, Wohl chides the profession, in general, for its lack of sensitivity, although she firmly believes "you can't have integrated office automation without having it intimately connected to information systems and services; therefore, it belongs in that department. We say to customers, 'If MIS has been a debacle in your company and the end users cringe when they hear it mentioned, we suggest you start office automation someplace else.' "

Jan Duffy, president of Duffy Consulting Group in Toronto, thinks overall responsibility for a successful office automation implementation should reside with a person accustomed to providing a service for the organization as a whole. "I'm still not convinced that there is sufficient depth in the data processing division for them to look at the organization and its business globally." Instead, Duffy said, the person responsible for designing, directing, managing and owning the system should be someone who has a dotted-line relationship to those two [OA and DP] departments. "We have recommended that that person exist and that the job be reevaluated after three years to determine where in fact the responsibility for the entire system and its management lies," Duffy said.

And what happens to the management of OA once it is absorbed by MIS? Bonnie Kline, president of the Association of Information Systems Professionals (formerly the International Word Processing Association) thinks that each function has much to learn from the other and, indeed, each can perform tasks in which the other has little interest. People who have grown up in the OA ranks tend to be more people oriented and to understand the user's needs better, while the DP professional is typically more technically oriented and has extensive expertise in hardware and software, Kline said.

Kline cautions, however, that the traditional OA person cannot rest on past laurels. She stated if the OA people are to survive in the new world of system integration, they must learn the language of their counterparts, understand the workings of the popular software packages, take some DP courses, learn to use the systems with telecommunications and subscribe to the major personal computer and DP publications. "The office automation people need to seek out a new career path or extend the present path to include the data processing/MIS world. If they don't, they better look for a whole new area to work in because they won't survive," Kline said.

To ensure something beyond mere survival, something along the lines of real decision-making authority and a career path up a ladder instead of a treadmill, the OA person has to be assertive and aggressive. As Giovannini stated: "I had to fight, and I had to grope. We have to start to build another niche for ourselves and to grow beyond our word processing backgrounds. It is incumbent upon us to take a look around, see what is happening and begin to broaden our horizons and expand."

It is indeed a new world out there. As Dennis Lockard, manager of End User Support Services at Corning Glass Works, stated in a talk on change management at the 1985 Information Center Conference and Exposition in Nashville, Tenn., "The secretary of tomorrow will be more likely to start her day initializing a local-area network than making a pot of coffee."

* * *

White is a senior writer at Computerworld Focus.

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You *Can* Justify Office Automation: A Methodology

By David L. Shay

Many people claim you cannot justify office automation; I say horse feathers!

OA is easier to justify than the last time you spent extra money on an overnight delivery service when your package simply had to be 300 miles away. OA is easier to justify than the last time you planned an off-premise conference at a local hotel in order to get people away from their phone calls, so they could concentrate on the subject on hand. OA is easier to justify than when you took your subordinates out to lunch to show your appreciation for the extra effort they had put in on the last project.

You justified those actions on the basis that they made business sense; they were reasonable. Think about it. Could you have justified those decisions on hard dollar arguments? We justified the overnight courier on the basis of competitiveness; the off-premise conference on increased quality of the output; and the luncheon, on the basis of a reward for past performance (but with a big hope that we could get extra productivity some day in the future when we need it). But when our boss asks us to justify OA, we throw up our hands because we cannot find enough hard or even soft dollar savings.

Why do we do that? We do that for the following reasons:

- We tend to equate the word justify with hard dollar rationale rather than business reasonableness.
- We have a certain latitude as trustworthy employees to spend $17, $35 or $300 of the stockholders' money, but we do not have that latitude for $2 million of OA expenditures.
- Most of us who have gravitated to the systems professions have personalities that prefer to see in-depth studies with many charts and graphs and alternatives and numbers that tie together. Systems people have a lot in common with engineers and accountants in this regard.
- Most of us shy away from OA justification because we have not yet seen any good justification methodologies.

The most popularized methodology in use accounts for people's time by using a lexicon like, "How much time do I spend creating, keyboarding, telephoning, filing and so on?" We ought to be leary of this lexicon. The lexicon can be used as a diagnostic (to show you how people generally spend their time), but it doesn't tell you anything more beyond that.

What we need to have available to us is an OA justification methodology based on a business rationale, but backed up by an appropriate amount of charts and graphs that show we did our homework.

An alternative is a methodology I call "80/20 OA," which consists of the following:

☐ ***Establish the need:*** Our OA proposal will be signed off in the executive suite on a business case basis; therefore, the first step to justify OA on a business basis is to understand the business. Most people fail in this step because they write their documentation to appeal to their own logical and personality needs that are technology-based, not business-based.

Executives with sign-off power have nontechnology "hot buttons" such as market share, competitiveness, cost control, value added, new products and services or hiring and retaining good people. Read the business plan; find out what the executives want. How are they measuring their own success? I can guarantee they are not interested in your problems concerning standardizing on vendors, local-area networks or downloading from a host computer.

They are interested in bringing a new product to market, three to six months faster, to gain profits earlier and/or preexempt competition. They are interested in holding the line on the spiraling white-collar costs. They are interested in bidding on more jobs and getting quality proposals out the door faster. They are interested in locking in customers with some product, faster and better service or value-added information that will make customers give you more business. Undoubtedly, one of the many OA technologies can enhance your company's position in one or more of these areas.

By learning about management's "hot buttons," you have just completed the first step in the 80/20 rule of justifying OA. You have now identified the 20% of the company's activities that account for 80% of management's attention, interest and the areas they are likely to fund money to improve.

☐ ***Identify the key work efforts:*** Now you need to know what employees do to deliver. Again, using the 80/20 rule, your job is to find out those few key work efforts that individuals or teams of people do to satisfy those needs. Let's take writing a proposal as an example. It might take a month to write a proposal with a team composed of a manager, two engineers, an artist, an administrator, a secretary and word processing/editing center, for a total of approximately 360 hours.

If you interview the team from a time and motion perspective, which is what many OA justification teams do, they will tell you about the 80% of their effort in writing and keyboarding the proposal.

This is the pitfall that will trap you into studying issues that are nonissues to management. If you interview them from the business perspective, you will find that the most critical 20% of this time is spent on the following:

- Researching the company's qualifications to bid on the proposal and converting these strengths into the main strategy for the proposal.
- Planning (budgeting and scheduling) for the proposal effort itself so that everyone understands their tasks, time and outputs and everything falls into place in the allotted time.
- Reviewing and controlling the work of others at key checkpoints, personally or in review meetings.
- Pricing the proposal for the customer, which is based off the exercise of costing the proposal for ourselves.
- The final push when everything comes together and all the wordsmithing, charts and graphs and overview/summaries are written. This is when fast turnaround is critical.

These are the terms and tasks management understands. These 70 or 80 hours are the make or break hours for the company, not the other 80%. This is where management's adrenalin flows, and in these following areas you will make your business case for OA:

- Researching: OA can provide a textual data base of prior proposal information that will allow the team to search for which prior proposals were for similar industries, sizes or situations. Now you will know your strengths and/or weaknesses so that the best strategy, tone and emphasis of the proposal can be set fast, allowing more time for other activities.

OA can provide a tremendous amount of boiler plate that exists in those proposals on company strengths, approaches and qualifications. Over 80% of the time to write these can be saved and put on other efforts because it is merely a cut-and-paste exercise. Much of the non-boiler plate material in these earlier proposals can also be used, perhaps saving 30% to 50% of the time to write that.

- Planning and scheduling: OA can supply scheduling and project planning software so that the proposal effort can be planned and tracked and revised, if necessary. This can be very helpful on smaller proposals and absolutely invaluable on large proposals.
- OA can also provide graphics so the plan can be communicated using block diagrams or gantt or Pert-type charts. One of the most probable places for a proposal effort to get off course is when the manager hands tasks to subordinates. A comfortable desktop control system would be invaluable to keep control.
- Status review: OA can supply many strengths to make checking the work of others more effective. There is tighter control by publishing a schedule with milestones and asking people to report on progress (manually or electronically). Preparation for meetings is easier and consumes less time with electronic assists such as electronic mail, voice mail, project scheduling software and possibly time reporting software.
- Costing and pricing: OA can provide a downloading capability for the manager to obtain historical costs on similar jobs. OA can supply costing models and what-if models to help the proposal manager arrive at the best profit and lowest cost alternative, which will improve the capture rate on proposals.
- Final push: OA offers many advantages to people trying to pull a final document together. In addition to the obvious advantages of WP, OA allows for last-minute changes in charts, tables and graphs. Many people shy away from the use of tables and graphs because of the lengthy turnaround times to revise them through the art department. With OA graphics, people can prepare quality graphics without the assistance of an art department. The turnaround time is much less, and the unit cost is frequently lower.

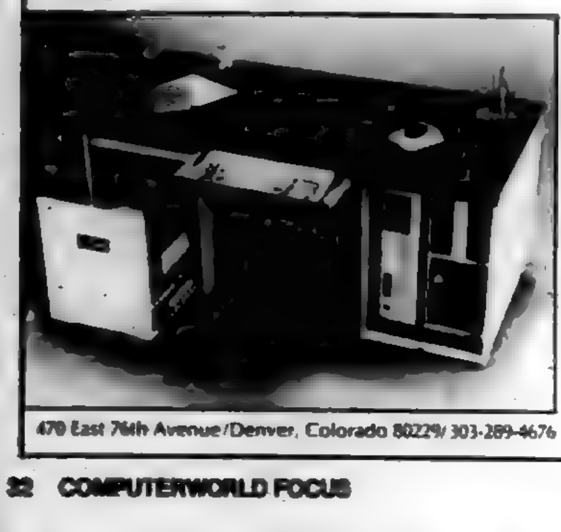
In summary, you have now zeroed in on the 20% of the efforts that are important to management and have sensed the power OA can bring to the situation — the true business benefits of OA.

☐ ***Quantify the Improvement:*** Improvements from OA are either tangible, intangible or both. Notice that I did not use the words hard and soft savings. Hard savings seem hard to come by, and most managers think soft savings are soft and fuzzy and don't like them.

Tangible savings can be quantified, usually in hours. In the above examples, the time saved by using boiler plate and some of the words in earlier proposals represents time saved.

The intangible improvements were from improved tools for costing and pricing; more effective planning, communication and control of the project; and more flexibility for adding graphics and revising text and exhibits in the final stage of the proposal. Fewer total hours needed for review meetings is a tangible improvement. More effective communication is intangible, but it should probably result in less rework — a tangible savings.

Being able to use a computerized what-if model has a tangible benefit of taking two hours vs. eight hours for a manual exercise. The intangible benefit



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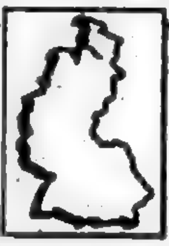

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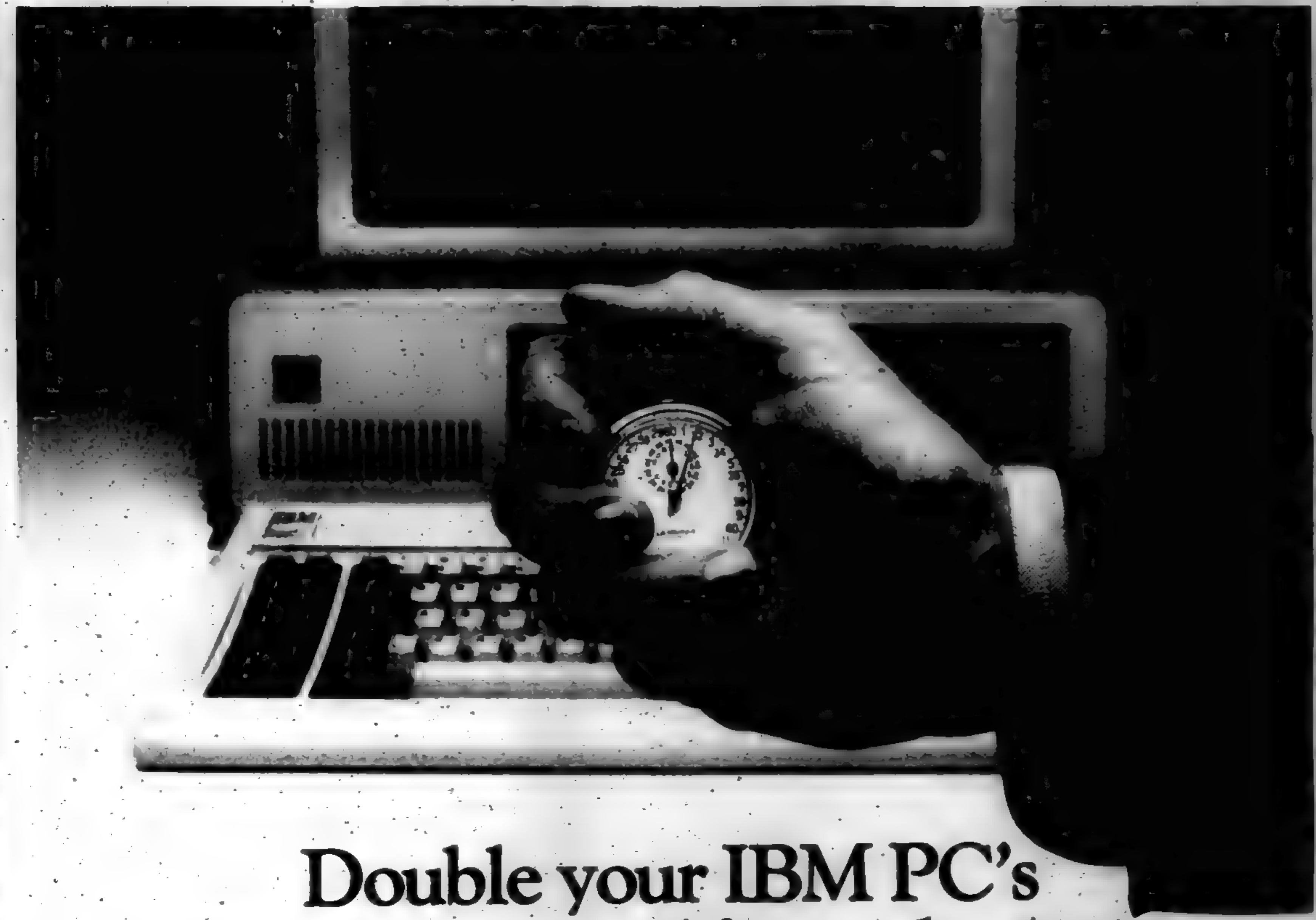

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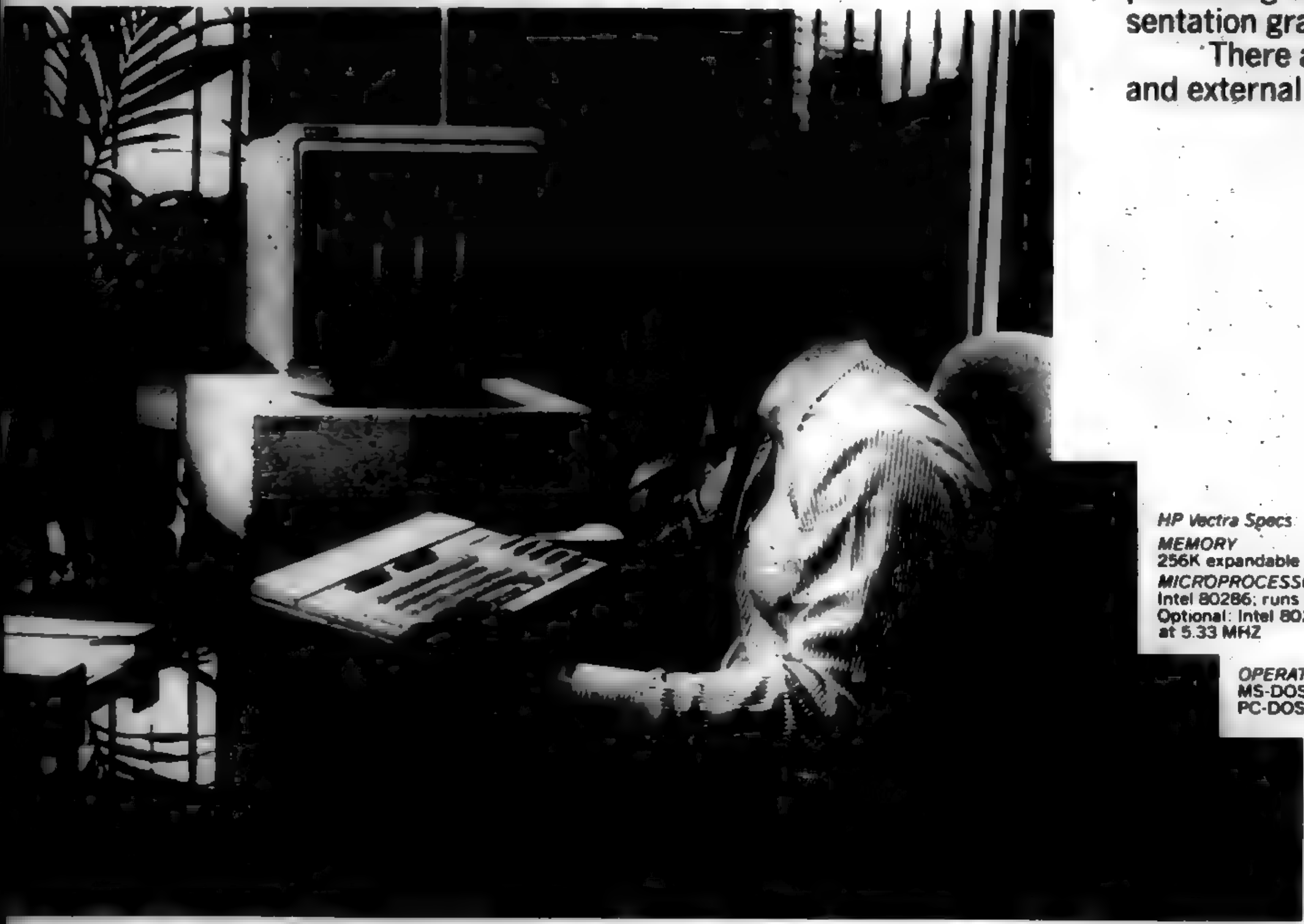

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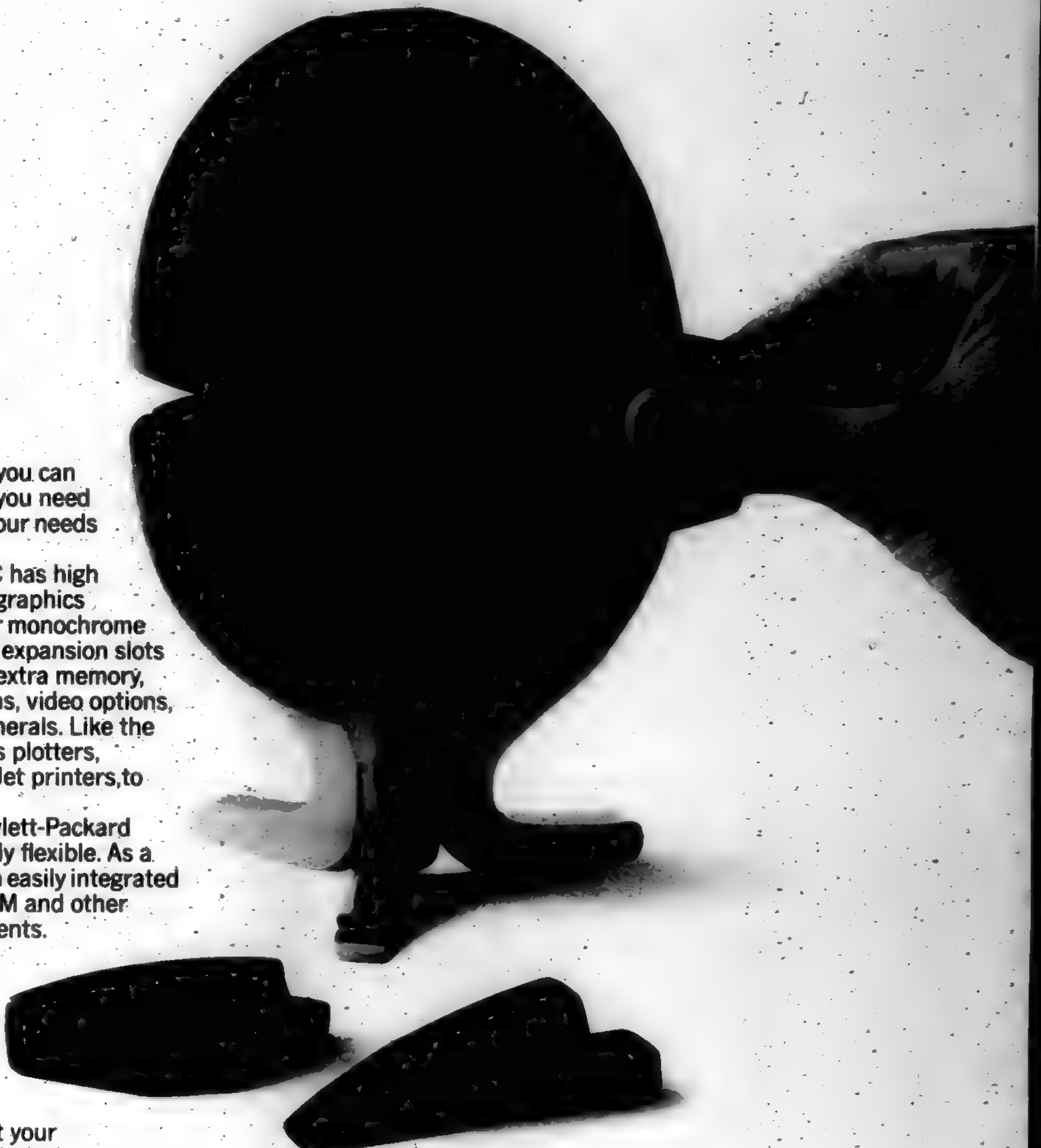

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of being able to run four what-if variations in a day rather than only one provides better information for better decision-making.

One of the simplest ways of capturing improvements is to ask groups of knowledgeable people who have used office technology to compare the way they used to perform their work effort before OA with how it happens after OA. Ask them to qualify the tangible improvement in hours, as in the what-if example above.

Then ask them to quantify the intangibles on the basis of high to low — perhaps on a scale of 5 to 1, with 5 being very high and 1 being low impact. In some instances, I recommend one ranking for all the intangibles. In some instances, I have asked for separate rankings for competitiveness, quality of the work and quality of work life. I have sometimes asked for further break outs if my reading of the business case in the first step told me that management had "hot buttons" in more than one area.

There will be many instances where employees will report that office technology can save them time, but they would like to plow that right back into their work. A good example would be with the what-if model above. Right now the manager spends one day going through only one complete manual costing exercise. The manager then looks over the data with an eye for lowering the cost and quotes the job at 10% less. That is no real what-if modeling. With the power of OA, the manager may want to go into some historical data bases and run the data through three or four different scenarios over a two-day period. That is what-if modeling.

The tangible savings from the two-hour OA what-if modeling is six hours saved over the old method of slow manual modeling. The intangible benefit from the improved accuracy and quality of work, more complete and creative planning and sharper-pencil, competitively, would probably be rated as a 4 or 5 on the intangible impact scale; the managers in the executive suite would agree.

A company we looked at recently resulted in tangible improvements for the one time $10 million OA investment, which added up to $8.5 million per year. That was based on 343,000 less hours required to perform the 100 work efforts — an equivalent of 171 full-time employees.

Only 13% of these improvements were in the secretarial/clerical ranks. Eighty-seven percent of the improvement from OA came in the managerial and professional ranks. In this engagement, the data gathered suggested that OA could help employees do discrete tasks two thirds faster, but the average impact on a full work day might be in the 10.6% range (50 minutes).

Productivity arguments are the arguments that make managers pick up pencils and sign.

Over the years, I have heard many people who were trying to justify OA get very frustrated when they could only find 20, 40 or 60 minutes a day freed up from OA. Their argument was, "So what if I save knowledge workers 20 minutes a day. They'll just go to the golf course 20 minutes earlier."

If you have done your homework as we described — you have the tangible and intangible benefits of OA in distinct work efforts times the number of times they occur per year, the old unit cost and the projected lower unit cost — management forgets about the golf course.

☐ ***Present key business benefits first:*** A persuasive argument is to present in a "want versus OA can provide" manner of presentation. An example is the following: Marketing managers want one more sales day in front of their customers per month. OA can provide one more day, a 50% increase in face-to-face selling time. Information such as this becomes the true selling justifications for your OA endeavor.

☐ ***Present key productivity benefits last:*** The "icing on the cake," the arguments that make managers pick up pencils and sign are productivity arguments. The productivity gains presented to management in this case study were relative to the business, plausible, defendable and consequently believable to management. They bought off on the improvement potential of OA for their business.

There is a reliable methodology for justifying OA, and we have successfully used it several times. It is not in pilot test, it works.

Establish need. It starts with uncovering what makes a business tick, where are the management needs, where are management's "hot bottons." These will have nothing to do with the problems, opportunities or challenges of installing technology. They are business needs. Defining those needs will direct you to those 20% of the employee groups that produce 80% of the strategic value of your company.

Identify key work efforts. The next step in the methodology is to isolate 20% of the work efforts that these employee groups perform that are the critical issues for their success. Question them on these activities to test for the impact of a wide variety of OA technologies. The impact will either be tangible or intangible.

Identify impact. Tangible impacts should be captured in hours saved or improved. The before hours times payroll costs can be used to determine the old unit cost; the new hours, for the new unit costs. Employees should also be asked to rate the intangible aspects of the improvement in terms of quality, competitiveness and quality of work life. You can start with words like very high, high, medium, moderate and low; but you should convert these to 5, 4, 3, 2, 1 to be able to perform math on the ratings.

Present business benefits fast. Management will be most interested in the "war stories" involved with improving competitiveness, customer relations, timeliness of response and quality of services for those really critical work efforts you have zeroed in on. Your presentation should be on these improvements.

Present productivity benefits last. At the end of the presentation, you should have an exhibit that summarizes the tangible impact of each improvement on each group of employees. These productivity improvement dollars will be the icing on the cake for the presentation. If you have done your homework well, the business benefits from OA will sell the investment for you, and management will rest easy that many of your tangible savings will convert to greater profits and competitiveness.

≡

Shay is a manager in Peat Marwick's New York office specializing in white-collar quality and productivity. The 80/20 OA methodology for justifying OA was developed on a number of engagements.

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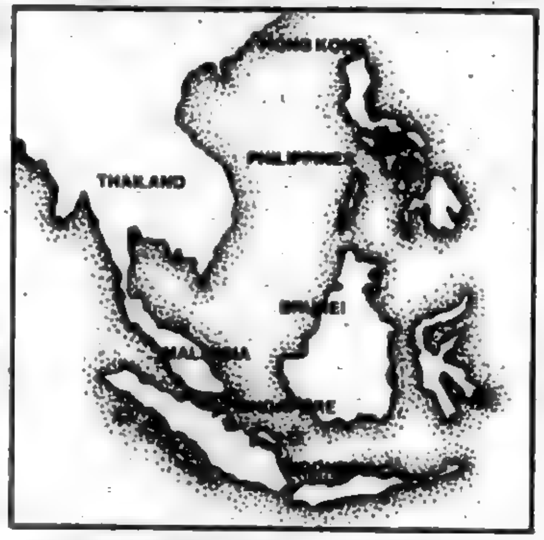

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The Hardware Reliability Problem: Who's In Charge?

By Bruce Poole

Hardware reliability is the single most important management factor in large-scale computer installations. Other considerations, although highly important, lose significance when machines are down or malfunctioning. Unfortunately, managing hardware reliability is not easy, even though the reliability of individual components continues to increase.

The cumulative effect of larger numbers of hardware and software components within the data center and network requires no less than superhuman efforts to meet the required levels of uninterrupted service. Few shops have the necessary in-house expertise. Even when that expertise is on staff, hardware vendors frown when users take things into their own hands and tear up the floor to get at cables or test and replace cards in suspect equipment.

This leaves us with an uncomfortable reality. Who's in charge here? The vendor. Hardware maintenance — and thus its reliability — is largely in the hands of hardware and third-party maintenance vendors.

The quality of maintenance provided by vendor organizations varies widely according to a number of factors: the vendor's attitude toward solving hardware problems, the attitude and abilities of maintenance engineers assigned to a site, the quality of management behind each representative and the user's attitude toward hardware problems.

One unhappy fact of hardware reliability is that user interests and vendor interests often conflict. The user wants the hardware to work as perfectly as possible with problems resolved quickly and minimal impact on production schedules. The vendor wants the same thing, but his orientation is quite different. He is less interested in the intimate internal workings of the client data center. He wants to keep the client happy, of course; invoices will therefore be paid on time, more equipment may be purchased and good references may result. But when corrective action for hardware failure is involved, it can be a very expensive proposition for the vendor — a nonnegotiable cost that can substantially reduce his profits. As a result, the vendor can't afford to comb the system for weaknesses and to respond in the data center's interest each time one is found. It's not in the vendor's best interest to volunteer, "It looks like volume 140 is getting too many temporary errors. Let me replace the HDA [head disk assembly] so you won't have a hard failure." The truth is, even when volume 140 hard-fails, the vendor is best served by finding a reasonable way to avoid replacing the HDA.

One approach the vendor can take is to talk away the problems. The vendor might call a given type of hardware problem normal and express the opinion that, in general, reliability on the site is excellent. Intermittent problems receive similar treatment. "Intermittent" comes to mean a normal deviation — nothing serious.

If peripheral units use removable media, the vendor may claim problems are due to media or environmental conditions, not the equipment. Although this argument sometimes has merit, it is often used as a blind.

Of all the arguments in support of system normalcy, availability statistics are the most effective. Discounting disaster circumstances, most large data centers can quote availability statistics of 99% and higher — an aggressive figure. What could be more positive to vendor and data center management alike than the knowledge that the system is available more than 99% of the time?

Unfortunately, availability figures can be misleading. For example, hardware failures that result in unplanned inital program loads (IPL) and network crashes don't have much impact on availability statistics. It doesn't take much time to get the system back up again, and the time it takes to make the system available again is a minor consideration. More important, however, is the question of how much it costs the organization to restart the work and to pay salaries of terminal operators left idle during downtime.

Other hardware failures don't bring the system down, but do cause one or more jobs to abort. Although the resulting reruns have no effect on availability statistics, their costs can be enormous.

What happens when failing peripherals units are varied off-line? The effect on availability is zero, but costs in dollars and time again occur. Still another problem shows up in the form of units that continually loop through retry and recovery from temporary errors.

In the name of maintenance, much is said, and the position — the user's hardware reliability is excellent — is supported in good faith. "You find what you are looking for," says an old adage. The vendor searching for evidence the system is healthy, evidence that's easily found because today's equipment is highly sophisticated and, indeed, works wonders. The user is satisfied because users want to hear the system is normal. Then disaster occurs. The vendor fixes the problem and everything is fine — until next time.

Users, recognizing the waste in the until-next-time attitude, are beginning to want to do what they can to manage their own resources. Tools that let the user get involved have been slow in coming. Most hardware devices relay a constant stream of log recording (Logrec) data that signals how things are going internally. A trained vendor representative can analyze this data to trace the source of a failure. Several available software packages collect this data in varying attempts to let the user become more involved, but these packages are still designed for maintenance engineers, not users. They address each problem on an individual basis and do not perform decision-making or problem-tracking functions. Most provide no comparative data for evaluating one data center against another.

Perhaps the greatest failing these tools have is that they provide their information after the fact. Whether because the raw data is difficult to analyze or because reports are available in batch mode only, the available tools can be used only after a failure, to dissect it in an attempt to find out what happened.

Implicit in the concept of management is the idea that information is gathered and, based on that information, decisions are made that will affect what is going to happen. Pulling together bits and pieces after a hardware crash is not managing the reliability. The ability to manage depends on getting information in advance.

What is needed is a system that reports Logrec information on-line in real time — capturing, analyzing and displaying IBM Logrec data as it happens. A tool of this sort will permit the operations staff to take action to prevent serious failure or to limit the impact in the event of serious failures that occur without warning. Operators should be able to take a closer look at problem spots by paging through the status of problem areas or specific units where problems are occurring. Component history should be saved so that batch reports can confirm system status or provide further analysis.

By capturing failure data in real time, operators know what is happening with their systems. When errors occur, they can see if they are inconsequential or if they signal trouble. Having this information changes the nature of the maintenance vendor relationship and dramatically reduces the time needed to allocate engineering activity. Vendor engineering work can be scheduled when it is necessary — when a problem appears — not on an arbitrary temporal basis. With each new wave of technology, vendors try to build higher reliability into their equipment in the design phase and in the factory. They are responding to the user need for reduced maintenance, but they have their own needs. Building a good machine, however complicated, is easier than exercising control over the abilities and attitudes of thousands of maintenance engineers out in the field.

Industrywide statistics show some firms are meeting with success. When users become more sensitive to this and start actually doing something about hardware failure, the built-in reliability enhancements engineered at the factory can finally pay off. Hardware failure will then be a problem to be addressed on a rational, timely basis, not an unpleasant and sometimes catastrophic fact of life.

Poole is director of marketing of Rescue/MVS, a hardware reliability tool, for California Software, Inc., in Sherman Oaks, Calif.

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FOCUS ON: PLANNING

A Close-Up Of Two Implementation Strategies

By Mary Karon Dash

There is a widespread belief among executives that the ills of the office can be cured through the introduction of technology. Many believe that problems such as high error rates, low productivity, high turnover, backlogs of work and customer complaints can be solved by the addition of equipment, a wave of the electronic wand.

The overlay of equipment or computer systems on areas experiencing operational problems can and most often does result in failure and disappointment. Anticipated results do not materialize, thereby creating morale problems and intensification of the original symptoms. Although forward thinking is essential to the efficiency and productivity of our offices, a prerequisite to change is that manual systems must be organized, efficient and effective. To superimpose technology on manual systems that do not meet the above criteria only makes matters worse.

The first requirement in introducing change is a smoothly operating manual system. If the present work force and manual systems are not prepared to incorporate and use the expanding technology, management's objective for improved productivity cannot be achieved.

The following case study illustrates the need to resolve operational problems before introducing changes.

Case Study 1

The customer service department of a financial institution traditionally had problems in getting work out and in retaining staff.

Because of the delays in responding to customers' initial requests and in updating or correcting their accounts, customers would write second or even third letters, adding to the backlog.

Management believed the problem was not one of staffing, but of inefficiencies in getting information entered into the appropriate computer system to update customers' records and inefficiencies in the letter production process. As a result, the firm installed a new system to enable customer service representatives to call up accounts for status, enter account changes, apply money or credits and even request the appropriate form letter to send to the customer. This system provided on-line validation, and management saw it as a marked improvement over the previous batch processing system. Processing delays resulting from the batching, editing and movement of source documents to the data entry unit were eliminated. It appeared to be an ideal solution.

However, management was in for some surprises. When the system was first installed, the department was on a current basis, but within nine months there were problems with throughput and backlog of work. The backlog persisted despite several attempts by the manager to reduce it. He scheduled the staff to work overtime on a regular basis and recruited staff from other departments to help in the evenings and on Saturdays. Each drive to cut backlog would be temporarily effective, but within a short period of time it would mount again. In addition, staff turnover (always high) remained a problem so that the department was comprised of relatively inexperienced staff, many still in training.

An examination of the operation, including charts of the work flow and critiques of each step in the process, showed that the source of the problems lay in the control and distribution of work, the methods for quality control and the training approach. Bottlenecks were designed into the work flow.

Compounding the weakness of the manual systems was the manager's work philosophy, which the staff characterized as authoritarian and overly controlling. This was apparent in the excessive number of logs and reports he instituted to monitor performance and accuracy; their maintenance created bottlenecks in the work flow. Even after installation of the new computer system, he continued to impose his earlier methods for training, controlling and distributing the work and maintaining quality checks. These methods remained exactly the same as they were before installation of the new computer system. Because the underlying causes of the backlog and turnover were not addressed, the problems persisted despite processing improvements realized with the new system.

If you are to manage change effectively, you must begin with the building of a logical model of the existing system. This logical model is developed by critical examination of current office operations. This means examining all aspects of each department including the nature of the work being performed by each person, the forms being used, the movement of work, standards that are being applied, exceptions and methods for handling them, timing requirements, equipment, identification of problems and so on. In sum, it means examining the department or the process in its entirety.

After the model of the current system has been built (that is, after the current work flow has been identified and charted), it is possible to critically evaluate the manual systems in each department. The key steps are to objectify the current operations, critique and question each step or aspect, propose and implement solutions to existing problems and then develop a new model of the improved work flow. The new model and the supporting documentation serve as a base from which management can determine what is needed technologically to perform the required functions and how to employ the equipment.

Armed with this knowledge, the manager can communicate more effectively with systems designers, office automation specialists and vendors and thus assure the equipment to be purchased will meet the company's operational requirements and offer the best return on investment.

Our premise is that you must begin from where you are; the essence of the new system is in the current system. If the decision makers in management examine current operations and processes and improve them before considering the addition of automated equipment or computer systems, they will obtain better results.

Case Study 2

A service firm's executives wished to evaluate their current and future OA requirements with particular attention to their text processing needs.

Equipment in the word processing center (WPC) required updating, so this was an opportune time not only to identify word processing requirements, but also to explore the possibilities of OA and examine available systems.

Major emphasis on the WP area arose from the professional staff's dissatisfaction with the performance of the WPC — specifically with getting material typed error-free and within specified deadlines.

If you are to manage change effectively, you must begin with the building of a logical model of the existing system. This model is developed by critical examination of current office operations.

The professionals generated a large volume of typed material such as proposals, reports and so on. They worked under time pressures and frequently had short lead times to get work out to the client. They also had heavy travel schedules and client commitments which kept them out of the office a great deal.

Management had consolidated their major typing functions into a centralized WPC which never really operated well.

The staff for the WPC came from an existing typing pool and the transfer of a number of secretaries from throughout the firm. The secretaries not assigned to the WPC were to provide administrative support to the professional staff. They were to restrict typing to documents less than five pages long and submit the remainder to the WPC. Management believed secretaries would only be spending an hour or two a day in typing.

Fifteen percent of the secretaries had typewriters with some memory; the remaining had standard typewriters. There was a proliferation of personal computers. The professional staff had access to two compatible types — one that was relatively portable for use on field trips and one stationary model for use in either the office or at home.

In addition to the dissatisfaction of the professional staff, the WPC itself had another problem — an extraordinarily high rate of turnover (85% in the previous year).

The equipment consisted of a shared logic system and a bank of stand-alone word processors inherited from the previous typing pool. The firm also had a mainframe that it used for billing, accounting and management reports. The firm occupied several floors of an office building.

The logical models were developed, and analysis of these models and the supporting documentation indicated the following:

- The need for localized WP capability at every secretarial workstation. The secretaries were typing an average of four hours a day instead of the expected one or two. More than half of their typing consisted of initial drafts that required two to three iterations having moderate to extensive revisions before final copy was produced.
- The need to expand the software support of the secretarial team to include mathematical functions, electronic mail, calendaring and a data processing interface.
- The need for a reduced centralized WP operation to meet some specialized production applications and to provide load balancing among the secretarial staff.
- The need to provide the professional staff with the capability to merge text, data and graphics.
- The need to link the personal computers to the mainframe and download files.
- The need to expand the use of the personal computer among the professional staff.
- The need to provide the secretarial staff with the capability of accessing text or other material keyboarded by the professionals for the subsequent draft to final copy process. Many of the professional staff were composing on personal computers and routing hard copy to the secretaries for further drafts or final copy. Because there was no compatibility of equipment, the practice resulted in an additional keyboarding.

For the short term, the firm elected to provide limited local WP capability to the secretarial workstations by moving the stand-alone word processors and staff from the WPC to strategic locations. Also, where possible, the firm would establish a team concept with a WP operator and secretary working in tandem to provide typing and administrative support to a group of professionals.

The firm also developed a program to improve the WPC operations. This plan addressed the turnover problem and practices such as the handling of rushes and corrections, scheduling methods, training approach and so on.

Management established an Information Center and developed a program to train the professional staff on the personal computers and the various software packages.

From analysis of the logical models, the firm was able to identify some of its initial requirements for a comprehensive OA system and develop a short-term strategy to meet some of those requirements.

However, the significant finding that emerged from the logical model was the need for communications control. And it was in this area that the major requirements for OA were specified. Communications control broadly includes the need to share or exchange information and is designed to handle the following:

- The need of professional staff members to be in contact with one another on an oral as well as written basis during and outside regular office hours.
- The need to determine availability of staff in order to schedule meetings with firm members and clients.
- The need to know the whereabouts of staff members in order to reach them to convey important messages or information — a tracking system.
- The need of professionals who travel to dictate by phone into a central unit and have their material transcribed and available when they return to the office or routed to others within the firm.

With these findings, management was able to specify additional capabilities that they were looking for in an OA system such as electronic mail, voice mail, calendaring, scheduling and electronic filing.

However, before the firm researched vendors for systems adaptable to its environment, management implemented the plans for improvement of the current operations and then developed a new model with supporting documentation.

Using the requirements list as a basis, management was able to intelligently research vendors and solicit proposals.

The next step was to develop a phased approach to implementing the OA system that management selected. With each phase, managers projected the impact on the organization and the changes in work procedures and job design.

However, examination of the office also includes a consideration of the workers. The involvement of the employees is essential to the introduction of any type of change, including change not related to automation. It is, after all, the persons doing the work who know it best; when their views are solicited, they can identify improvements and suggest how to simplify, how to eliminate the extraneous, how to reduce expenses and even how to do the same job with fewer people. The successful adoption of office technology must take the workers into account, and they must be involved in the planning for change.

It is clear that those affected by change must be involved in the planning and that it is best introduced in increments if we are to minimize the perceived threat and reduce resistance. And, as we have presented, a smoothly operating manual system is the reasonable basis from which to introduce change. Management should blend the needs of people and the organization with changes in the workplace, whether change involves new equipment, computer systems or manual methods. Positive acceptance and adoption of these changes requires planning and sustained effort throughout. To paraphrase Woodrow Wilson: A progressive office is not one that is ready to move, but one that knows where it is going when it does move.

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Dash is principal of Office Methods Ltd., a Chicago-based management consulting firm specializing in work flow analysis and the evaluation of office operations.

Micro Or Mainframe WP: Which Type To Use?

By Bart Carlson

An increasingly viable alternative to micro-based word processing is WP on mainframes.

There are two primary reasons for such a shift back to mainframe WP. First, many of the users in medium and large companies need to access large data bases that are usually resident on the mainframe computer. Second, a mainframe WP software package can provide WP on existing 3270 terminal equipment that is usually available and in many cases paid for, therefore providing a less costly alternative. This also eliminates the need to buy, inventory and manage the distribution of numerous copies of a given software package as is the case with micro software packages.

One advantage that micros have enjoyed is the tremendous array of fast and flexible office automation application products available such as spreadsheets, graphics, communications and WP. Mainframe users have simply not had access to comparable products.

Fortunately, software vendors are responding to this void by developing what use to be considered personal computer-type applications for mainframe systems. These programs are becoming faster, friendlier and more powerful.

Certain WP applications for correspondence, proposals, personalized mass mailings, sales letters, custom forms, donor acknowledgments, form letters, contracts and customer support responses lend themselves particularly well to mainframe systems.

Mainframe WP can best be utilized in industries such as banking, insurance, utilities, nonprofits, education, associations, health care and government — in fact, anywhere a large number of users share the same computer or have a large data base.

Mainframe WP solves many of the document distribution and retrieval problems inherent with micros. It allows the user to access the same data and text instantly, regardless if the user is located in an office across the hall or across the country. And depending on the type of software, the user can create a document on one terminal, print it on any printer on the system or send it to any other user's "in box."

Another major benefit of mainframe WP is security and control of data. From a data processing management point of view, access can more readily be controlled in the mainframe environment. For instance, if someone leaves the company, the systems administrator can immediately take away that individual's authority to access data. By contrast, on a micro, that same person could have easily made back-up diskettes and carried them out undetected in a briefcase.

Equally important is the security of data from system problems and natural disasters. Most companies with mainframes back up their disk files to tape every night. Many companies also arrange periodic off-site storage of these back-up tapes so that a major disaster (such as fire or flood) will not cripple the company. This is also a major benefit from the user's perspective because users do not have to worry about the tedious routine of daily diskette back-up. Even with the best of intentions, most micro users do not back up data on a regular basis.

A typical micro user perhaps has 400K bytes to 10M bytes of dedicated on-line storage available and has access to a letter-quality printer. Contrast this with the mainframe user who has access to massive amounts of storage and can share the use of several different types of printers such as high-speed band printers, laser printers, ink-jet printers, dot matrix printers and letter-quality printers.

Although the foregoing list of benefits presents a powerful case for mainframe-based WP, there are some disadvantages and some instances where micros would be the preferred method. One example occurs in companies that have branch offices distant from the mainframe computer. If there are no existing communication lines in place and no pressing requirement to share the same information on an interactive basis, then a micro may be the system of choice. In such companies, one or a small number of micros can quickly and relatively inexpensively be installed versus what may be the greater expense and time involved in installing communication lines.

Another situation where the mainframe might not be the preferred method is when the number of WP users on the system at any one time would degrade the system enough to slow response to other critical transaction-based production applications. These companies might have to switch to a larger mainframe or add the next increment of memory to support mainframe WP.

Many users may also be uncomfortable because their document access is always tied to the performance of the mainframe. Mainframe problems can shut down every terminal on the system, frustrating the average user who has absolutely no control over these types of problems.

Finally, although the best mainframe products are quite interactive, they sometimes do not give the user the immediate feedback of a micro. With micro WP, each keystroke of text entered is immediately sent to the CPU, and the document instantly appears updated or reformatted on the screen.

Most mainframe systems store entered multiple keystrokes of text in terminal memory, so the changes to your document are not permanently updated or reformatted until the operator presses a key to order the document updated on the mainframe. This is a plus in that the mainframe is not interrupted every time a keystroke of text is entered; therefore a large number of users will not degrade the system performance. On the minus side, the user does not always have an exact picture of what the document looks like.

Keeping the above pluses and minuses in mind, there is no magic formula to determine the advisability of installing mainframe WP at a particular company. Some experts believe, however, that many medium and large companies that have a large number of users would benefit from the centralization, control and shared access to data and text provided by mainframe WP.

In the 1960s, the earliest versions of mainframe text editors (such as TSO and Wylbur, which still exists as Super Wylbur) were introduced to the market. These products were born in university and research environments and were generally command-oriented systems whose primary function was to allow programmers to input and edit their program instructions. They were also generally limited to large OS-type environments.

Because they were developed for programmers, it was difficult to teach the average end user how to use these systems even if, in theory, you could produce the same document as on a stand-alone word processor. Secondly, there were significant limitations in document editing and formatting functions such as right margin justification, headers and footers, pitch selection, pagination and merging of text and data.

In the late 1970s and early 1980s, command-level mainframe WP systems such as ETC from Applied Data Research, Inc.; Bimtext from B I Moyle Associates, Inc.; and Qwik-Draft from Top Down Systems were introduced. These products provided users with many of the most desirable document formatting features, but were not considered as user friendly as the stand-alone word processors available at that time. This lack of

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user friendliness was somewhat compensated for by the fact that these systems were sometimes customized for particular applications and performed these tasks well.

The future also promises products that provide horizontal mainframe WP links to data bases, list management, personal computer-mainframe links, electronic mail, spreadsheets, graphics and other mainframe applications.

In 1984, other independent software companies such as Cincom Systems, Inc. and McCormack & Dodge Corp. announced embedded mainframe-based WP products. These products are embedded or integrated into their other application products, so they are not expected to represent a major thrust in the marketplace.

On October 25, 1984, IBM announced in a statement of direction that it is planning to release Displaywrite/370, its mainframe WP system for 370 architecture mainframes. IBM also indicated that Displaywrite/370 would emulate IBM's Displaywrite 3 micro software. Some OA experts predict Displaywrite/370 will operate in the VM/CMS environment, similar to Professional Office (Profs), IBM's electronic mail system, and possibly other environments as well. Since IBM's announcement, four other independent software companies have announced or preannounced entries into the mainframe WP marketplace.

In June 1985, Mega Group, Inc., of Irvine, Calif., announced Megaword, a mainframe WP product that enables users to move data from multiple spreadsheets into multiple documents. The Megaword product runs in VM/CMS and MVS/TSO environments. Mega Group said its product is aimed at managers who wish to retrieve data from a central computer, create models and write reports.

Group 1 Software, a division of Comnet Corp. of Washington, D.C., announced EZ-Word in August 1985. EZ-Word, which emulates IBM's Displaywrite, offers full-function WP and is completely menu-driven. EZ-Word can be used in conjunction with mainframe data files to create personalized correspondence with variable inserts on letter-quality or laser printers. This includes integration with a mail/merge and list management product called EZ-List. EZ-Word also features electronic document distribution so users can transfer documents to any other local or remote terminal or printer on the system. EZ-Word operates in CICS environments on all IBM or plug-compatible mainframes.

Word/3270 by Chicago Soft, Ltd., was introduced at the Information Center Conference. Word/3270 is a mainframe adaption of Micropro International's Wordstar software product for micros. Working on-line on a 3270 or compatible terminal, users can enter, edit and format text and save and print files. Word/3270 runs in VM/CMS environments on IBM or plug-compatible mainframes.

This past summer, Multimate International Corp. of Hartford, Conn., announced its intention to deliver a mainframe WP product by the end of 1985. However, shortly thereafter, Ashton-Tate announced its intent to purchase Multimate. Since that time, numerous conflicting stories have been reported in the press on whether Multimate is moving forward with their plans. This leaves the company's entry into this market open to some speculation.

With Group 1 and Chicago Soft products now available for shipment and IBM and Mega Group products in the advanced development stage, the mainframe WP market is about to expand rapidly. This is primarily true because of the user friendly functions these new products bring to mainframe terminals and the prominent role mainframe DP will play in the office of the future.

The future also promises products that provide horizontal mainframe WP links to data bases, list management, personal computer-mainframe links, electronic mail, spreadsheets, graphics and other mainframe applications. In fact, WP systems without a data base/mail merge interface will probably have little or no market.

Mainframe WP promises to be a dynamic and evolving market as users continue to demand new features and new links to other existing and new application products.

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Carlson is vice-president, development, of Group 1 Software in Washington, D.C., a developer and marketer of OA, mailing management and postal discount software.

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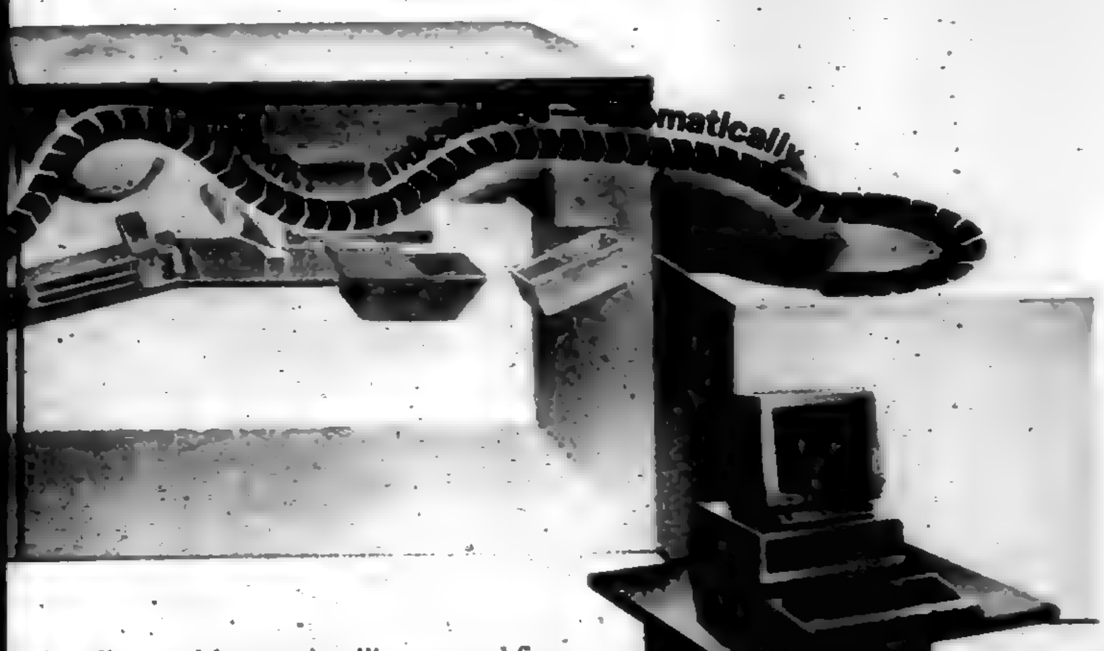

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Combining Voice And Data Through Local Nets And PBX

The controversy rages on between PBX and local nets. Either of these transport systems may be of benefit in combining voice and data depending on your specific installation needs. Every vendor seems to have a unique approach to implementing voice and data. Find out what vendors are offering to make these systems even more useful to you.

By Stuart Wecker

In the Aug. 28 issue of Computerworld Focus, *Wecker discussed some of the advantages and disadvantages of the PBX and the local-area network. In this month's article, he offers some pointers on vendor selection and current offerings.*

Each private branch exchange (PBX) vendor has a unique approach to the implementation of voice and data integration within the PBX architectures, within the wiring structure and within the integrated telephone sets. Some vendors digitize the voice information at the telephone set and multiplex the voice and data together onto a single digital path into the PBX. Other vendors use separate paths for voice and data from the telephone station to the PBX; the voice remains in analog form while the data is sent on a separate pair of wires in digital format and the wires are physically multiplexed within a single three or four twisted-pair jacket.

The key to the success of the integrated voice/data PBX is the integrated digital telephone set. This single instrument provides voice capabilities through a telephone handset, data capabilities through an attached RS-232C data interface and signaling capability through buttons and lights and an optional display on the instrument. This combined information, voice, data and control is sent to and from the instrument in digital form, multiplexed together on either one or two pairs of wire.

Currently all PBX vendors have proprietary architectures for the signaling between their digital telephone sets and the PBX. When you purchase a particular PBX, you must purchase the digital telephone sets from that vendor. In a typical example of multiplexed digital signaling, the instrument supports 64K bit/sec of voice as 8,000 samples of 8 bits each, up to 64K bit/sec of data in synchronous mode or 19.2K bit/sec in asynchronous mode and 16K bit/sec of control to manage the buttons, lights and display on the instrument. Examining the transmission link to and from the digital switch (ignoring framing bits) you would typically see groups of 8 bits of voice, 8 bits of data and 2 bits of control. This 18-bit group would be repeated 8,000 times each second, resulting in 64K bit/sec voice, 64K bit/sec of data and 16K bit/sec of control over this channel. Some PBX have the ability to increase this speed even further and to provide potentially up to 2M bit/sec of data at the instrument via a variety of interfaces.

In addition to their integration of voice and data, PBX offer a second major feature: network management capabilities. PBX offer extensive network management features as a result of both the maturity of their products and the importance of management, accounting and maintenance features in telephone-oriented applications. Among the PBX network management features are the following:

- **Accounting:** Detailed message recording of both off-site trunk calls and on-site conversations between stations attached to the PBX. This information can be used for charge-back or accounting purposes and for measuring the usage of the switching system.
- **Restriction and authorization:** Classes of service. Each user on the switch can have an individual station profile designating to which other stations or ports they can be connected. In addition, these profiles can be changed based on time of day. This allows, for example, certain systems to be accessed only by certain classes of users at designated times of the day and by other classes at other times. This adaptation can be used to provide load balancing and resource sharing of systems attached to the switch.
- **Maintenance:** Fault monitoring and diagnosis. PBX have extensive monitoring, diagnosis and reporting features. They are generally built as highly redundant systems meant to operate in a nonstop mode. When the PBX is not doing anything else, it is usually running diagnostics on internal components. PBX are usually built so that boards can be removed and replaced without powering the switch down.

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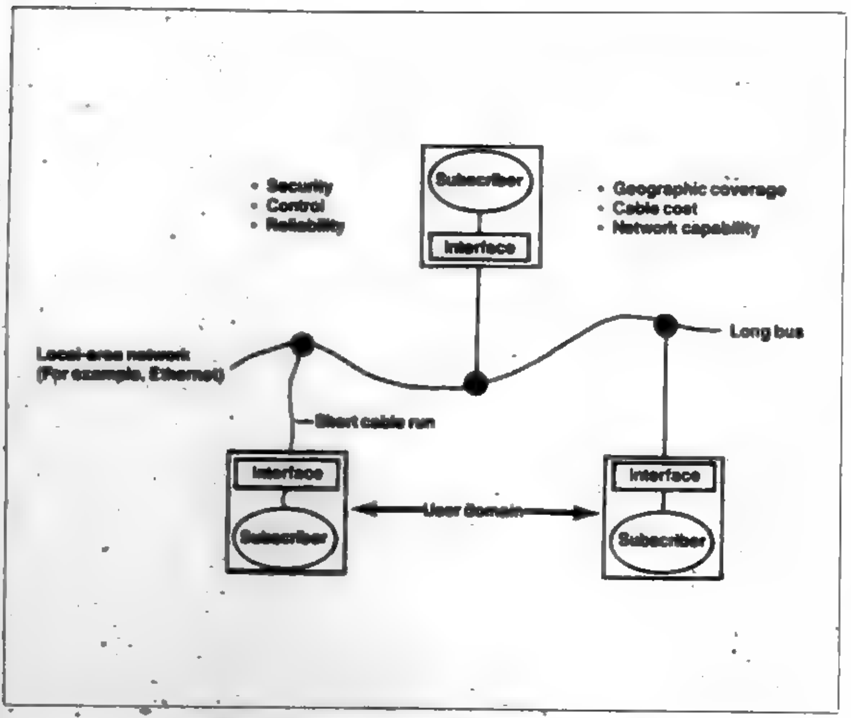

Figure 1. Local-Area Network Architecture

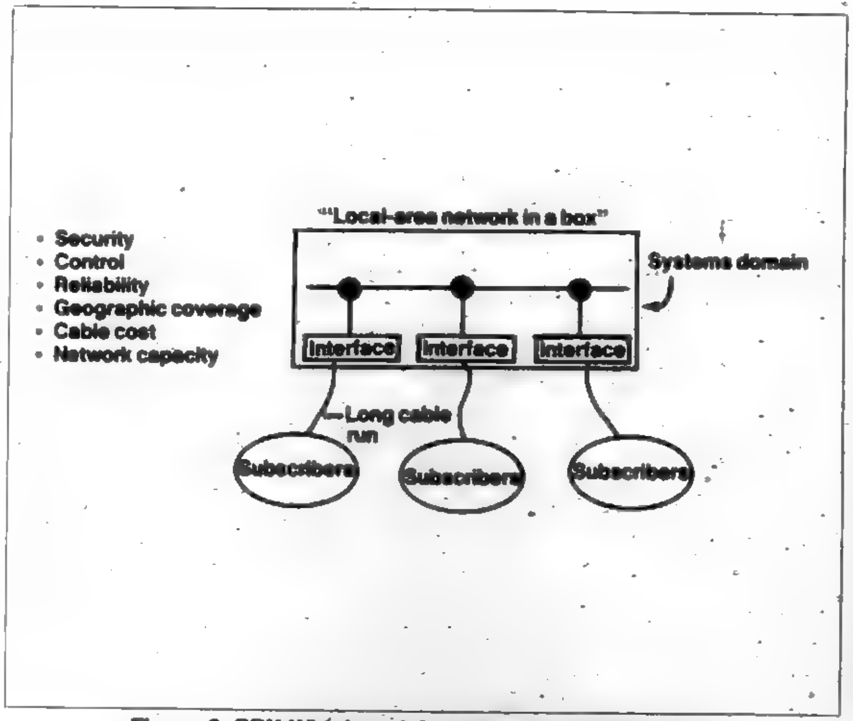

Figure 2. PBX With Local-Area Network Architecture

- **Security:** As a result of the technology of circuit switching and the architecture of PBX, circuits are dedicated between station users. Information is not broadcast among the users on the switch. Thus, security is an inherent part of PBX operation. In addition, more and more fiber-optic trunks are being used between modules of the switch, adding to the security in the system.

An initial examination of the star centralized topology of the PBX might lead one to believe that PBX structures have a potential single point of failure and are inherently unreliable. Generally, this is not the case. At a minimum, large PBX are built with redundant processors and memories. Newer architectures have adopted network structures via a loose coupling of multiple switching nodes. What appears to be a centralized PBX can be designed to be highly reliable via a logical distributed architecture.

For example, a bus-oriented distributed-switch can appear externally to be a centralized PBX with wiring attaching the instruments to the centralized switching unit. Internally, however, that switching unit is designed as a distributed switch consisting of many small processors, each supporting a group of attached instruments and communicating with each other over a shared bus. The system can be built in such a way that if one of the processors fails it affects only those users attached to the particular processing element, resulting in a highly available structure.

A close examination of present local-area network architectures and high availability distributed PBX architectures shows they are really quite similar. All that really differs are some of the dimensional parameters of the two structures (for example, see Figures 1 and 2). Figure 1 is the structure of a typical local-area network architecture consisting of an Ethernet cable with connected transceivers and short cable runs to interfaces and subscribers. Each interface operates independently, coordinating with the other interfaces using the carrier-sense multiple access (CSMA) arbitration scheme. The interface and subscriber are colocated in the user domain. Information is broadcast on the cable, received by all of the interfaces and accepted by those to whom the address matches.

In the PBX structure (see Figure 2), the dimension of the two cables has been changed. The local-area network cable has been shortened and put inside a box, the interfaces have been moved closer to the local-area network cable and the long cable run is now between the interfaces and the subscribers.

From a structure point of view, we have the same basic components, the same interconnectivity and the same reliability in the PBX and the local-area network architectures. The PBX architecture has the advantage that the interfaces and shared cable are within the system domain. The result is higher overall security; the only information sent to the subscriber on the long cable run is information for that subscriber, not information broadcast to all users in the network, as in the local-area network example.

In addition, control is simplified in the PBX because the interfaces can even be interconnected via a second local bus for this purpose. Cable cost can be lower in the PBX because the long cable runs are point-to-point terminated cables supporting reasonably high speeds while using inexpensive twisted-pair cabling. The PBX network capacity can also be significantly higher than a local-area network as the internal shared bus — local-area network in a box — can be a parallel bus of very high speed due to its short distance.

A comparison of PBX wiring and local-area network wiring also shows there is no major difference in the wiring requirements of the two systems. In both cases, wiring is from individual offices to wiring closets. In a PBX, the wire is then physically concentrated into trunks and brought to the PBX. In a local-area network, the network interface units are located in the closets and then connected into the major local-area network cable. In both cases, the bulk of the wiring is from the offices to the wiring closets.

The capacity and bandwidth usage of voice and data on a PBX are important considerations for those planning the size and capacity of a total integrated voice and data system. Voice has the characteristic of a continuous bit stream of 64K bit/sec, specifically 8,000 samples of 8 bits each per second. It is, however, of generally low call duration, on the order of a few minutes. A standard busy office telephone is assumed to have a connected time of approximately 8% to 16% per hour. Thus, a switch with 500 connected instruments could probably get by with an internal circuit capacity of 100 pathways.

Data has just the opposite characteris-

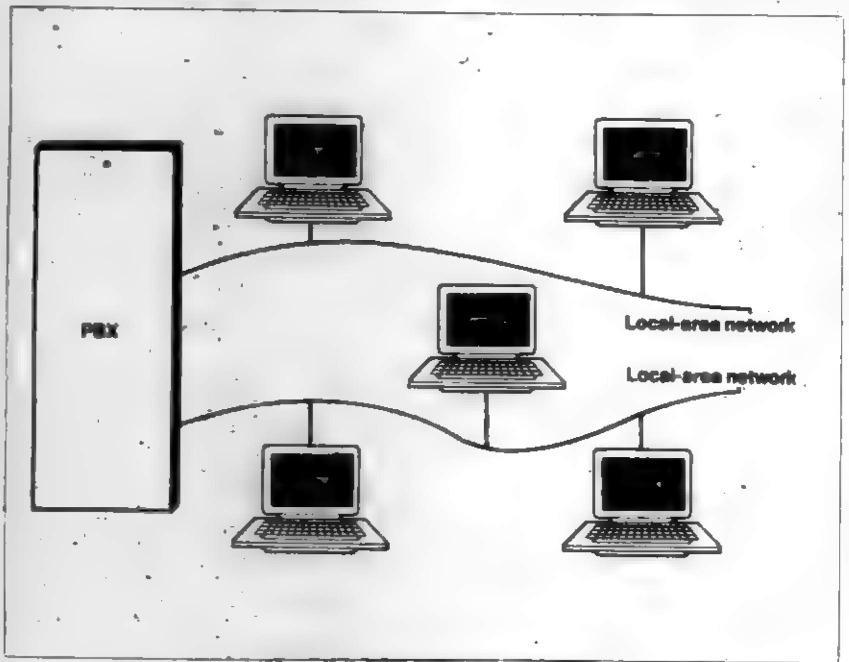

Figure 3. Alternative Topology

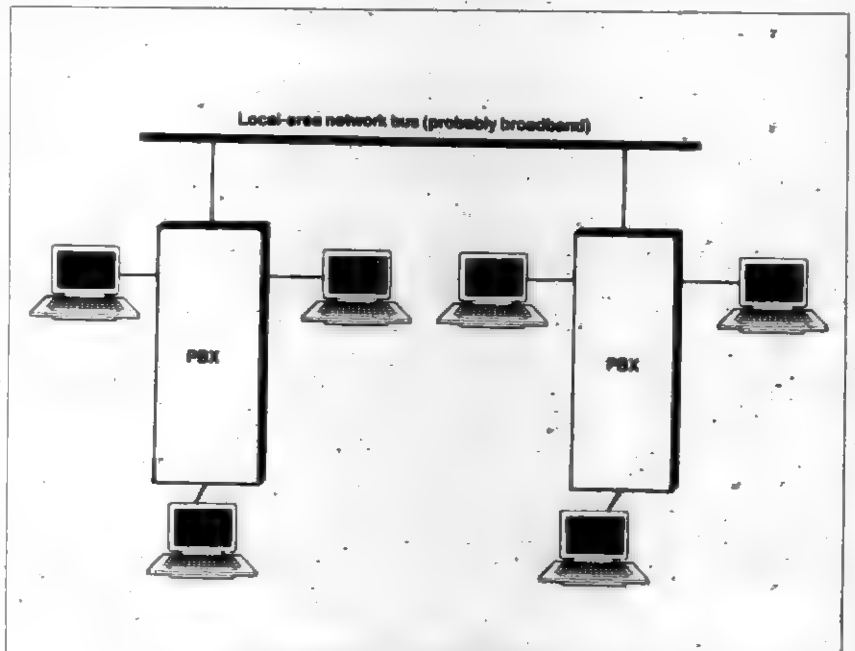

Figure 4. Alternative Topology

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tic compared with voice. It consists of bursty blocks of transmission, particularly terminal-to-host traffic, usually averaging less than 1,000 bit/sec, significantly less than the voice transmission speed requirement. Data, however, has a high call duration, on the order of hours. Users typically connect their terminals to their host computers and remain connected for long periods of time. The connected busy time in many cases approaches 100% per hour. Thus, a system with 500 terminals trying to connect to host computer ports would not present acceptable connectivity if the switch internal capacity offered only 100 pathways. In this environment, a switch with a capability for 500 simultaneous connector paths would probably be required to satisfy the data requirements.

PBX vendors refer to the capacity characteristics of their switch using the term blocking. Blocking is the probability that a call request will be rejected. Unfortunately, each vendor defines blocking in a way that emphasizes the advantages of the particular product. For example, the following are three possible definitions of blocking:

- The call request was rejected because the switch had no more capacity for call circuit connections.
- The call request was rejected because multiplexing paths within the switch have no more capacity.
- The call request was rejected because the expected duty cycle or usage level specified by the vendor was exceeded.

Clearly, the best of the three definitions is the first, where users cannot build any more paths through the switch because the capacity of the switch is fully utilized. The second definition says that the capacity of some level of internal traffic multiplexing between the port interfaces and the switch has been used up. There still may be internal switch capacity, but it is not available to the requesting users. The third definition, also the weakest, states that the switch will not block as long as it is not overutilized. Using this definition, heavy data usage will usually result in unacceptable performance of the switching system.

Vendors have employed various techniques to achieve better data capacity and bandwidth usage for data not requiring the full 64K bit/sec paths, as for terminal-oriented traffic. If the switch has enough total capacity in 64K bit/sec paths to support the attached users, the bandwidth may simply be wasted with no adverse effects. If the switch does not have enough total capacity, the 64K bit/sec paths may be submultiplexed. That is, a 64K bit/sec path can be subdivided into some number of equal capacity subpaths (for example, eight 8K bit/sec paths from one 64K bit/sec path, handling 8 data terminals within a single voice capacity pathway). Other vendors packet switch a 64K bit/sec path dynamically among many terminals and share it on an as-needed basis.

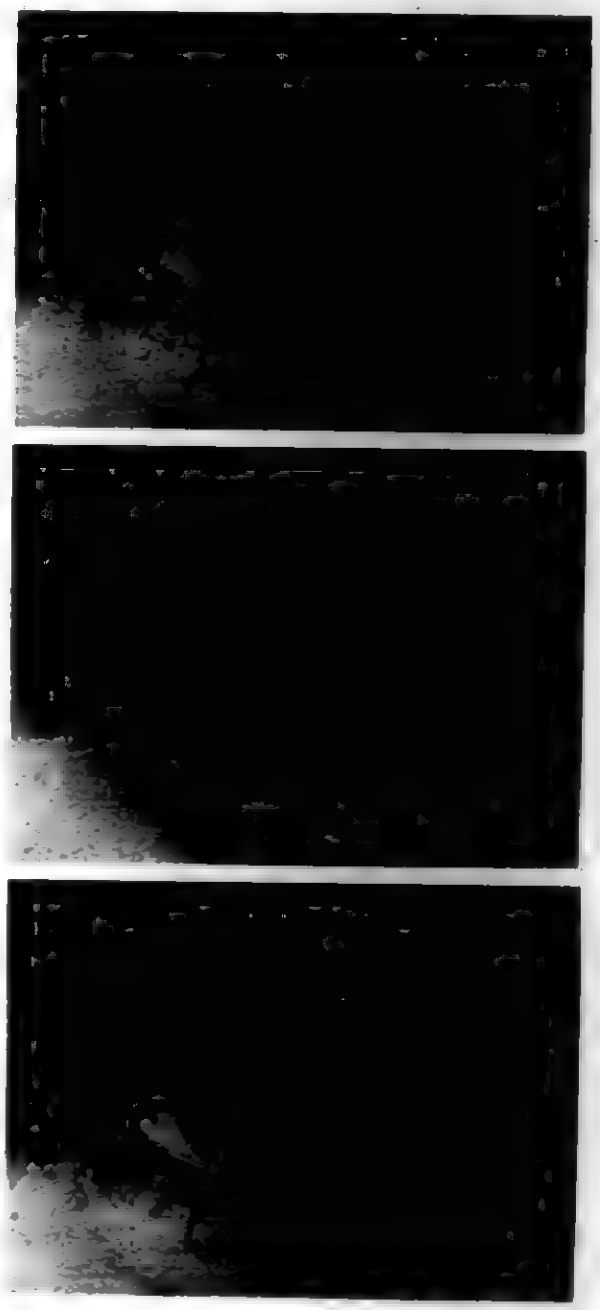
There are many issues that have to be considered in the evaluation and selection of PBX. Clearly, in each environment and for each user priorities differ. The following is a brief list of some issues that should be considered in such an evaluation:

- Architecture and topology.
- Function and switch capacity.
- Availability and reliability considerations.
- Data interfaces and network services.
- Network management sophistication.
- Voice and data performance tradeoffs.
- System and user station features.
- Service and maintenance.
- Physical characteristics.
- Wiring plant.
- Vendor reputation.
- Price.

Price is generally the last consideration. First, a PBX will not be useful unless it meets its set of technical characteristics; second, systems with similar function characteristics won't have large price differences.

Price is generally the last consideration to be applied, for two reasons. First, a PBX will not be useful unless it meets its set of technical characteristics; second, because of the competitive nature of the PBX industry, systems with similar function characteristics won't have large differences in price.

There are many vendors in the voice/data PBX business. The major established vendors selling large switches in the 5,000- to 10,000-line size today are AT&T Information Systems, Inc. (System 85); Northern Telecom, Inc. (SL-1);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IBM/Rolm Corp. (CBX); Intecom, Inc. (IBX); Ericcson Information Systems (MD110); and NEC Telephones, Inc. (Neax 2400). In addition, many other vendors are in the voice/data PBX business with either newly announced switches or with switches of smaller size including companies such as Telenova, Inc.; Ztel, Inc.; CXC; Harris Corp.; and Siemens Corp.

Through these gateways it is possible to get the best of both the local-area network and PBX worlds — to use each communication technology where it makes sense from both economic and requirements considerations.

The architectures of these switches vary from completely centralized to highly distributed, but fall into three basic types.

The first is a centralized architecture — a single centralized switch with the interface units being remoted to user locations, reducing the user-to-interface wiring. The Intecom switch is an example of this architecture.

A second basic architecture is a distributed architecture consisting of an independent stand-alone PBX with a shared switch used to interconnect these independent PBX when required. This is the architecture of Ericcson and AT&T.

A third type of architecture is also a set of stand-alone PBX, but without a central switch. In this configuration, the individual PBX are connected in a mesh fashion. This is the architecture of IBM/Rolm and Northern Telecom.

To determine which particular architecture and switch characteristics are most applicable to a specific environment, an evaluation of each user's requirements, physical topology and performance trade-offs must be made.

Local-area networks can be interfaced to PBX through the network interfaces described earlier. These high-performance and high-function interfaces attach to the PBX switch and act as gateways connecting external networks to the internal PBX switch architecture. The most common interface gateways available today are those for Ethernet and X.25. Through these gateways it is possible to get the best of both the local-area network and PBX worlds — to use each communication technology where it makes sense from both economic and requirements considerations. Local-area networks can connect computer systems to each other and to the switch via a high-speed interface, and the PBX can be used directly to interface lower speed personal computers and terminal users. Local-area networks can also be used to provide trunking between distributed PBX systems.

Figures 3 and 4, Page 46 show two possible alternative interconnections: Figure 3 with workstations connected directly to a local-area network and the local-area network interfaced to the PBX and Figure 4 with the local-area network serving as a PBX interconnect structure.

Communications networks must meet the most restrictive service requirements of their users. An examination of the requirements of voice and data shows voice to have the more difficult set of requirements to satisfy. Integrating data into a digital voice PBX architecture is a fairly straightforward task, which makes the integrated voice/data PBX an ideal hub for a total communications system.

Wiring cost and maintenance are major cost components of a communications system. By integrating voice and data within a single system, both of these cost components should be reduced to the cost of the wiring and maintenance of a single switching network. Sharing the communications system for voice and data is a good economic choice if both voice and data capabilities are needed. If data is the only requirement, this integration may not be justified and a data-only PBX or local-area network may be a good alternative. In addition, taking this integration step prepares you for the eventual interconnection to the international voice/data network (ISDN).

The next few years will mark an evolution for the voice/data PBX industry. There will be more network interfaces and data communication capabilities available from PBX vendors as they implement their plans to make PBX the hub of the voice and data communications system.

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Wecker is president, Technology Concepts, Inc., a firm specializing in network consulting and implementation in Sudbury, Mass.

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End-User Computing Is Transparent At Corning Glass

Corning has been encouraging end-user computing since 1979. Today, 50% of its employees use computers. Management figures they're halfway home.

Dennis Lockard, manager of End User Support Services at Corning Glass Works, must have felt like a pioneer in 1979. As head of the business analysis function within the applications development department, he agreed to look into "this personal computing stuff."

Today, Corning Glass Works, which employs approximately 7,000 people at its Corning, N.Y., headquarters location, has 500 personal computers. This year alone, 15 trainers will teach more than 1,500 people in various courses ranging from introduction to personal computing to mainframe applications. The information center, a term the crew at Corning feels it has outgrown, has spread beyond the southern tier of New York to its other manufacturing facilities and regional offices in the U.S. Soon the road show will travel to South America, Europe and Asia.

A good part of Corning's growth in end-user computing was an evolutionary process. But the goodwill spread by the training team; the behind-the-scenes support of Lockard; the visibility of computing at the highest level in the company (James R. Houghton, chairman, makes sure all pictures taken of him in his office include his personal computer); and the master plan of the newly arrived vice-president, Information Systems Division, appear to be working very much in concert to make end-user computing something much more than an end in itself.

It wasn't really too traumatic at the beginning, Lockard said. At the initial presentation there were those in the data processing department who were alarmed

By Lee White

that an alternative to traditional DP was being set up. The resistance lasted, according to Lockard, exactly one-half day. "We became conscious of how we presented ourselves." Once the DP people realized the information center staff would be relieving them of duties that had kept them from doing "big exciting data processing stuff, one at a time they all lined up behind us," Lockard said.

Once the DP people realized the information center staff would be relieving them of duties that had kept them from doing "big exciting data processing stuff, one at a time they all lined up behind us," Lockard said.

Lockard knew creative hiring would be the key to good staffing for his information center. The first person he hired was a woman who had begun a users' group to solve problems to which the DP group was unresponsive. Lockard had sat in on one of the meetings she was conducting and vowed the first chance he got, he would hire her. Because she worked out so well in the information center, he formed a philosophy to hire the person who is successfully working in another department.

According to Lockard, this has proved a good philosophy for two reasons: a person who is in demand is going to work well with people and information center staffers need a career path.

The present information center staff supports Lockard's premise. Floyd McWilliams, who supervises the staff, came to Corning just over a year ago from Harris Corp. He had years of experience in traditional mainframe DP, including positions with the New York State Department of Education, University of Denver and General Electric Co.

What could possibly convince a dyed-in-the-wool mainframer to take a job supervising a staff concerned primarily with teaching the use of personal computers? "I've got a very strong feeling that in five years, programmers — as we've come to know and love them — are going to be gone, at least in most places. I wanted to get away from that mainframe centralized focus, yet still work with computers and people," McWilliams explained.

While at Harris, McWilliams did a lot of training, mostly in mainframe tools and word processing. Acceptance of his work was difficult to overcome on three levels. The people he was training were originally resistant to change, but soon accepted and then loved the new technology. Management acceptance was spotty, but when they saw the benefits they tended to see it in terms of cost savings. Most difficult to overcome was the resistance from his cohorts in the DP department. "I was persona non grata by the end of the time I was there, as far as my colleagues went," McWilliams said.

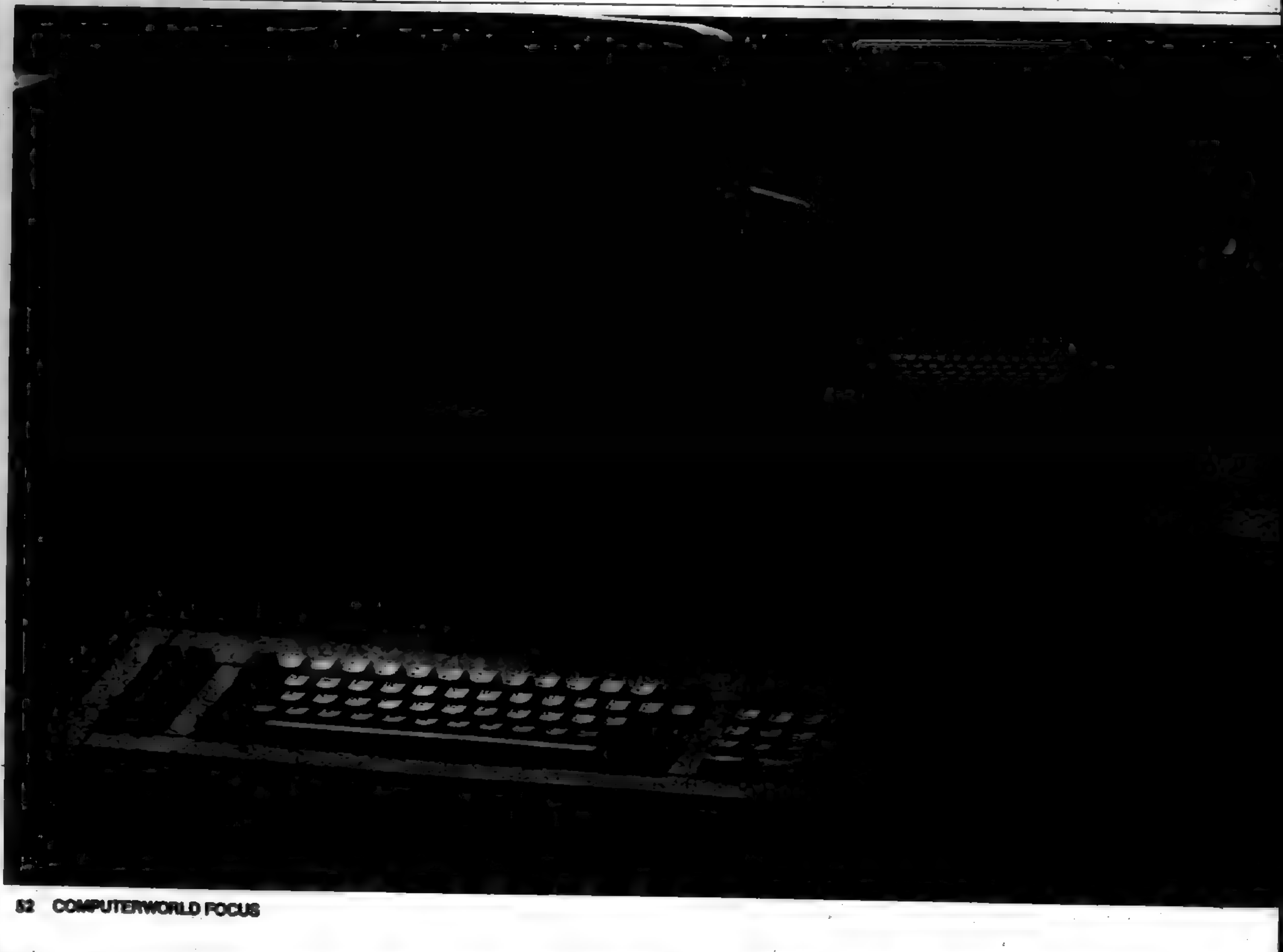
McWilliams was most impressed that Corning committed a great deal of money and resources to its training center — a large, brightly lit classroom with 10 personal computers. He inherited one team of trainers and soon created a second one. The first team, which everyone calls the A-Team, is comprised of three analysts — Jill Hurst, Gary Pease and Terese Ruocco. Hurst has an undergraduate degree in philosophy and a master's in library science; Pease's undergraduate work was in marketing, he has a master's degree in business administration and once sold mainframe computers; Ruocco has a two-year secretarial degree, a two-year chemical technology degree and should complete her bachelor's degree in general studies in about a year.

The second team, which no one calls the B-Team, is peopled by Randy Pruden (master's in business administration), Don Schwartz (whose background is in mechanical engineering), Debby Whitson (with secretarial school background) and Linda Smith (a systems analyst).

It is these teams to which the bulk of the teaching, training, consulting and help-desk work falls. And it is because of the teaching, training, consulting and help-desk work that Lockard has never hired anyone from within the confines of Corning's own DP department.

In the beginning, when the information center resided on The Hill with the data center (End User Support Services is now located three miles away at the corporate headquarters building), nobody wanted to be in the information center. The general feeling was it wasn't real DP, according to Lockard, but slowly the attitude changed. "We were having fun, and one at a time [DP] people came to me and said, 'Gee, can I talk to you?' and I said, 'Sure, let's talk.' "

Lockard estimates he has interviewed 30% of the applications development



staff. Yet none, by mutual consent, has ever moved into the information center.

The rationale behind all heavy-duty training done at Corning headquarters and its far-flung offices and subsidiaries is twofold: establish standardization within the company and make each group, division and company capable of operating independently.

This will change in early 1986 when the first person from DP moves into the end-user function. "There are about 195 people in the division, about 100 exempt people, so we'll have hired 1%. There really is a difference between the people, but the key is to allow them the option of moving in. It's all right to create country clubs as long as you give everybody the option to join," Lockard said.

But the work being done by the end user support services teams should be compared to that done by the country club workers rather than the country club members. Training 1,500 people on- and off-site, in addition to project work, software evaluation and long stints on the help line cannot really be called fun, although none of the team members expressed any desire to leave the department for greener pastures.

One of the highlights for the A-Team was the training project at Siecor Optical Cables, Inc. in Hickory, N.C., which is owned jointly by Corning Glass Works and Siemens Corp. Siecor wanted an information center, but had no idea how to begin one.

Originally, the plans were to train 80 people, a number that grew quickly. Because Siecor had no on-site location suitable for such training, they arranged space at the local community college. In all, the training lasted six weeks and included courses such as introduction to personal computers, beginning Lotus 1-2-3 (Lotus Development Corp.) and advanced Lotus 1-2-3. They now have their own information center; the manager of that center used to run a travel agency, owned a hammock company and has a master's in business administration.

The rationale behind all of the heavy-duty training done at Corning headquarters and its far-flung offices and subsidiaries is twofold: establish standardization within the company and make each group, division and company capable of operating independently.

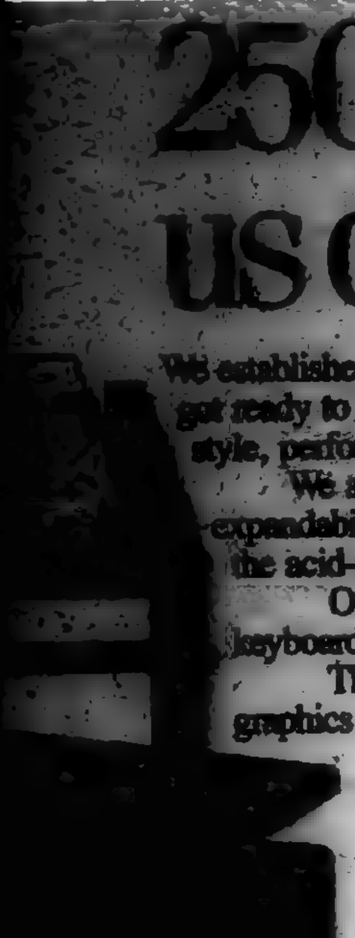
The issue of standardization has not been difficult for Lockard and his group. The desktop computers are all IBM Personal Computers or Personal Computer XTs. The portables are Compaq Computer Corp.'s Compaq. The primary software packages are Lotus' 1-2-3, Multimate International Corp.'s Multimate or IBM's Displaywrite 3; for presentation graphics, Decision Resources, Inc.'s Chart-Master and Sign-Master.

While Schwartz expressed concern that the training staff did not have time to evaluate all the new products, it was obvious that Corning operates on a need-to-have basis: If they need to have it, they'll go look for it.

The independence of each operating group within Corning was demonstrated by the young start-up information centers around the company. Mike Slovak, who ran the information center at corporate headquarters prior to Floyd McWilliams, has moved on to the Fallbrook plant at Corning, where he's doing it all over again. At the present time, Slovak has two people reporting to him and has just opened a WP center. When Slovak arrived at Fallbrook, there were two personal computers and eight terminals hooked to an IBM 8100. They have just purchased a Digital Equipment Corp. VAX 785, and Slovak anticipates by June 1986, 30 terminals will access the VAX, 10 of which will be personal computers that can act in the stand-alone mode. Slovak has also ordered an IBM Personal Computer AT, one of the few at Corning.

In another offshoot, Duane Welch, project manager in planning and business development, serves as the expert in his group. Although never formally trained in computer science, Welch has always liked math and found computers a natural outlet. Part of the original users' group back in the days at Corning when end-user computing consisted primarily of IBM's A Departmental Reporting System (ADRS) on the mainframe, Welch likes to think of himself as one of many people at Corning who serve as catalysts in computing.

He misses the formal users' group meetings, speaking wistfully of the days when people got together to share the little tricks they'd discovered noodling around the keyboard, but realizes the formality of today is better in the long run. "Now [end-user computing] is mushrooming, and I guess that's what you really want it to do," Welch said.



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However, Welch was quick to point out that responsiveness from Lockard's group was not a problem. When Lotus Development Corp. announced Symphony, Welch was one of several people who was asked by Lockard's group to take a look at the product.

His opinion and the opinions of others looking at Symphony were that the product would not be a good choice for Corning.

"My feeling was that [Symphony] and the manual were written by and for a bunch of computer jocks spending a weekend at Malibu Beach and saying, 'What can we do that's fun for the weekend?' " Welch joked.

What kind of company does it take to see to fruition the kind of computing power that more than 50% of the working population at Corning now uses?

Janet McLaughlin, manager, Office Systems Consulting Group, gives a great deal of credit to David Luther, vice-president, who recognized that although technology was a key to improved productivity, technology couldn't be separated from people issues. It was he, McLaughlin said, who moved her group from its home in the personnel department into the Information Systems Division.

The mission of the Office Systems Consulting Group is to implement Corning's mission: Know what needs to be done, have the tools to do it, then do it right the first time. Often, according to McLaughlin, a department or work group sees the new technology as the only tool necessary to increase productivity. McLaughlin and her staff actually study the department, interview members, chart work flow and come up with recommendations.

An even more important measure of success at Corning is called total chargeback. In the early days of information centers, little money or human resources were expended because no one was really sure end-user computing would be much more than a fad. But times have certainly changed.

Sometimes the answer is more computerization; often it is much more than that. A total analysis can take from nine months to two years.

The success of McLaughlin's program can be attested to by the fact that there is a waiting list for the Office Systems Consulting Group's services. And the success of End User Support Services can easily be measured by the number of satisfied end users. But there is an even more important measure of success at Corning; it's called total chargeback.

In the early days of information centers, little money or human resources were expended because no one was really sure end-user computing would be much more than a fad. But times have certainly changed.

According to The 1985 American Management Association Report on Information Centers, close to 90% of surveyed companies purchased personal computers in 1984, and of that 90%, half purchased between 11 and 100 of the boxes. The average number of full-time information center staff members in the surveyed companies in 1984 was 5.4; the average anticipated increase for 1985 was 1.86.

At Corning, the foresight that put in place an information center in 1979 must have also played a role in the decision to implement chargeback. Although a telephone call to the help desk doesn't cost the caller anything and the time the trainers spend evaluating new software and advanced applications and training techniques has no price tag attached, just about everything else does.

Training and consulting at Corning headquarters costs $40 per hour per person; the road show is $400 per person per day plus expenses. The Office Systems Consulting Group charges $350 per day, "and that's a bargain," McLaughlin said.

How does a department or division or group know more than a year ahead whether to budget money for such expenditures? And if they find they need some training or another personal computer along about March, are they out of luck until January of the next year?

Corning seems to have an answer for just about anything, including the unanticipated line item expense.

Upper management at Corning requires its managers be responsible for only a bottom-line budget. If a manager thinks the purchase of a personal computer is important, then that manager might put off a new hire for a couple of months or borrow from some other part of his budget, as long as the bottom line at the end of the year comes out right.

As one manager phrased it, "If you don't have authority over your own budget, then you're really not a manager, are you?"

And management is the key to everything at Corning — even to managing its environment. Two years ago, Corning Enterprises was formed as a wholly owned subsidiary of Corning Glass Works.

One of its main objectives, according to Hank Milledge, controller, was to secure new jobs in the area by bringing in new companies, helping to start new companies and funding venture capital activities. Corning Enterprises owns Corning Hilton Hotel, Watkins Glen Raceway, Elmira Aeronautical Group and Wine Market, Inc. that sells wines from 19 different vineyards in the area.

Milledge even serves as a financial adviser to those who might be interested in starting a business in Corning. Often people will come to him with an idea and some figures.

Milledge uses his personal computer to help them turn theories into workable plans. But this is one place where the chargeback mode doesn't come into play. "We do that sort of thing as a service, specifically to help a business get started and employ people," Milledge explained. It isn't only altruism, however, that spurs the good work of Milledge's group. Providing this sort of service in order to make a healthy, thriving town helps to attract good people from the big cities to the little community of Corning (population 17,000).

The most recent of the big city transplants is Harvey Shrednick, vice-president, Information Systems Division. Coming from a position as senior director, Information Management Systems at Nabisco Brands in New York City, Shrednick saw the challenge of adding the one piece of end-user computing that seemed to be lacking: mainframe-based information center tools that could be accessed by the huge installed base of terminals and personal computers. "Personal computing at Corning has whetted the appetites of the users. Now they want more," Shrednick said.

For Corning's users, the definition of more will start with an IBM 3033 operating under VM where Information Builders, Inc.'s fourth-generation language Focus and IBM's Professional Office System (Profs) will be running within months.

Shrednick, who recently presided over a reorganization of his 200-plus person department, sees himself as a conductor who will orchestrate the balance between mainframe and microcomputer.

Lockard, on the other hand, might see himself as the concertmaster when he brings together his end user computing group with the techies on The Hill.

Does Lockard anticipate problems? None at all, he said.

"There's a technical guy over at the data center named Jim Scott. He and I have differing objectives, but we both know what the overall mission is and we have an agreement: Jim makes it run, and I make it work.

"If I can help, I will, and if he can help, he will. We're both going to own the overall objective," Lockard said.

* * *

White is a senior writer at Computerworld Focus.

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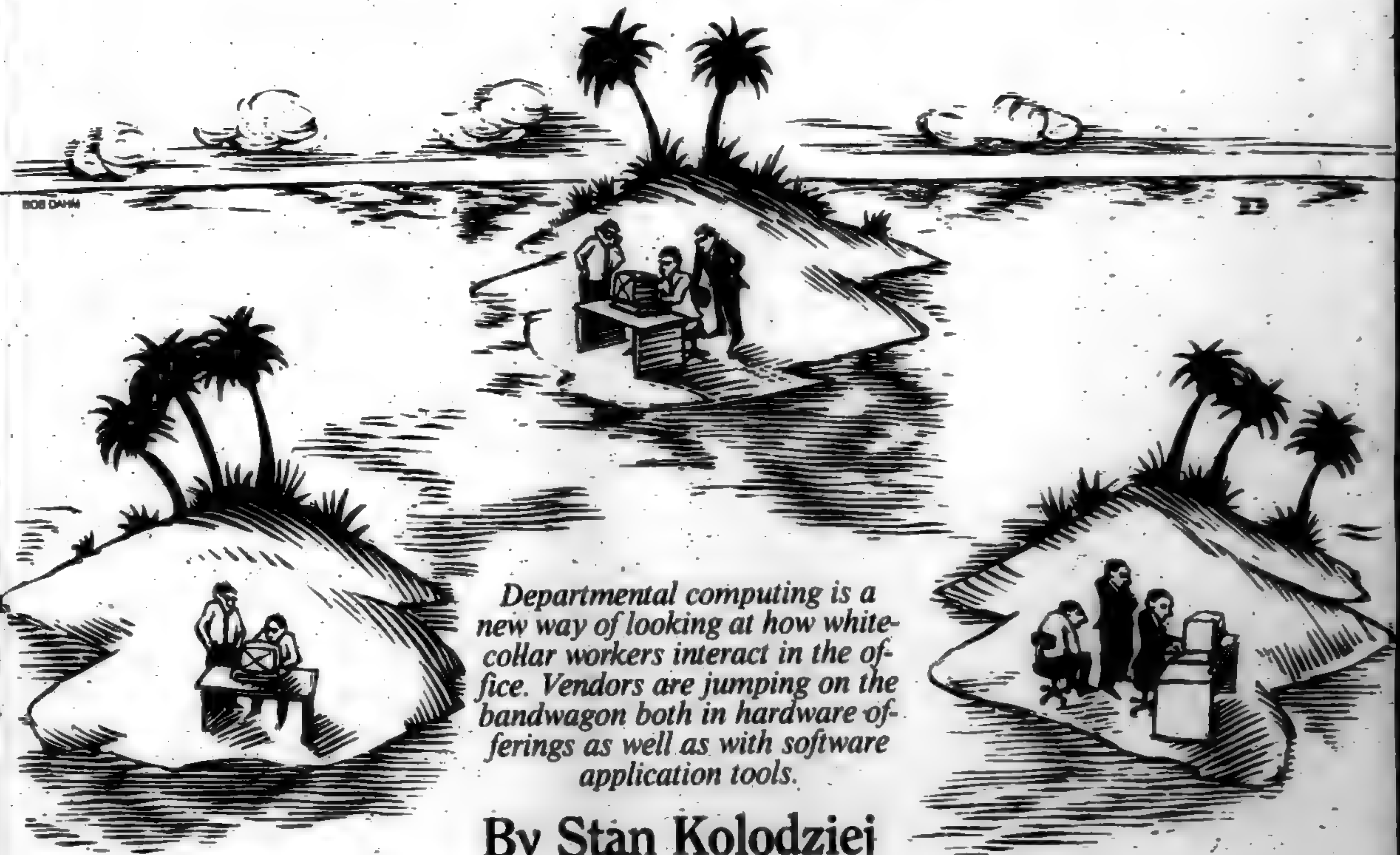
Departmental Computing



BOB DAHM

Departmental computing is a new way of looking at how white-collar workers interact in the office. Vendors are jumping on the bandwagon both in hardware offerings as well as with software application tools.

By Stan Kolodziej

Departmental computing may be a new buzz word, but the idea is really an outgrowth of distributed processing. What makes departmental computing different is its concentration on work groups, those clusters of corporate workers ranging from five to 50 in number, who share a common work area, common business goals and more often than not the same type of information.

These work groups are not necessarily in the same office, but rather are linked by the need for strong, daily interaction. A group could be sales people sharing the same regional territory and products, an accounting group within a corporate division or a group of engineers working on the same project.

"Departmental computing focuses on knowledge workers," Tim Williams, senior analyst at Future Computing, Inc., a market research firm in Richardson, Texas, explained.

In the past, vendors of vertical software have targeted these work groups, which were frequently regarded as a market too specialized to be profitable enough for the large hardware vendors. But now that the computer market in general has tightened, hardware vendors are scouring the market for third party software houses to create vertical application software for their systems and departmental customers. Other vendors are providing fourth-generation software application tools for departmental users (usually through the management information systems group) to help them create their own application software.

Interestingly enough, MIS departments are proving to be a big mover in the demand for these software application tools, often as a way to help relieve their backlogs of user application requests.

"Users might be vocal, but many are now having to channel their demands through MIS. MIS is becoming a bigger influence in departmental computing," Roger Bailey, senior director of systems marketing at Motorola Information Systems, Inc., Cupertino, Calif., noted.

Bailey sees the surge in departmental computing as stemming from a reaction to the corporate personal computer buying sprees of past years. "MIS has been assigned or taken on the task of organizing what has often been a mess in corporate personal computing," he explained. "MIS is trying to gain control again and better organize individual computing through a work group approach."

"The [IBM] PC has become a pervasive element, and there has been some dragging of feet on the part of users as to where these machines come into play in the office scheme of things," explained Carl Machover, president of consulting firm Machover Associates Corp., White Plains, N.Y. "Departmental computing is a framework with which to integrate these workstations and help reverse the fragmentation of data bases," Machover said.

Data General Corp. of Westboro, Mass., is one of the vendors marketing the idea of departmental computing. J. David Lyons, vice-president and general manager for the information systems division at DG, said in a recent speech, "Departmental computing is the linking of personal systems to corporate systems with a third tier of processing power. It is a direct result of the organizational tension created when centralized mainframes meet proliferating personal computers." Lyons concluded by saying, "These two opposing organizational tiers have traditionally used processing methods that don't lend themselves to easy integration."

Most computer vendors seem in general agreement with Lyons' definition of departmental computing. Kirby Herron, senior director of strategic product planning for Datapoint Corp. in San Antonio, Texas, puts the maximum number in a group at 30 and says that 50% to 60% of the information used by any one department originates in that same department.

Vendors are taking departmental computing and selling it to users according to their respective backgrounds of expertise.

Digital Equipment Corp. of Maynard, Mass., has played the game a long time. DEC's All-In-1 integrated office software is geared specifically for departmental computing, according to the company, and since DEC's recent integration of its Microvax II family of computers with All-In-1, DEC has solidified its position as a leading departmental computing supplier. In fact, International Data Corp. (IDC), a research firm in Framingham, Mass., estimated All-In-1 represented almost 33% of all integrated office systems shipped in the U.S. in 1984.

DEC seems to approach departmental computing as an exercise in chemical warfare. "We break a company into components and articulate its business problems at various levels and at different departments. We then isolate a work group and concentrate on it." Dick Loveland, manager of product planning for office and information systems at DEC, said.

DEC is one of those few vendors that can give its customers many hardware options for departmental computing. Loveland said All-In-1 can isolate the work group from other work groups while using a Microvax as a file and application server. It can connect other work groups with electronic mail, tie in IBM Personal Computers or connect with the Decnet local-area network to go corporatewide and share data bases and files. It can work in clusters of VAX minicomputers in several different configurations.

IBM offers the same sort of hardware flexibility. IBM corporate sanction has made the company's System/36 computer its main thrust into departmental computing. IBM's approach is also just as structured as DEC's. (IBM, to begin with, slots every user within one of its six well-known categories of users ranging from secretarial to engineering/scientific.)

Bob Murphy, division director, general and office systems, product line planning and national accounts division at IBM, offered a parable to illustrate departmental computing. "On the first day," Murphy explained, "users will install their PCs and solution their own problems. On the second day, they're walking down the aisles with diskettes to share information with people in their departments. On the third day, they want to send the diskettes outside the department or outside the company altogether." The moral, Murphy intimated, was to make sure you can provide users with what they can't immediately foresee.

Murphy said IBM has recently changed marketing schemes and is adopting a four-level strategy in departmental computing. The first option is a series of IBM Personal Computers and terminals attached to a System/36 computer and running IBM's Personal Services document distribution and Displaywrite software. The second model has an IBM 370 running in a Distributed Office Support Systems (Disoss) environment with the Personal Services software connecting IBM PCs with the system. The third approach has VM Professional Office Systems (Profs) emphasizing electronic mail and document exchange and again tying in IBM PCs. The last method is the IBM PC Network, a system that has recently been criticized for lack of power, but in which IBM still says it has the utmost faith as an important departmental computing vehicle.

It's clear from what Murphy said that IBM is making sure its PCs are now playing a big role in its departmental computing strategy. The glue tying everything together seems to be the Displaywrite and Personal Services software. Departmental computing is also proving of great benefit for minicomputer sales, making the minicomputer industry one of the few areas enjoying current computer sales success, according to Richard Mikita, IDC analyst.

Minicomputers using 32-bit processors are fast and powerful enough to act as departmental file and application servers for up to 100 workstations while also acting as a communications gateway for users needing to access data beyond the department level. Minicomputers can also provide individual users with virtual storage capacity and increased memory for applications requiring more than a personal computer could handle. Users are seeing the benefits of minicomputers in departmental computing. Research from IDC indicates that U.S. shipments of minicomputers in the 17 to 128 user category will enjoy a compound growth rate of almost 13%, compared with 10% for the computer industry as a whole.

Beyond computer hardware there is the continuing movement underway to provide software application tools and training programs to departmental users.

Additional competition for mainframe and minicomputer vendors in departmental computing has come from multiuser systems vendors such as Altos Computer Systems, Inc. and Convergent Technologies, Inc., both located in San Jose, Calif. Multiuser systems came into departmental computing behind the larger systems vendors, providing 16-bit (several years ago, Altos even started selling 8-bit servers for work groups) processors and catering to the needs of clientele who had neither the need nor the funds for the departmental computing power that the likes of DG, Datapoint, IBM and DEC were offering.

Convergent Technologies, a vendor of multiuser systems for original equipment manufacturers, offers a good example of the type of concentrated computing power that multiuser systems vendors market. Convergent Technologies recently introduced its series 286 Ngen processor, based on the Intel 80286 microprocessor, and offering a full 8 MHz speed, 1M byte of main memory expandable to 4M bytes, 4M bytes of main memory for each workstation and RS-422 ports for data exchange speeds up to 1.8M bit/sec. Convergent Technologies also just introduced its Mightyframe, a 32-bit supermicro computer capable of feeding 42 terminals and handling main memory up to 16M bytes.

"I think it's evident that these machines are produced to do more than just spreadsheets," Nate Brookwood, director of product marketing strategy at Convergent Technologies, explained.

"The fastest growing segment for computer systems is the $6,000 to $25,000 range," said Phil White, Altos senior vice-president, who claimed revenues in this area of multiuser systems are rising at better than 30%. "Departments want the number crunching up front."

If they do, they will have to pay for it. For heavy transaction processing within departments involving up to 30 people, dedicated multiuser systems are considered more suitable than local-area networks linking personal computers to a file server, minicomputer or mainframe. The per user costs are also initially higher. According to Omri Serlin, president of Itom International Co., a Los Angeles, Calif., consulting firm, "Most dedicated work group systems contain an overhead that is meant to be amortized over a number of years."

Multiuser systems are generally more cost-effective the more users are on the system. If the system has a capacity of 20 users and only 12 are currently on-line, there is disk space and CPU power going to waste, which can be translated into lost productivity. Once the system reaches its intended capacity, however, it can be expensive, even cost prohibitive, to add more disk space and processing power, perhaps even another processor to the system. Unless the multiuser system is overmatched for a departmental computing task, it can be expected to be more economical in absolute cost than networking PCs. "It's not enough anymore to give a lot of processing to individual users," Brookwood explained. "You have to have networking to share data. Users are expecting these things from one vendor now."

Multiuser companies have apparently gotten the word. These vendors have always stressed quick data access and exchange within work groups, but increasing market pressure from local net vendors such as 3Com Corp. of Mountain View, Calif., and Novell, Inc. of Orem, Utah, is making multiuser systems vendors include networking in their product offerings (if not a full-blown network, at least gateways to such popular network architectures as Ethernet and Decnet).

Although Altos has recently introduced its Worknet high-speed data network and Convergent Technologies has just come out with its own Ethernet gateway link, some analysts, nonetheless, play down the departmental incursions of network companies. "There is simply not enough power and allocation of resources available on micro networks," Joan McKay, analyst at Kidder Peabody & Co., a Boston, Mass., consulting firm, said.

Most observers agree that if the work group emphasis is on individual tasks such as spreadsheets and word processing with little requirement to access more regional or corporate data bases, then a low-speed micro network is fine. For high-speed data transmission, there are higher capacity networks available from 3Com and Ungermann-Bass, Inc., Santa Clara, Calif. Because these are still micro-based, however, some detractors point to their limited processing and storage capabilities, instead recommending networks that use minicomputers.

A big advantage of multiuser systems, however, is the handling of larger data processing tasks through the temporary cancelling of service to some or all of the users. It's impossible to do this with workstations or PCs connected over a local-area network.

Despite some drawbacks, local-area networks are often preferred over multiuser systems when low initial installation costs are a big factor or electronic mail is a major consideration. Local-area networks cannot usually provide as efficient electronic mail as a multiuser system using a centralized computer, although Bill Krause, president of 3Com, said this is becoming less of a factor with improvements in network servers.

A large part of the product expansion strategy of vendors of departmental computing systems involves voice. Datapoint, one of the first companies to apply minicomputers as file and application servers and local-area networks to departmental computing, is trying to regain market respectability with Minx, a workstation integrating voice and video messaging. "Minx is aimed at work groups where high degrees of personal interaction are required," Herron explained.

Voice Processor from Convergent Technologies has the ability to embed voice messages into documents, a feature, according to Brookwood, "appealing to the growing number of departmental professionals who are sharing secretaries and equating economy with improving productivity."

DG is slating its D555 voice/data workstation to be a key part of their Comprehensive Electronic Office (CEO) computing environment.

Beyond computer hardware there is the continuing movement underway to provide software application tools and training programs to departmental users.

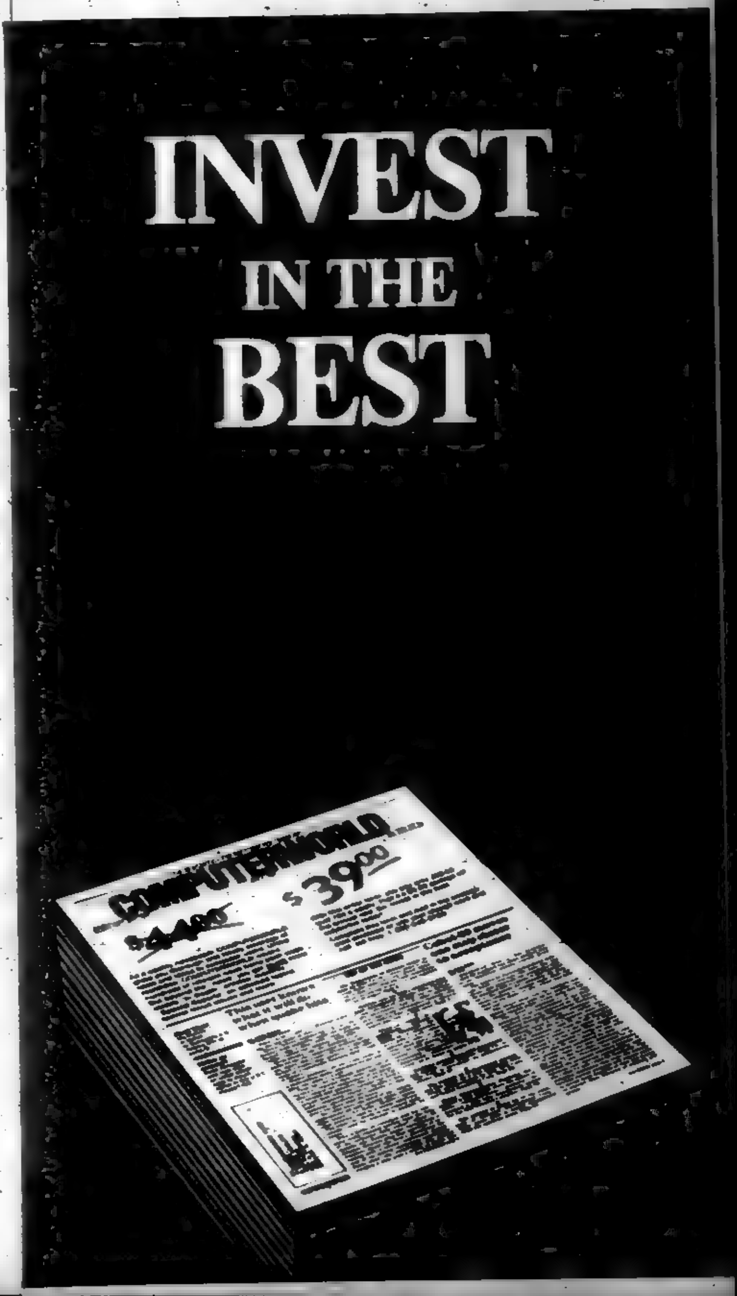
At Monsanto Polymer Products Co. in Saint Louis, Mo., for example, a consortium of the MIS department, sales personnel and some supervision from DEC support staff, used application tools within DEC's All-In-1 architecture to produce continually updated sales reports application software on a DEC VAX 780 minicomputer. According to Russ Sprague, director of commercial information systems at Monsanto, sales personnel use DEC VT 220 terminals at their homes to key in and access the updated sales data pertaining to their sales areas.

Sprague described the system as "highly menu-driven, requiring only a few keystrokes." Brought about as an experiment to circumvent the growing costs of maintaining separate regional sales offices, Sprague classifies the experiment as a success.

"MIS has too big a backlog of user requests, to be responsive," Williams said. "These software application tools are a way of departments to get around MIS."

Herron at Datapoint explained, "Almost all vendors offer a family of horizontal software and application tools for spreadsheets, word processing, data base management systems and so on. The real incentive is to provide tools to custom produce such things as data base query programs and report generation. I'm not talking about programming in Cobol, just the ability to put some power directly into the hands of the departmental user."

Kolodziej is a senior writer at Computerworld Focus.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Through The Plexiglass

ROB SAUNDERS

Have you ever felt that everything was topsy-turvy when you found yourself dealing with end user concerns? If so, join Alice as she ventures through the plexiglass into the confusing world of office automation.

By Keith A. Brown

From her cubicle in the computer room, Alice could see the business world, from time to time, through the plexiglass window where users would come to submit their jobs and their complaints. Endless streams of them would file by the pigeonholes and carry away the listings, lest they clog up the holes and spill on to the floor.

At times Alice imagined what it might be like to pass through the plexiglass window and explore the business world on her own. Then one day the project leader assigned Alice a project — to implement office automation.

Suddenly the plexiglass had gotten all soft and gauzelike, and Alice's hand could pass right through it. She soon discovered that she could pass her whole self through; she did so at once and jumped lightly down into the business world.

She began looking about and noticed that what could be seen from the computer room was quite common and uninteresting, but all the rest was as different as possible. They don't keep this room as tidy as the other, Alice thought.

There was a listing lying on the table near Alice. She leafed through it to find some part that she could read, for it all seemed to be in some strange language.

She puzzled over this for some time until a bright thought struck her. "Why, it's a user listing, of course, and they read upside down from normal. So if I turn it around, the words will all go the right way again." This was the poem that Alice read:

Jabbercopy

Twas binary, and the flippin bits
Did twiddle and toggle in the shop
All vacant were the terminal pits,
And the virtual space did swap.

"Beware the abend code, my son!
The jaws that byte, the claws that cache!
Beware the JCL error, and shun
The ominous system crash!"

He took his object deck in hand;
Long the intermittent foe he fought —
So he rested by the Dasd bank
And stood awhile in thought.

As in structured analysis he stood,
The abend with eyes of flame
Came crashing through the sysout wood,
And dumped core as it came.

Zero, one! Zero, one! Over and over
He zapped the code, hack and hack!
He left it dead, and with its head
He went compiling back.

"And hast thou slain the abend code?
Come to my arms, my technocrat!
Oh joyous day in decimal mode!
You found where the bug was at!"

"It seems very pretty, but it is rather hard to understand!" (You see she didn't like to confess, even to herself, that she couldn't make it out at all.) "The words are familiar, but all have different meanings. However, somebody killed something; that's clear.

"But oh!" Alice thought, suddenly jumping up, "If I don't make haste I shall have to go back through the plexiglass window without seeing the rest of the office. Let's have a look in the garden first."

She went a long way, but wherever the road divided, two fingers pointed the same way — one marked "To Tweedledee's house" and the other "To the house of Tweedlepee." "I do believe," Alice said at last, "that they live in the same house. I wonder why I never thought of that before?" She wandered on talking to herself until, upon rounding a sharp corner, she came upon two fat little men. They were standing beneath a tree, each with an arm around the other's neck. Alice knew which was which in a moment because one of them had Dee embroidered on his collar and the other had Pee. "I suppose they both have Tweedle round at the back of the collar," she said to herself.

They stood so still she quite forgot they were alive, and she was just going round to check if they had Tweedle on back of their collars when she was startled by the voice of the one marked Pee. "I know what you're thinking," Tweedlepee cried, "but it isn't so, nohow."

"Contrariwise," Tweedledee said, "If it was so, it might be, and if it were so, it would be; but as it isn't, it ain't. That's logic."

"I came," Alice began, "to automate your office."

"Sounds horrid! You keep away from me!" Tweedlepee shrieked.

"Oh, but it truly is lovely," Alice explained. "It makes your work ever so much better and easier. It could increase your productivity 100%, so that one of you could fire the other!"

"Here now! None of that if you please, young lady!" Tweedledee said indignantly. "We've no productivity to improve here because we do not produce. Neither do we attrish."

"We shall see," Alice continued. "First we must do a study and discover that the project is justified."

"No, no, no!" Tweedlepee protested. "You have begun all wrong. When you sell a service, the customer justifies it if he so chooses."

Tweedledee added, "When you buy fish and chips, does the vendor have to make sure you are hungry? It is, after all, our money paying for this drivel. You must tell us what it costs and of what use it is. If we decide it is worth the cost, we might buy it; otherwise, you may be on your way. So there!"

Alice was sure they were just being obstinate, but couldn't quite find the fault in their logic. If no rational reason could be found, she could always reference the standards. "The standards say we must do the cost benefit study," she stated sternly, "and find enough cost savings to cover the development."

"Balderdash!" Tweedlepee exclaimed. "Your standards don't bind me; they are your standards. You study the justification, but don't expect me to pay for it."

"And as for those cost savings," began Tweedledee, "That is ridiculous. Could not a project have any value of its own merit save displacing current costs? You could never justify anything new that way, only automation of the old. If we were in business to cut costs, we could just close up shop and be done with it. Anyway, it is time for our poetry recitation. "The Walrus and the Carpenter" is our longest. Care to hear it?"

The Walrus and the . . .

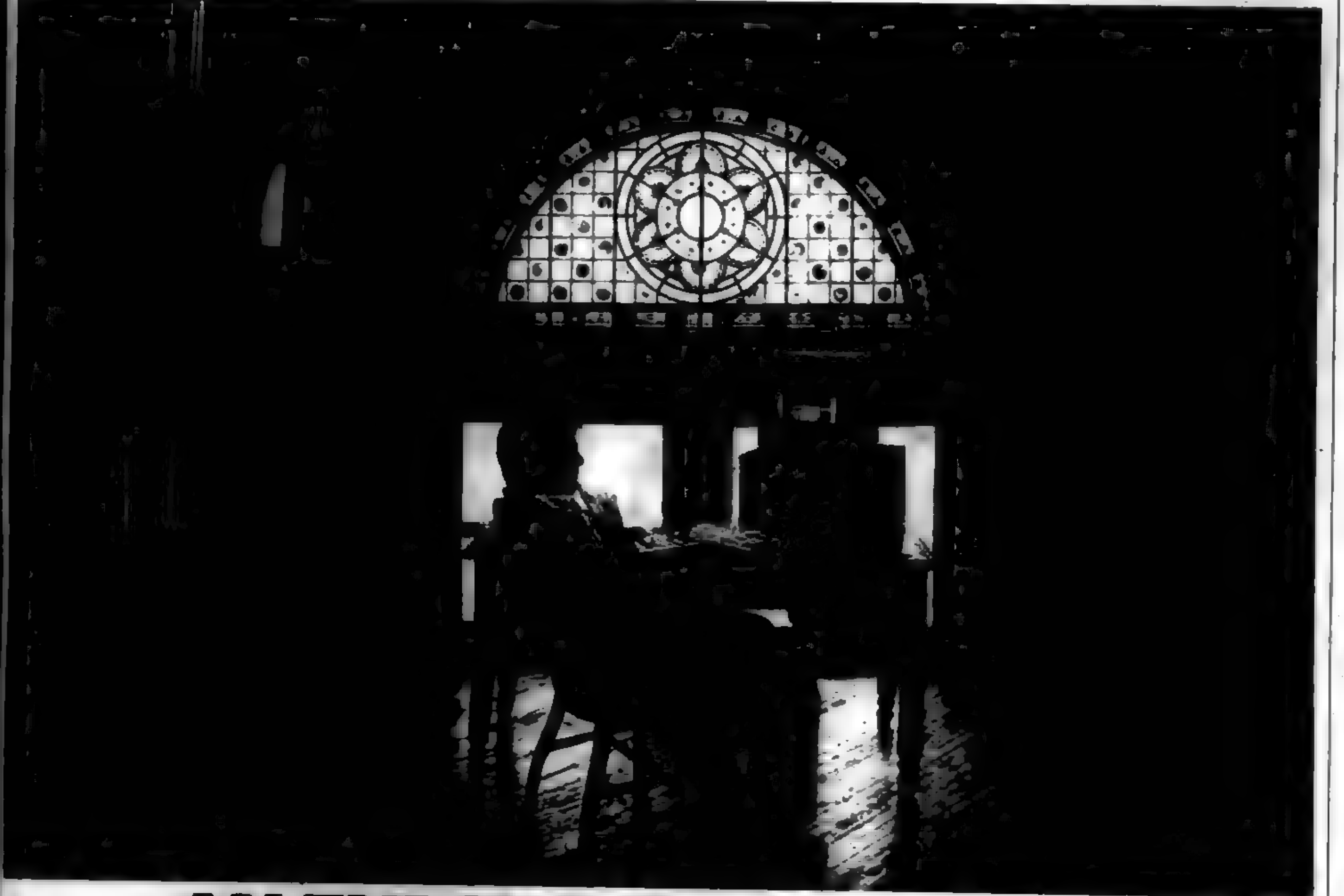
Here Alice ventured to interrupt him. "If it is very long," she said, "would you please first tell me which road . . ."

Tweedlepee smiled gently and began again.

The Walrus and the Carpenter
Took a walk way down the hall
They wept like anything to see
File cabinets along the wall
"If these were all on fiche," they said
"The stacks would be so small!"

"If seven clerks with seven cameras
Filmed till nineteen ninety-one
Do you suppose," the Walrus asked,
"That they could get it done?"
"I doubt it," said the Carpenter,
For schedule had he none.

The office phones were ringing loud
But not a message could one send
The papers, they swirled everywhere
Being blown from end to end



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• Query & Report Facility	Yes	VS Only	Limited
• Data Entry Facility	Yes	Limited	Yes
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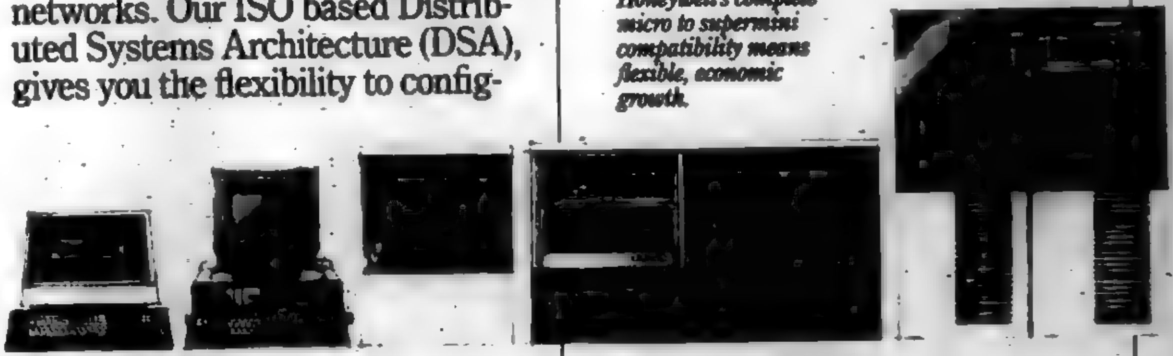

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And this was odd because, you see,
There wasn't any wind.
"The time has come," the Walrus said,
"To speak of office stuff,
Of phones and paper and typewriters
But that is not enough,
For how can desks be like computers?
And must using them be tough?"

"Electronic mail," the Walrus said,
"Is what we chiefly need:
Calendaring and text besides
Are very good indeed."
"But if no one sends me mail," he asked
"Then what am I to read?"

When Tweedlepee had finished, Alice politely excused herself and proceeded to the garden. A table was set under a tree in front of the house, and the March Hare and the Hatter were having tea at it. A Dormouse sat between them, fast asleep, and the other two used it as a cushion, resting their elbows on it and talking over its head. The table was large, but all three were crowded together at one corner and shouted, "No room! No room!" as Alice approached. "There is plenty of room," Alice said indignantly as she sat down in a large armchair at the end of the table.

"Have some sangria," the March Hare said. Alice looked all round the table, but there was nothing on it but tea. "I don't see any sangria," Alice said.

"There isn't any," said the March Hare. "Then it wasn't very civil of you to offer it," said Alice.

"It wasn't very civil of you to sit down without being invited," said the March Hare.

"We must finish up this tea party so we can get on with the plan," said the Hatter.

"What plan might that be?" inquired Alice.

"Why the plan for the tea party, of course."

"But it makes no sense to plan a tea party when it is over," commented Alice.

"Oh, is that so, Miss Smarty? I suppose you plan things before they happen? Just what would you include in such a plan without knowing how the affair was conducted?"

"Well," thought Alice. "I suppose you would select the date and time, the names of the guests, where each would sit and how much tea must be brewed. Things of that sort, you see."

"Then you must plan very poorly," observed the Hatter. "How could you possibly get any of that right before the party? Can you tell where guests will sit, or even who will come? We certainly had no idea you would come until you did, but now that you are here we can properly put you in the plan."

"No, no," explained Alice, "You simply decide on the guests and guess at the amount of tea. You ask each if they will attend and discuss seating and other details. Then you publish the whole affair in a Requirements Document and force the guests to attend and do what the plan requires of them."

The Hatter countered, "But they might not come, and they may not know how thirsty they will be on the day of the party. The only way to get the plan right is to have the party first."

"Wake the Dormouse and ask him," said the March Hare. Then the Hatter and the March Hare both poured hot tea on the Dormouse, who roused and complained bitterly. "Tell us," said the March Hare, "whether one should plan a party before or after the party occurs."

The Dormouse said sleepily, "Why both, of course. You make your best guess at the plan, then you prepare the party according to the plan. When your guesses prove wrong, you adjust the plan. As the party progresses, you alternately plan and party. When it's over, your plan matches your party and vice versa."

"Idiot!" cried the Hatter and the March Hare. "You couldn't decide which answer, so you picked both," said the Hatter. "No fair," said the March Hare.

At this point, the three of them filled their teacups. Alice noticed each had his own teapot. How wasteful, Alice thought. "You know," she said, "you could all share the same pot and save a lot of tea as well. That would greatly improve your teapot utilization."

The three of them gazed at Alice in disbelief. "My dear confused little girl," condescended the Hatter, "At a tea party, the purpose of a guest is to drink tea, is it not? Teapot utilization is a meaningless concept. The purpose of teapots is to improve our productivity in drinking the tea. Teapots are here to improve our productivity; we are not here to improve the productivity of teapots! That is called 'optimizing the wrong resource.' "

Why does this make such perfectly good sense with teapots, but back home it never works with terminals in the computer room, she wondered. "This office automation project is going to be a lot more work than I thought," she said. "Perhaps it's just the beginning of a new and better way of doing business. But if it is not a project and it is new, perhaps all the things I learned in the computer room will need rethinking. I'm sure some of the ideas are still valid, but — oh dear, my head is beginning to ache from all of this. I had best get back to the computer room. There is much work to do."

Alice proceeded back through the plexiglass window. She returned to her cubicle, opened her standards manual to Page 1 — "Beginning a Project" — and read Step 1: Complete a cost-justification form. Was it only a dream after all?

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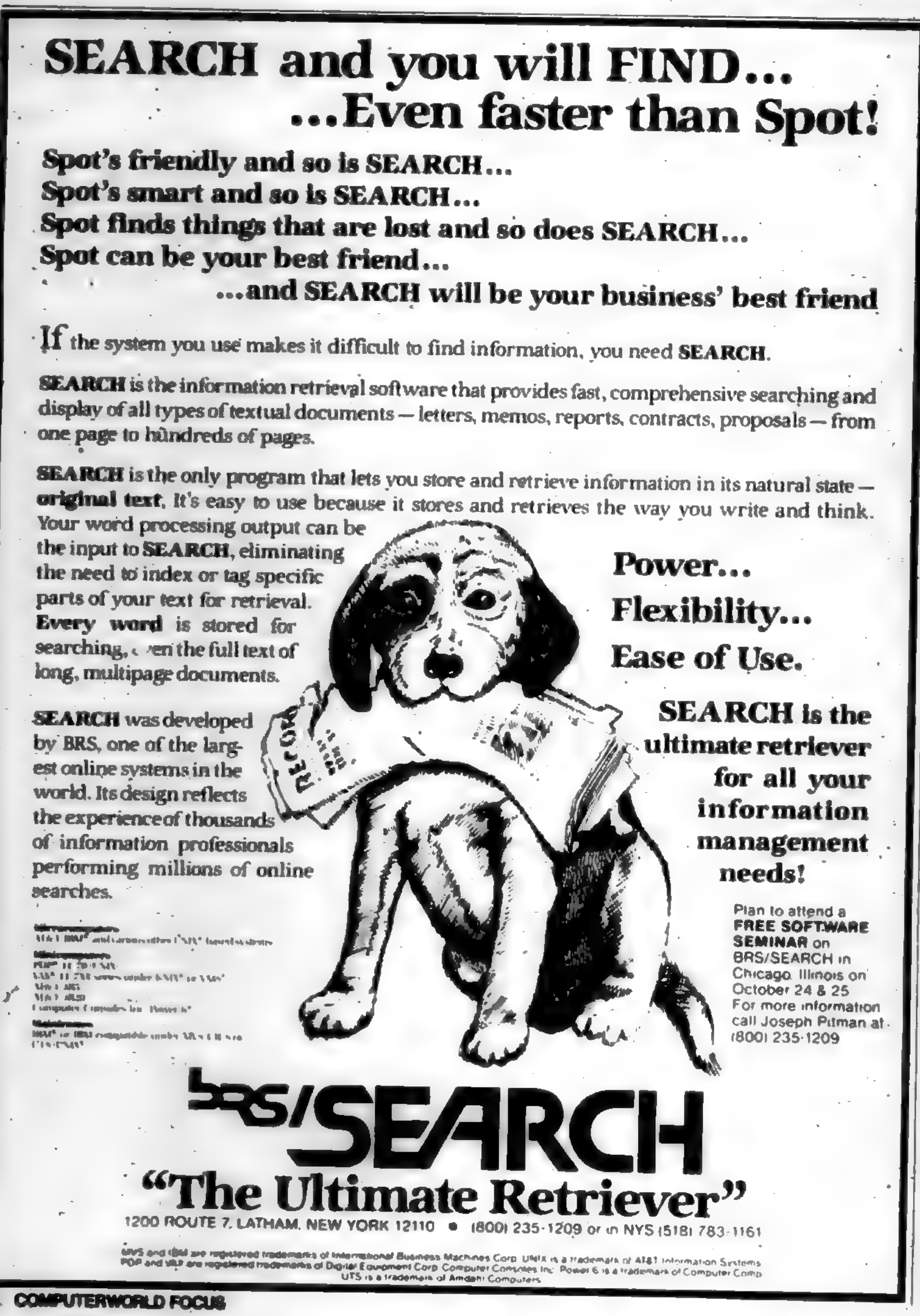
Brown is a consultant in the firm of R.R. Blackmarr & Associates, Inc., management consultants located in Dallas, Texas.



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STEVE HAEFELE

A developing technology on the office horizon is machines that recognize and transcribe speech. Read who the major players will be, when these new machines will appear and how they will change the office.

By John R. Vacca

Machines that transcribe speech already work in the laboratory — but don't fire the stenographers yet. How soon the machines will turn up in the office depends on the outcome of a nip-and-tuck race between the two leading technological contenders: IBM's Talkwriter (computer speech recognition system) and Kurzweil Applied Intelligence, Inc.'s Voicewriter (voice activated word processor).

IBM's experimental device was developed at IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y., and is one of the first talkwriters — machines that transform speech into text. It can understand more than 6,000 words — a small fraction of the more than 110,000 the average adult knows, but enough for composing routine business correspondence. IBM's experimental Talkwriter requires about $2 million of computing equipment — a large minicomputer and four auxiliary computers — to render an utterance into text.

The result of a 13-year development project estimated to have cost $16 million, IBM Talkwriter works in a radically different way from commercially available word recognizers. It operates entirely without templates; instead, it tests speech against two massive sets of statistics. One models the English language so that, given two words in a sentence, Talkwriter tries to predict which word in its 6,000-word vocabulary will come next.

Soon after IBM unveiled Talkwriter, Boston inventor Raymond Kurzweil, 36, of Kurzweil Applied Intellience, Waltham, Mass., called a press conference to present his machine — Voicewriter. He claims to have a long lead on IBM and plans to start production of a voicewriter with a 16,000-word vocabulary early next year. At an initial price of nearly $30,000, it is designed to be shared by several users.

Like IBM's system, Kurzweil's machine is designed to transcribe rapid dictation instantly, but requires users to pause briefly between words. It too must be trained to understand a speaker's pronunciation — a process Kurzweil says will take two or three hours in the finished product.

Talkwriters/voicewriters promise to make computers accessible to tens of millions of people who can't type and to speed the journey to paper of ideas now slowed by keyboards, pens and stenographers. Although it's too early to reliably forecast the potential, industry participants think the market for talkwriter/voicewriter machines could grow as quickly as the market for word processors (now over $3 billion a year).

Such machines also represent an important step toward computers that can converse with humans, along the stuff of science fiction. In fact, an episode of "Star Trek" called "Assignment: Earth" hinged on such a machine. Imagine speaking into a device that could translate your verbal pearls of wisdom, memos and letters into neatly typed text. The voice/talk-activated typewriter has been sought after since the mid-1940s. More properly termed a voice/talk-activated word processor, this powerful machine would rival even Mr. Spock's "Vulcan mind link."

IBM's Talkwriter: IBM scientists have actually created and demonstrated a prototype speech recognition system (Talkwriter) that can correctly recognize and transcribe speech from a large vocabulary almost as fast as the words are spoken. According to Tom Murphy, communications specialist at the Thomas J. Watson Research Center, "Spoken communication with computers has long been an industry goal, and some inroads have now been made: Limited recognition of human speech has even found its way into a few consumer and industrial products." It allows human voice input to create office documents such as letters and memos. It can recognize sentences composed from a 6,000-word business correspondence vocabulary and correctly identifies more than 96% of the words in these sentences.

In a demonstration with outsiders, IBM found the system performed better than they thought it would. Meant to understand only speakers who had enrolled their voices in its memory by reading it a 20-minute training text, the system was able to decipher the words of a stranger.

Based on its large vocabulary, high accuracy and real-time recognition of the spoken words, IBM scientists believe this is the most advanced speech recognition system yet developed. Designed to adapt to individuals, the system trains itself to recognize a person's voice by listening to the user read a brief standard text. The system requires a short pause between words during both training and dictation. A small microphone on the user's desk picks up the speech.

Once the system is trained, words, phrases and sentences appear on a workstation screen as the individual speaks.

The resulting letter or memo may be edited or amended by voice or keyboard.

The recognition technique is statistical. It functions by determining the degree of similarity between the speech and the words in its vocabulary as well as the probability that they would be used with other words in the sentence. Both pronunciation and context are considered so the system can distinguish between *to*, *do* and *through* because they are pronounced differently and between *to*, *too* and *two*, based on the surrounding words.

Words not stored in the vocabulary can be used in documents by spelling them out, and new words that will be frequently employed can be verbally added.

IBM's speech recognition system uses an innovative and unique statistical method to transform human speech into text.

"Our recognizer statistically models the essential speech processes involved," said Frederick Jelinek, who heads the IBM speech recognition group. "That includes the way the speaker pronounces words, puts words together to form sentences and details of the speaker's personal vocal characteristics.

"The system is not based on rules, nor does it attempt to imitate the way people create or recognize speech. It computes the probability that a given word will appear in a particular context based on an analysis of about 26 million words of office correspondence," Jelinek said.

Recognition begins by extracting a set of 20 measurements from the speech every one-hundredth of a second. The system compares each of these sets of measurements with 200 patterns (automatically tailored to the individual's voice during the 20-minute training session) and makes the appropriate matches. This labels the sound segments so they can be identified.

Next, the system examines the sound labels in this context (that is, their apparent relationship to each other at that instant). On this basis, it chooses several candidate words from its vocabulary.

As additional sounds are uttered, new word candidates are created and initial candidates are reevaluated in light of this new data. The number of candidates is thus narrowed until the most probable word sequence is selected.

If the spoken word is in the vocabulary, the system correctly chooses more than 95% of the time. If the word spoken is not in the vocabulary, it chooses one that is; it can be changed later with the system's editing features. Words not in the vocabulary can be added to the vocabulary while dictating.

The speech recognition computations are done by an IBM 4341 working with three Floating Point Systems array processors. An IBM Personal Computer handles communications, and other special-purpose hardware is used for document formatting.

Kurzweil Applied Intelligence's Voicewriter: According to Kurzweil, the Voicewriter project is already well past its essential software development breakpoint. "Speech Systems is ahead of schedule in development," he said. "The expert software modules have already been demonstrated in the lab. The custom VLSI chips have been designed. And we are currently working on the key hardware architecture."

At a recent demonstration, Kurzweil's guests were warned that the prototype being shown would identify words, not instantaneously as the final product is supposed to, but at the rate of one word every 2.5 minutes. They watched through the window of an acoustic isolation chamber as an engineer read a sentence that one of them had proposed.

Just as in IBM's demonstration, a nearby monitor gave an intriguing picture of what was going on inside Voicewriter. Voicewriter began by making a series of passes over sounds it had to decipher. The first pass established a list of word candidates that each subsequent pass refined. The word *controversy*, for example, showed up accompanied by *conspiracy*, *bankruptcy*, *embassy* and *New Jersey*, all of which Voicewriter thought less likely but still possible. At the end of this procedure, which lent drama to the two-minute wait between words, Voicewriter displayed its final choice on the main screen. It picked the right word every time. The sentence read, "Along with the increased attention has come increased controversy as to what constitutes an intelligent machine."

Unlike IBM's great statistical engine that subjects words to only two tests, the Kurzweil Voicewriter is a big bag of speech recognition tricks. The system applies more than a half-dozen programs to each word, comparing it in various ways with stored patterns and analyzing its role in the sentence being spoken. Some programs make predictions about the word even before it is said; others work on it during or after pronunciation. Kurzweil calls these testing programs "experts"; their work is coordinated by a master program called "expert manager," which weighs their results and resolves disputes. In the case of choosing between *tore* and *door*, for example, the expert manager would favor advice from the sentence structure program and ignore an acoustic program because short words are hard to differentiate by sound alone.

With so many complex programs operating simultaneously, Kurzweil's scheme requires more computation than IBM's. Voicewriter would be prohibitively expensive if it had to depend on ordinary computers. Kurzweil avoids this problem with arrays of custom-designed special-purpose chips. No one knows for sure what will happen when Kurzweil tries to speed the system up from two minutes per word to the 150 words per minute needed to take dictation.

The major software subsystems of Voicewriter include a language processor that applies grammatical and syntactical rules and the characteristic patterns of a speaker's voice to the task of inferring what a spoken word will be. Using that process, humans can narrow the possibilities down to around 60 words. Voicewriter can reduce the number of possibilities to around 600 out of a vocabulary of 11,000. Once the choice of possibilities has been narrowed down, the second major subsystem applies acoustical patterns to the 600 to determine precisely which one is being spoken.

Market analysts estimate a $6 billion market for voicewriters/talkwriters by 1990. A substantial percentage of that market — transcribing natural human speech — will be supplied by IBM and Kurzweil.

The acoustical subsystem has been the most difficult to create. English, a rich mongrel language bred of Trentons, Celts, Romans, Norman French and a dozen other peoples, has 11,000 syllables; compare that with a tidier spoken language like Japanese with only 130. (The Japanese, however, may have a more compelling need for a voicewriter system because their typists have to contend with some 3,300 characters.) Digitized wave forms of speech signals, changes in pitch, phonetic information, syllables and words — information at all these levels has to go into the recognition algorithms.

Kurzweil cited one simple example of the difficulties encountered in developing the acoustical subsystem: "The vocal tract goes through certain transformations to pronounce a vowel. Perhaps the speaker doesn't pronounce the vowel, but goes directly into pronouncing the following plosive. Voicewriter has to be able to deduce the presence of the vowel from the context of the voice preparation to pronounce it and the following plosive. Syntactical and grammatical constraints also have to be programmed into the system to resolve ambiguities."

Therefore, among the 25-member team of computer scientists, electrical engineers and human factors experts — speech scientists and linguists are especially important.

Kurzweil and his research team at Kurzweil Speech Systems are exceptionally reticent to discuss the technical details of their work — one of the reasons, no doubt, Kurzweil has managed to protect the exclusivity of his inventions.

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The future of IBM's talkwriter system will be assured through the continuous work of their speech recognition research team. Over the past 13 years, this team has performed a number of such experiments to determine what is technologically feasible in speech recognition. In doing so, these scientists are supplying answers to the first question of technology: What is possible? Their answers are creating a body of knowledge that will contribute to answering technology's further questions: How and when might such technology be best applied outside the laboratory?

The IBM team's future research goals in speech recognition include enlarging the vocabulary, increasing the system's accuracy, shortening the training period, making the system more impervious to extraneous noises and enabling the system to recognize continuous speech. "Our next objective is to enlarge the vocabulary and make the system even easier to use," Jelinek said: "Ultimately, we believe such a system might be able to recognize continuous speech without pauses. Our results so far convince us that this is a reasonable goal."

On the other hand, from a technical standpoint there is little doubt that Kurzweil's (IBM's counterpart) promise to produce a working voicewriter system by early 1986 has, for the most part, already been fulfilled. Whether or not the work of configuring a system within a practical cost range will be done by 1986 is not as clear. Kurzweil said the voicewriter system makes use of "large standard hardware subsystems that will help bring down the price." In addition, Kurzweil has also brought production, quality control and marketing experts into his company to supply manufacturing and sales strength.

According to Kurzweil, some 80% of all today's business text is created either by hand or by hunt-and-peck typing. The market for a workable voicewriter system is therefore enormous in terms of text production and editing alone. Data base retrieval, potentially a much larger applications area, is second. "That's the whole thrust of the fifth-generation computer project sponsored by Japan's Ministry of International Trade and Industry," Kurzweil said, "providing ease of access to computer-based information and computer tools to nontechnical personnel. Natural language processing and the voicewriter are two of the four pillars of the project along with supercomputers and artificial intelligence."

Kurzweil is already working on follow-on products to the first Voicewriter that will be announced in early 1986. One of them, he hopes, will be a voicewriter-based system to enable deaf people to use the telephone with complete freedom and flexibility. Anyone who knows anything about Kurzweil and his impossible machines will have very little doubt in mind that he'll not do it.

Therefore, even if IBM's or Kurzweil's system works, it will take a few years before such speech recognition systems can make communicating with a computer as easy as talking to a person. However, researchers are growing confident that they can solve whatever problems crop up — even though it could take 15 more years.

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Vacca is a free-lance contract writer and consultant in information management and security, based in Topeka, Kansas.

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Products

WESTBORO, Mass. — **Data General Corp.** recently announced the Dasher/One workstation, CEOwrite and a letter-quality printer.

Dasher/One is the first in a series of intelligent workstations that extends the functionality of its Comprehensive Electronic Office (CEO) to the MS-DOS environment, the vendor said. Dasher/One allows the user to implement specific business applications that run on the IBM Personal Computer, is fully compatible with DG's Eclipse/MV processors and, when used within a departmental cluster, enables users to share peripherals, applications and information, according to the vendor.

CEOwrite is a word processing package that runs on the Dasher/One workstation, the DG/One lapsize portable computer and the IBM PC. In addition, it is fully integrated with DG's CEO via the CEO Connection, a software link between Dasher/One, DG/One, IBM PC and Eclipse MV/Family computers. Rounding out this product line is a letter-quality printer that produces output at 20 char/sec.

The prices for this family of products are $2,100 for the 256K-byte memory, single diskette Dasher/One workstation, $395 for the CEOwrite software and $650 for the Model 4467 printer. For more information, Data General Corp., Information Systems Division, 4400 Computer Drive, Westboro, Mass. 01581.

LOWELL, Mass. — **Wang Laboratories, Inc.** Information Services Corp. (Wisc) has announced a text and data messaging service that enables companies with mobile employees or multiple locations to access information, according to the vendor. The new service, called Text and Data Messaging (TDM), includes a portable terminal and is available immediately for a basic monthly fee of $90 plus 35 cents/min of measured long-distance communications usage when access is gained through Wisc-provided Wats numbers.

The portable word processing, data entry, printing and communicating terminal, WP 600, includes the Wang Model 7000 modem, a snap-on Bell 103-compatible communications device that plugs into any standard RJ-11 phone jack. WP 600 weighs 6.4lb, has a 44-key typewriter keyboard, a 24-char. display and cursor controls.

While WP 600 and the Wang Model 7000 modem are included in the Wisc service, they can also be purchased directly from Wang for $549 ($525 for WP 600, $75 for the modem). Write to Wang Laboratories, Inc., 1 Industrial Ave., Lowell, Mass. 01851.

MERRIMACK, N.H. — External Document Exchange (EDE) with Distributed Office Support System (Disoss), a software product that exchanges revisable and final form documents stored in an IBM host library into revisable form WPS-Plus and DECdx VAX/VMS documents, was recently announced by **Digital Equipment Corp.** According to DEC, EDE with Disoss provides advanced Disoss interface capabilities conforming to Document Interchange Architecture/Document Content Architecture utilizing Logical Unit 6.2 (IBM's peer-to-peer communication capability).

The product allows users to search, retrieve, file, edit or delete documents residing in an IBM host document library. By integrating the IBM Displaywriter, 5520 Administrative System and 8100/Distributed Office Support Facility (DOSF) with DEC office systems, WPS-Plus and DECdx can access and edit documents created on IBM systems. In turn, documents created on DEC systems can be filed into an IBM Disoss data base for later access.

EDE with Disoss software is priced between $3,000 and $4,500 depending on the VAX system configuration and is available immediately.

More information is available from the vendor, Digital Equipment Corp., Maynard, Mass. 01754.

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Products

KING OF PRUSSIA, Pa. — Previously incompatible office systems from Wang Laboratories, Inc.; NBI, Inc.; Xerox Corp.; and other vendors can reportedly exchange notes, final form documents and revisable form documents with users of IBM Professional Office Systems (Profs) through an interface available from **Soft-Switch, Inc.** The Soft-Switch interface allows office systems to send and receive notes from Profs users without the users needing to know what office system the recipient uses or where it is located in the network.

The interface supports the following IBM systems: IBM Personal Computer, IBM Final Form Print Image, IBM DCF (Script), IBM Displaywriter, IBM Displaywrite 2 and 3, IBM 5520; IBM OS/6, and the 6640 and 6670 laser printers. It also supports the NBI Oasys 8 and 64, NBI 3000 and 4000, Wang OIS and VS, Xerox 850 and 860 and the Multimate system for the IBM PC.

The Soft-Switch product line is priced per module with a typical introductory system licensed for $49,000. The Profs interface is available immediately for $20,000 ($10,000 if the customer already has the required Soft-Switch final form generic print translator).

For more information, contact Soft-Switch, Inc. at 200 N. Warner Road, King of Prussia, Pa. 19406.

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DAYTON, Ohio — **Fox Research, Inc.** has introduced the Fox 10-Net RS-232 gateway and 10-Net RM Cobol Runtime, two networking products.

The RS-232 gateway allows remote IBM Personal Computers to dial-in and become part of the company's 10-net local-area network, according to the firm. The company added that the software works through a telephone and an asynchronous modem to allow remote IBM PCs and IBM compatibles to have the functionality of local-area network nodes.

RM Cobol Runtime allows Ryan/McFarland (RM) Cobol users to share files and lock records of common files with full concurrency control while operating on the Fox 10-Net local-area network, the company said.

The RS-232 gateway software is priced at $89.95 for the single IBM PC or IBM compatible link and $595 for the multiple local-area network version. RM Cobol Runtime, including software and documentation, is priced at $495.

For more information write to Fox Research, Inc. at 7005 Corporate Way, Dayton, Ohio 45459.

DANBURY, Conn. — **VM Personal Computing, Inc.** has released Relay Gold, its communications software package for the IBM Personal Computer, IBM compatibles, Data General Corp. DG/One personal computer and Wang Laboratories, Inc. personal computer.

Designed to link microcomputers to other micros as well as minicomputers and mainframes, the company said Relay Gold's features include multitasking, a new generation script language, full menu or command-driven operation, screen rollback, a learning mode and a tutorial disk.

The company added that binary, text and data files can be uploaded or downloaded to and from IBM mainframes using Relay/3270, VM Personal Computing's mainframe package. Relay Gold is priced at $225, Relay/3270 at $9,500.

Further information is available from VM Personal Computing, Inc., 6 Germantown Road, Danbury, Conn. 06810.

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Calendar

October 21-23, Boston — **Hammer Forum '85.** Contact: Hammer Forum, 5 Cambridge Center, Cambridge, Mass. 02142.

October 21-23, Washington, D.C. — **Controlling Software Projects: Management, Measurement and Estimate.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

October 23-25, New York — **Strategies for Office Automation.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

October 28-29, Eugene, Ore. — **Fourth Annual Pacific Northwest Computer Graphics Conference.** Contact: Conference Manager, University of Oregon Continuation Center, Atrium Building, Suite 333, 99 W. 10th Ave., Eugene, Ore. 97401.

October 28-30, Washington, D.C. — **Local Area Networks.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

October 28-30, Houston — **DPMA Houston '85.** Contact: Conference Manager, Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60060.

October 28-November 1, Toronto — **The James Martin Seminar.** Also, November 18-22, Atlanta. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

October 29-31, Washington, D.C. — **Federal Office Automation Conference.** Contact: Federal Office Automation Conference, P.O. Box N, Wayland, Mass. 01778.

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IBM fits CICS to VM/CMS/6

Intel sends 32-bit chips to vendors

By Clinton Wilder

Intel Corp. last week took the wraps off the initial entries in its much-heralded 32-bit product line, the 386 family.

Although mass production of the 80386 chip is not expected until late 1986 or early 1987, several vendors are expected to begin developing a new generation of computer hardware based on the Intel architecture. Representatives of a number of these commercial customers joined an Intel news conference in San Francisco last week.

Leading the parade of new Intel products was the 80386 microprocessor chip, the largest and most powerful ever made by Intel. Available now as a prototype to systems developers and expected to start shipping in volume in the second half of 1986, the 80386 contains processing power of 3 million to 4 million instructions per second.

Available in versions running at 12 or 16 MHz, the 80386 runs software compatible with all previous Intel microprocessors — the 8086, 8088, 80186 and 80286. The new chip supports simultaneous applications running on Microsoft Corp.'s MS-DOS or Xenix or on AT&T's Unix System V operating systems.

Representatives of several companies announced they have already made commitments to using the Intel chip in future product lines.

Conspicuously absent from the committed group was IBM. However, William Lowe, president of IBM's Entry Systems

Continued on page 4

IBM token-ring net bows; software prices boosted

Tariffs hiked on 1,100 packages; end-of-year profit relief expected

By John Gallant

ARMONK, N.Y. — Three days after confirming that its third-quarter profits were lower than those of a year earlier, IBM last week announced an average 10% price increase on more than 1,100 application and utility software packages for medium- and large-scale systems.

The price hike was the company's second major software pricing increase this year. In February, IBM increased by 7% the price of nearly all of its program products. With last Tuesday's increase, initial license charges and one-time charges for affected software rose by about 10%. Prices for program products supplied with a monthly license charge will increase by the same amount Feb. 1, 1986.

The price increase did not affect operating systems and many important systems software products such as DL/1, CICS or IMS. Analysts said that those products were spared because the cost of using them has already increased significantly over the past few years.

In its financial statement, IBM said that third-quarter profits were down 7% from those of the same period last year. For the quarter ended Sept. 30, IBM posted a $1.47 billion profit, compared with $1.58 billion in 1984. Revenue for the third quarter jumped by nearly 10%, from $10.66 billion in 1984 to $11.67 billion. Despite that rev-

Continued on page 7

Long-awaited network architecture connects micros, not mainframes

By John Dix

NEW YORK — The long-awaited debut of the IBM Token-Ring network played to a packed analysts' briefing last Tuesday morning and a standing-room-only press introduction that afternoon. But users and analysts were generally unimpressed with the network, which proved to be functionally similar to the previously available IBM PC Network.

The product followed along the lines of statements of direction issued by IBM more than a year ago, but as presented, it provides only for direct connection of Personal Computers.

IBM did not reveal any plans or timetables for connecting departmental computers to the network, but the company did provide gateways to the Series 1 processor and 370 mainframe hosts.

"This is a token-passing ring implementation of the PC Network," according to Dale Kutnick, an independent consultant in Wayland, Mass. "You can't do anything on this network that you could not have done on the PC Network."

Some users were expecting nothing more of the 4M bit/sec. network. "I'm not surprised that the Token-Ring is strictly for Personal Computers because IBM is losing a lot of network business to other technologies and firms," said William J. Johnson, director of telecommunications

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Service firms in parts blockade

Leading vendors take hard line on maintenance

By Clinton Wilder

For players in the fast-growing game of third-party computer maintenance, there is a major occupational hazard. In practices ranging from withholding discounts on spare parts to outrightly refusing to do business with third parties, many leading hardware vendors follow a hard line when it comes to competition against independent service firms.

Such policies can constitute a significant roadblock as the demand for third-party service grows, but most third-party vendors concede there is little they can do about the policies — except find creative ways around them.

Although some third-party vendors believe the practices unfairly infringe on users' rights to choose their own service providers, there is no trade regulation that compels hardware vendors to make parts, documentation or support materials available to their competitors in the maintenance field. "There are no specific laws that deal with this issue," according to Richard Donahue, an attorney with the U.S. Federal Trade Commission. "The unilateral refusal to deal in any commodity has always been allowed."

The only illegal situation would be collusion among vendors in jointly agreeing not to do business with third parties, which would violate antitrust laws, Donahue said. No third-party companies have alleged such collusion, and such a hypothetical charge would be extremely difficult to prove.

The notable exception to the rule is IBM, which is required by a 1956 consent decree negotiated with the U.S. Department of Justice to provide parts and documentation to any company that wants them. In addition to the obvious attraction of IBM's huge installed base, the mandated cooperation helps account for the vast majority of third-party service dollars going to the maintenance of Big Blue boxes and

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TOP OF THE NEWS

Paul M. Villiere, executive vice-president at AT&T's Network Systems Group, said during Info '85 last week that 1984 industry modem sales matched the total of all previous years' sales. He predicted that 1987 will be the year in which corporations make volume purchases of Integrated Services Digital Network products. AT&T plans to incorporate ISDN capabilities into the company's 5ESS switch next year. **For more on Info '85, see page 2.**

■

As expected, Applied Data Research Chairman and CEO John Bennett had to field some hard questions about the current snafu at the New Jersey Department of Motor Vehicles with ADR's Ideal fourth-generation language product [CW, Sept. 30] at last week's Alex Brown & Sons computer services investment seminar in Baltimore. At least Bennett hasn't lost his sense of humor about the whole mess. He repeated a quip currently making the software industry rounds that ADR may have finally found the answer to the current

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NEWSPAPER

Software vendors pulled heaviest Info show traffic

By Paul Korzeniowski

NEW YORK — The Information Management Exposition and Conference (Info '85) got off to a slow start on Columbus Day, but attendance picked up on the following days, despite a lack of new products.

On Tuesday morning, bus loads of data processing professionals from large New York companies like Chemical Bank and big Connecticut insurance companies like Aetna Insurance Co. were unloaded. Show aisles may not have been jammed, but booth personnel no longer had to read the paper to pass the time.

Few products were unveiled at the show (see story at right), but there was some action with voice-activated products. Data General Corp. announced voice/data capabilities for its Comprehensive Electronic Office (CEO) system. IBM also announced voice products last week (see story, page 4).

While several conference speakers commented that micro-to-mainframe links are still in their infancy, attendees were on the floor stalking the rare link.

Sara Levy of Citibank NA in New York hoped to find a way to download and upload data from her departmental IBM Personal Computers to the company's IBM 3033 and Digital Equipment Corp. VAX series machines.

Despite being hidden on the top floor of the New York Coliseum, software companies seemed to attract the most attention. Ansa Software, Inc.'s recently announced Paradox micro data base program attracted a long line of potential customers.

The range of attendees was broad, from relative novices to experienced data processing managers. For example, J. H. Pope, from the records management department at the National Center for Health Education, used the show to help determine what the company's first computer purchase would be. Pope was examining spreadsheet and word processing offerings that would run on IBM Personal Computer ATs.

Joseph J. Surdoval, applied technologies specialist at Finance America Corp. in Allentown, Pa., was interested in the latest personal computer offerings, including the IBM Token-Ring network and Ansa's Paradox.

Thomas Finnessey of the consulting firm of Urbach Kahn & Werlin PC of Albany, N.Y., said he was looking at personal computer networking products as a result of customer inquiries to his firm. "A lot of clients are expressing interest in networking," he said, so the firm is setting up a pilot network in its own offices to link personal computers and two IBM System/34s.

The broad range of attendees concerned some exhibitors. "At a show like this, we spend a lot of our time educating users," one vendor said. "At the vertical shows, we sell more products."

In recent years, attendance at some of the broad-based shows such as the National Computer Conference has slumped. This year's Info '85 drew 22,286 attendees in its first two days, up 6% from 1984, according to show organizers.

But Robert Weltzien, president of Softran Corp. in Brooklyn, N.Y., said Info '85 was a good place to "talk to all the people who are dipping their toes into the Unix world." Weltzien's company specializes in microcomputer software running on IBM microcomputer systems under Microsoft Corp.'s Xenix, a variation of AT&T's Unix. But following conversations with representatives of Sperry Corp. and other vendors offering AT&T Unix-based systems, Weltzien said Softran will move in the direction of porting its software to AT&T Unix System V-based systems.

Contributing to this report were Mid-Atlantic Correspondent Charles Babcock and Staff Writer Donna Raimondi.

SAS, SPSS use Info forum to unveil micro software

NEW YORK — There were few major product debuts at the Info '85 last week, but two traditionally mainframe-oriented companies announced micro software offerings.

■ Statistical modeling software vendor SAS Institute, Inc. of Cary, N.C., announced that its SAS/FSP software, previously sold for mainframes and minicomputers, is now available for the IBM Personal Computer family.

In another move to broaden its microcomputer software offerings, SAS announced that it will make a development tool, Version 6 of SAS/AF, available at the end of December.

SAS/FSP is a full screen interactive data entry, editing and letter-writing tool. The micro version will be fully compatible with the larger system version, and a user will be able to download data sets from SAS/FSP on a mainframe to a micro, according to James Goodnight of SAS Institute. The SAS system requires a micro with a hard disk and at least 512K bytes of random-access memory (RAM).

SAS/FSP Version 6 will be licensed on an annual basis with fees based on the number of workstations used. First-year fees for corporate customers with one to 50 workstations will be $2,000, with renewals available at lower rates.

SAS/AF will be licensed for $1,500 at sites with one to 50 workstations, he said.

■ SPSS, Inc. replaced its present microcomputer statistical analysis package with three expanded modules that require more main memory and a hard disk.

The three packages, replacing SPSS/PC, are SPSS/PC+, SPSS/PC+ Advanced Statistics and SPSS/PC+ Tables. The latter two programs cannot run without the first package.

SPSS/PC+'s file and data management capabilities include the ability to work with a number of file formats such as ASCII, Micropro International Corp.'s Wordstar and Lotus Development Corp.'s 1-2-3.

The package has data base management-like report writing capabilities and generates graphs. SPSS/PC+ Advanced Statistics' factor analysis capabilities can input correlation matrix, factor loading matrix or data files.

The third module works with stub and banner tabulations, multiple response data and presentation tables. SPSS/PC+ Tables supports descriptive statistics within tables such as means, medians, standard errors, sums and percentiles.

SPSS/PC+ represents the company's third release of its central microcomputer package. A number of new features have been incorporated into the program. A Review function supplies an on-line editor with a split screen so that users can edit jobs, compare output files and edit test data for reports.

The previous versions of the program supported only 64K bytes of RAM of work space for a file. The latest version supports work spaces of 256K bytes of RAM.

SPSS/PC+ requires an IBM Personal Computer XT or AT, 384K bytes of RAM, IBM's PC-DOS 2, 2M bytes of hard-disk storage, and the company recommends an Intel Corp. 8087 coprocessor. To run the additional modules, 448K bytes of RAM and 6M bytes of the hard-disk storage are needed, the vendor said.

SPSS/PC+ costs $785, and the other two modules each sell for $295. Current customers cannot upgrade from the current SPSS/PC to SPSS/PC+, but they will receive the new package if they buy one of the other two modules.

Each version of SPSS/PC+ includes Kermit, a public domain file transfer package from Columbia University. A mainframe version of Kermit is available for $250.

— Paul Korzeniowski and Charles Babcock

NEWS SUMMARY

Rounding out its Personal Computer line, IBM offered a series of voice and telephone management add-ons as well as an enhanced version of its Displaywrite 3 word processing package/4

IBM quietly unveiled a version of CICS that operates under VM/CMS and on the Personal Computer AT/370 and XT/370/6

Apple returned to profitability in the fourth quarter, stemming its yearly decline in earnings to a modest 4.4% drop compared with fiscal 1984/8

IBM's Token-Ring network supports only Personal Computers in its initial release and provides host links through gateways/11

Both AT&T and NCR reported increases in profits and revenue, but AT&T's results were below company expectations/13

The struggle for supremacy within the independent DBMS market continued as Computer Corporation of America unwrapped a release of its Model 204 relational DBMS/14

Prime will claim computer room powers in an office-environment computer with the announcement of a pair of systems/15

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We can't be everywhere — but our readers are — and we want to hear from you directly.

CORRECTIONS

The power of personal computer power conditioners [CW, Sept. 9] from Sola Electric Co., a unit of General Signal Corp., was incorrectly listed. The PCPC 150 handles 150 VA, and the PCPC 300 handles 300 VA.

The article "Boom times seen for DSS" [CW, Oct. 7] incorrectly reported that Comshare, Inc.'s System W decision support software had lost market share in 1984. System W, in fact, recorded a significant market gain during that period.

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From page 1

Intel sends 32-bit chips to vendors

Division, said in prepared remarks that, "While [the 80386's] use in an IBM [Personal Computer] product is not expected in the immediate future, we look forward to exploring its potential."

Among the committed customers are the following:

- McDonnell Aircraft Flight Simulation said it selected Intel's chip and Multibus II architectures as the basis for the development of an advanced aircraft flight simulator.
- Burroughs Corp. said it will use the 80386 in future workstations and network server systems.
- GCA Corp. Industrial Systems Group said it would use the 32-bit chip, Intel's Multibus I and Multibus II architectures as the basis for extending GCA's factory automation products.
- Sperry Corp. said it expected to deliver 386-based workstations in late 1986.
- AT&T announced that it would port its Unix System V operating system onto the microprocessor.
- Daisy Systems Corp. will use the microprocessor on its Physical Modeling Extension system.

Others that have made commitments to using the chip include Altos Computers Systems, Inc.; Convergent Technologies, Inc.; Grid Systems Corp.; and Wang Laboratories, Inc.

One company that was missing from the list of potential customers was Sun Microsystems, Inc., a rising star among workstation makers.

Sun now employs Motorola, Inc.'s 68020 chip in its Unix-based workstations. "We would wait for IBM to set a standard first before we did anything with it," Andreas Bechtolsheim, Sun's vice-president of technology, explained. Sun is also concerned about the lack of 32-bit floating-point processors. "Intel seems to be a year away from that," he said.

But, according to Intel, that technology could hit the market in six months. Through a joint marketing agreement with the Sunnyvale, Calif.-based Weitek Corp., Intel will develop and market a chip that provides an interface between the 386 and Weitek's 1164 and 1165 64-bit floating-point devices.

According to Intel, the 80386 chip features on-chip demand paging, memory management, self-test functions and software debugging. The 32-bit registers and data paths can support 32-bit, 16-bit or 8-bit addresses and data types.

The chip costs $299, down slightly from the initial $360 price of Intel's 8086 and 80286 chips when they were introduced. The 80386 offers superminicomputer-type performance at an approximate price of $75 per MIPS, according to David House, vice-president and general manager of Intel's Microcomputer Group.

William F. Zachmann, vice-president of International Data Corp. in Framingham, Mass., called the new Intel chip "a high-end, expensive product." He predicted the rumored IBM engineering workstation will still be based on the existing Intel 80286 chip. "Intel is a good company but has a history of late deliveries," Zachmann said. "I wouldn't expect a 386-based system until the second half of 1986."

> ”
>
> *'Intel has a history of late deliveries. I wouldn't expect a 386-based system until the second half of 1986.'*
>
> **— William F. Zachmann**
> **International Data Corp.**

With a maximum addressable memory of 4G bytes of main and 64 terabytes of virtual memory, the 80386 is targeted at the engineering, telecommunications and sophisticated office automation applications markets, House said.

Based on Intel's high-performance CMOS technology, the 80386 reportedly packs more than 275,000 transistors on the chip. A local bus provides a bandwidth of 32M bytes per sec.

Intel also announced two board-level products, the ISBC 386/20 Multibus I and 386/100 Multibus II; assembler and system utilities; and C and PL/M programming languages for the 386. The 80387 floating-point math coprocessor and other 386 software will be unveiled in 1986.

Contributing to this report were West Coast correspondents Maura McEnaney and Peggy Watt.

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Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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Phone, voice aids run on IBM micro

By Eric Bender

NEW YORK — A series of voice and telephone add-ons for the Personal Computer line were announced by IBM last week, along with an enhanced Displaywrite 3 word processing package that provides smoother document exchange with other IBM systems.

The Personal Computer Voice Communications Option, a $1,250 adapter card, supports voice recognition, voice storage, voice synthesis, telephone management and modem emulation functions. Combined with suitable software, the option permits users to operate application programs with voice commands or to set up micros as telephone answering machines.

The Telephone Access to Office Systems package, $250, allows users with a tone-generating phone and a Personal Computer XT or AT to access data in office applications that is output with voice synthesis.

"IBM decided to do something useful with voice" by creating links into an overall office system, and is likely to offer voice services elsewhere in its product line, said Tom Billadeau, president of TRB & Associates in Ogunquit, Maine.

Other software applications include the $99 Voice-Activated Keyboard Utility, which supports voice commands for applications; the $149 Voice/Phone Assistant, which lets the micro act as an advanced telephone answering machine; the $70 Personal Telephone Manager Program/Voice Communications Option, which automates telephone functions; and the $149 Augmented Phone Services package, which lets individuals with hearing or speech impairments communicate on the phone by typing their messages, which are converted to synthetic speech. A Voice Communications Application Program Interface Reference for programmers costs $149.

Compatible with the Personal Computer, Personal Computer XT and AT, most of these products are shipping now. Personal Telephone Manager Program/Voice Communications Option and Telephone Access to Office Systems will be available in December, while the Augmented Phone Services package will be offered next month.

IBM also is selling the Personal Telephone Manager program with another adapter card, providing phone directory and dialing features. The program and adapter cost $70 and $325, respectively, and are available immediately.

Displaywrite 3 Version 1.1 can automatically convert text to and from revisable-form and final-form text formats, IBM said. This will make document exchange simpler with other IBM machines, like the System/36, that support those Document Content Architecture formats.

Additionally, the new release supports the Proprinter, Model 2 Color Jetprinter and Model 2 Quietwriter Printer. The program costs $450, and Version 1 users may upgrade for $35.

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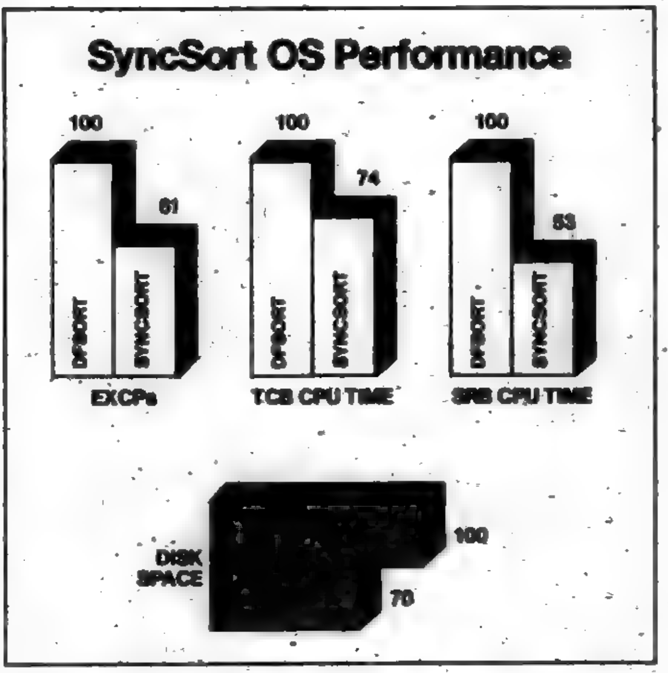

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IBM offers CICS teleprocessing monitor for VM/CMS

CICS/CMS version allows for leverage into CMS component

By John Gallant

Amid the din of local-area network pyrotechnics last week, IBM quietly introduced a version of its widely installed CICS teleprocessing monitor that allows users to develop CICS applications interactively under VM/CMS.

IBM's CICS/CMS was met with enthusiasm by analysts who said the product allows CICS applications programmers to leverage for the first time the development tools within the CMS component of the VM operating system. CICS/CMS also runs on the IBM Personal Computer AT/370 and XT/370 — a capability some observers said could transform those machines into useful development workstations.

According to Thomas Foth, a member of the senior technical staff of Adesse Corp., a Ridgefield, Conn.-based VM software house, CICS/CMS opens up a new development environment for CICS, which is the foundation for on-line applications in more than three quarters of all IBM mainframe shops.

"CMS is the perfect environment for developing CICS applications," he said. "It is highly isolated because it is in a virtual machine environment, and it is highly tuned for that type of work. Finally, you can exploit CMS for one of the most fundamental things people are doing — transaction-oriented applications development."

> 'CMS is the perfect environment for developing CICS applications.'
>
> — **Thomas Foth**
> **Adesse Corp.**

Previously, Foth said, users could not run CICS under VM/CMS without modifying the teleprocessing monitor. Some CICS users — a total of more than 16,000 at year-end 1984, according to market research firm International Data Corp. (IDC) — braved those unsupported modifications in order to use CMS for CICS development. But, Foth said, many were waiting for IBM to announce a supported product.

"This is an exciting announcement," Foth said. "But it is disappointing that it took so long for IBM to make it. It has been many years since the user community demonstrated that this could be done."

The debut of CICS/CMS gives yet another boost to VM, which rapidly is becoming one of IBM's most important software offerings. Already this year IBM has introduced an AT&T Unix system to run under VM, IX/370; an extended architecture VM offering; and an entry-level version, VM/Entry, for smaller machines. Analysts said that last week's announcement could spur an even faster growth in VM installations.

"IBM is moving more and more mainline programs into VM," said John King, executive director of the San Jose, Calif.-based James Martin Associates consulting firm. "This will continue to boost the popularity of VM, which may end up being IBM's answer for the future of all its systems."

Analysts said CICS/CMS — which allows a user to edit, translate, compile and test initially CICS command-level Cobol, PL/I and assembler applications under CMS — will significantly pare development time.

"The product should open up a quicker overall response in developing CICS applications," said Christopher Gruchawka, senior technical manager with the Bogota, N.J.-based CICS consulting and education firm Interactive Solutions, Inc. "It will also limit the impact of testing. Before, a bad test could bring down a whole CICS region. Now, the exposure will only be for the particular CMS user and not [for] all the users within a region."

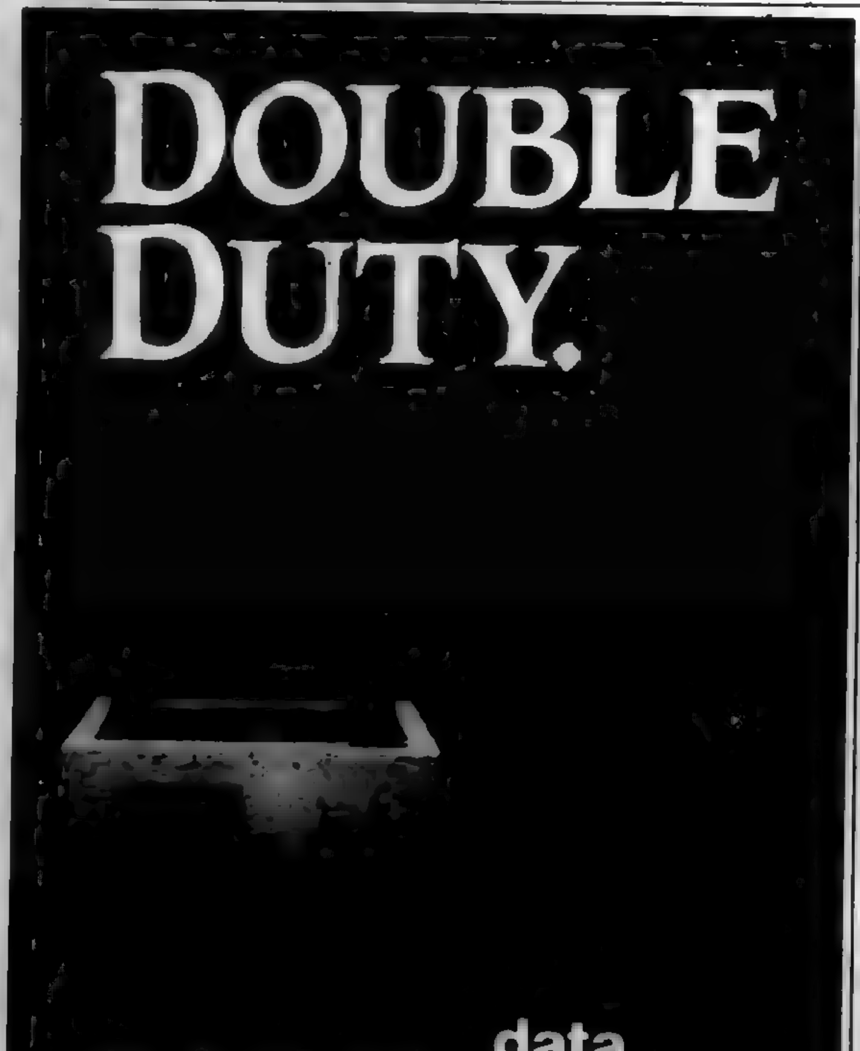
CICS/CMS offers interfaces to production data in other systems, such as the DL/1 and IMS data base management systems, and provides a pseudo-VSAM facility that allows a user to test VSAM file requests. Those capabilities and other testing tools make it simpler for a developer to put a CICS application through tests within CMS before it is ported to a production environment.

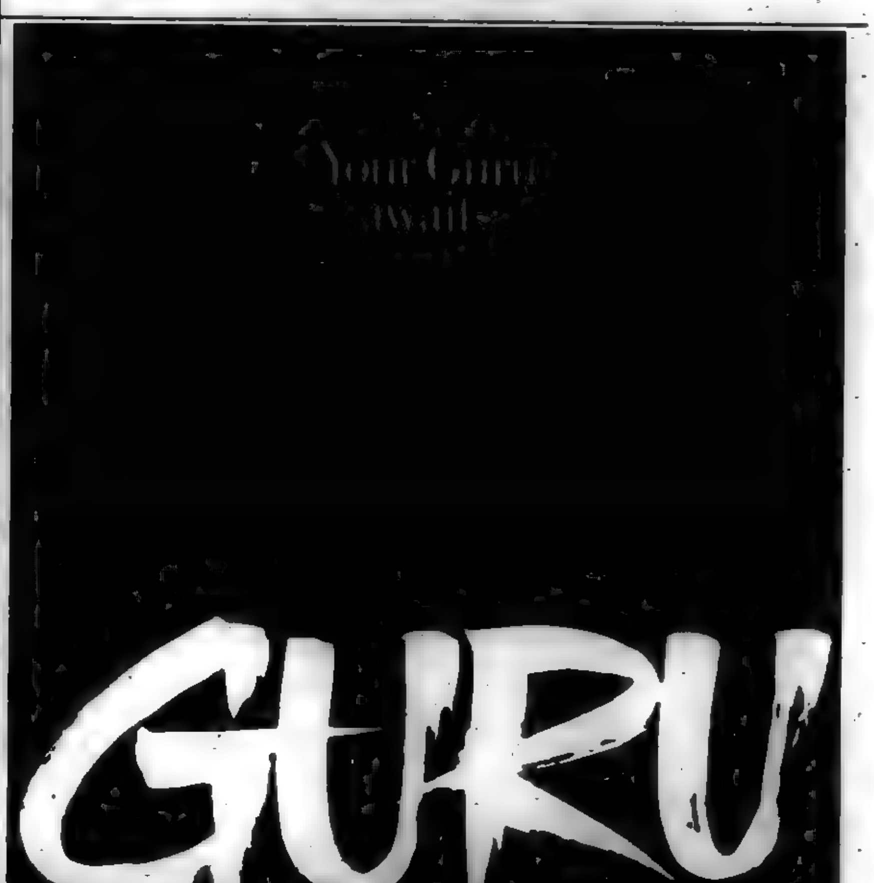
Perhaps more important for the future is that CICS/CMS runs on the Personal Computer AT/370 and XT/370. The current capabilities of those machines — CICS/CMS requires 20M bytes of fixed-disk storage — may limit their functionality as CICS development nodes, analysts said. And CICS/CMS' $15,000 price tag may seem too high for some potential workstation users. But IBM seems to have given the nod to the programmer workstation concept.

"This could be a very impressive workstation environment for developing CICS programs," said Ed Acly, a senior consultant with IDC's User Services group. "IBM seems to be giving a programmer a full environment for off-loading development from the mainframe. The workstation is a much more efficient approach to developing systems."

Foth agreed. "IBM seems to be saying it understands the importance of programming on [Personal Computers]. But it will have to improve those machines. If IBM could provide [its] VS Cobol II [compiler] and [CICS/CMS] on a more powerful system, you would have the dream workstation."

CICS/VMS is scheduled to be shipped in June at a monthly charge of $835 or at a one-time charge of $15,000.





From page 1

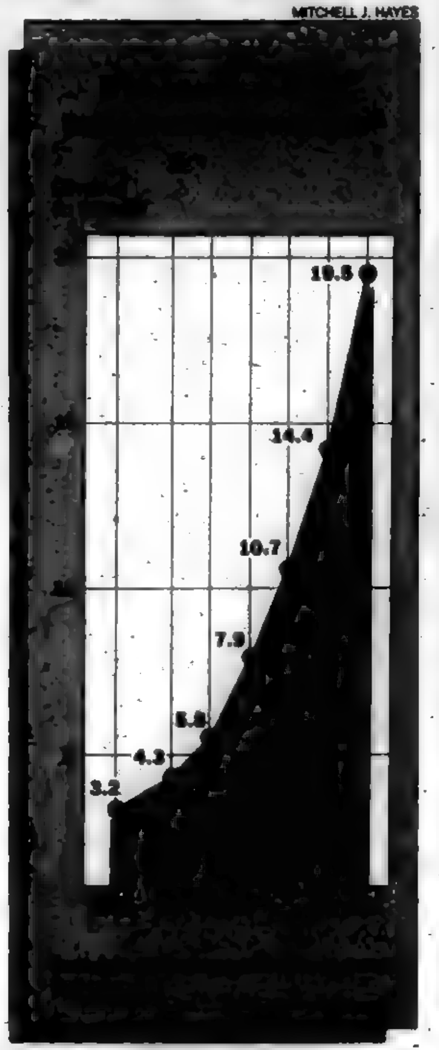
Tariffs hiked on 1,100 IBM packages

enue hike, which IBM attributed to a strong growth in orders for high-end processors and storage equipment, earnings per share fell by nearly 8% to $2.40 from $2.60 for the same period last year.

Weak dollar, slow shipments blamed

IBM blamed the weak dollar and slower than expected high-end processor shipments earlier in the year for a more than 12% year-to-date drop in profits from 1984. For the nine months ended Sept. 30, IBM posted a $3.87 billion profit, compared with $4.41 billion for the same nine-month period last year. That profit dip resulted in a 12.6% drop in earnings per share, from $7.22 for the same period in 1984 to $6.31. IBM's revenue for the year to date was $32.9 billion, representing less than a 5% increase over the $31.4 billion figure reached in the third quarter of 1984.

MITCHELL J. HAYES



Observers said the pricing move was aimed at brightening IBM's fourth-quarter financial picture.

A few industry analysts said the software cost increases announced in the wake of the financial results were simply part of a longer term upward trend in IBM software costs. But most observers agreed that the move was aimed more at brightening the fourth-quarter financial picture.

"This is exactly what IBM did at this time last year to boost its fourth-quarter earnings," said Bob Djurdjevic, computer industry analyst and president of Phoenix-based Annex Research.

'Legitimate costs, but they hurt'

According to Damian Rinaldi, director of the Software and Services Information Program at International Data Corp., the price hike will have a real impact on users. "I am sure IBM is passing on legitimate costs, but they hurt," he said. "A 10% hike over the life span of multiple products really increases the software bill for most users."

In addition to raising prices, IBM made 262 programs, formerly supplied only through monthly licenses, available for a one-time charge — in effect, offering them for sale rather than lease. While that option may serve to bolster fourth-quarter results immediately, Djurdjevic said, IBM may be mortgaging its future to pay for the present (see chart).

"IBM did this last year for a much smaller number of software products," he said. "I think that paved the way in large measure for the huge drop that IBM had in first-quarter 1985 earnings."

But Michael Geran, vice-president of research with E. F. Hutton & Co. in New York, disputed Djurdjevic's claim. "Over the last five years, IBM has increased the functionality and price of this labor-intensive product called software. This is just a continuation of that trend, and it has nothing to do with the fourth quarter," Geran said.

Analysts said software costs will continue to increase as that segment of IBM's business becomes an ever more important contributor to the company's bottom line. "This is clearly an extension of IBM's strategy to gain a more significant portion of its total revenue from software," Rinaldi said. "IBM has a solid lock on its customers. As much as you hear about software alternatives, the wind blows the way IBM says it does."

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Apple ends year on upturn, but Lotus profits decline

By Clinton Wilder

Apple Computer, Inc. returned to profitability in the fourth quarter ended Sept. 27, stemming its yearly decline in earnings to a modest 4.4% drop compared with fiscal 1984.

But Lotus Development Corp. reported a 30% drop in profits for its third quarter compared with the same period a year ago.

Apple ended the most tumultuous year in its history with a 27% revenue gain over fiscal 1984, with total revenue of $1.92 billion. Although profits dropped from $64 million, or $1.05 per share, to $61.2 million, or 99 cents per share, Apple President and Chief Executive Officer John Sculley was optimistic that the firm has turned the corner from its $17.2 million third-quarter loss.

"It's working," Sculley said of Apple's massive reorganization that cost 1,200 jobs and closed three plants. "These financial results offer the most compelling evidence possible that the steps we've taken to streamline the company are producing results faster than anyone thought possible last summer."

Sculley attributed Apple's respectable fourth-quarter sales to its traditionally strong markets — education and retail dealers.

Apple's revenue in the fourth quarter was $409.7 million, a 14.2% decline from $477.4 million in the year-earlier quarter but a significant rebound from its disastrous dip in sales to $375 million in the previous quarter ended in June.

Profits were $22.3 million, or 36 cents per share, down 27.4% from $30.8 million, or 50 cents per share, in the fourth quarter of 1984. A spokesman for Cupertino, Calif.-based Apple said the firm's 46% gross profit margin in the fourth quarter was its highest in nine quarters.

At Lotus, third-quarter earnings fell to $6.3 million, or 39 cents per share, from $9.1 million, or 57 cents per share, in the year-earlier quarter. Revenue grew 9%, from $45.6 million to $49.7 million.

Despite the drop in profits from second-quarter levels of $10.7 million, or 65 cents per share, Lotus President Jim P. Manzi said the company successfully contained expenses during the quarter. Third-quarter expenses were $29.6 million, compared with $30.4 million in the second quarter, he said. Revenue, however, fell 16% from $59.3 million in the quarter ended in June.

Manzi said that "expenses associated with major strategic initiatives" knocked down third-quarter earnings for the Cambridge, Mass., microcomputer software leader.

TOP OF THE NEWS

Continued from page 1

CPU capacity glut that has slowed the demand for new hardware. "The joke goes, 'Just buy Ideal; it'll eat up anything,' " Bennett said.

■

Software Publishing Corp. will combine two more pairs of programs from its PFS line of microcomputer software into single modules sometime next year. The successful Mountain View, Calif., vendor of low-end offerings for IBM and Apple Computer machines will combine its PFS:Graph business graphics with PFS:Plan spreadsheet and its PFS:File data base management system with PFS:Report generator. Software Publishing had previously announced its combination of word processing and spelling checker programs. "Our shelf space is getting squeezed," said President and CEO Fred Gibbons.

■

Even the recent multimillion-dollar acquisition of Informatics General has not satiated Sterling Software's appetite for new companies. Sterling will shortly add another banking software developer to its stable of traditionally smaller acquisitions, according to President Sterling L. Williams.

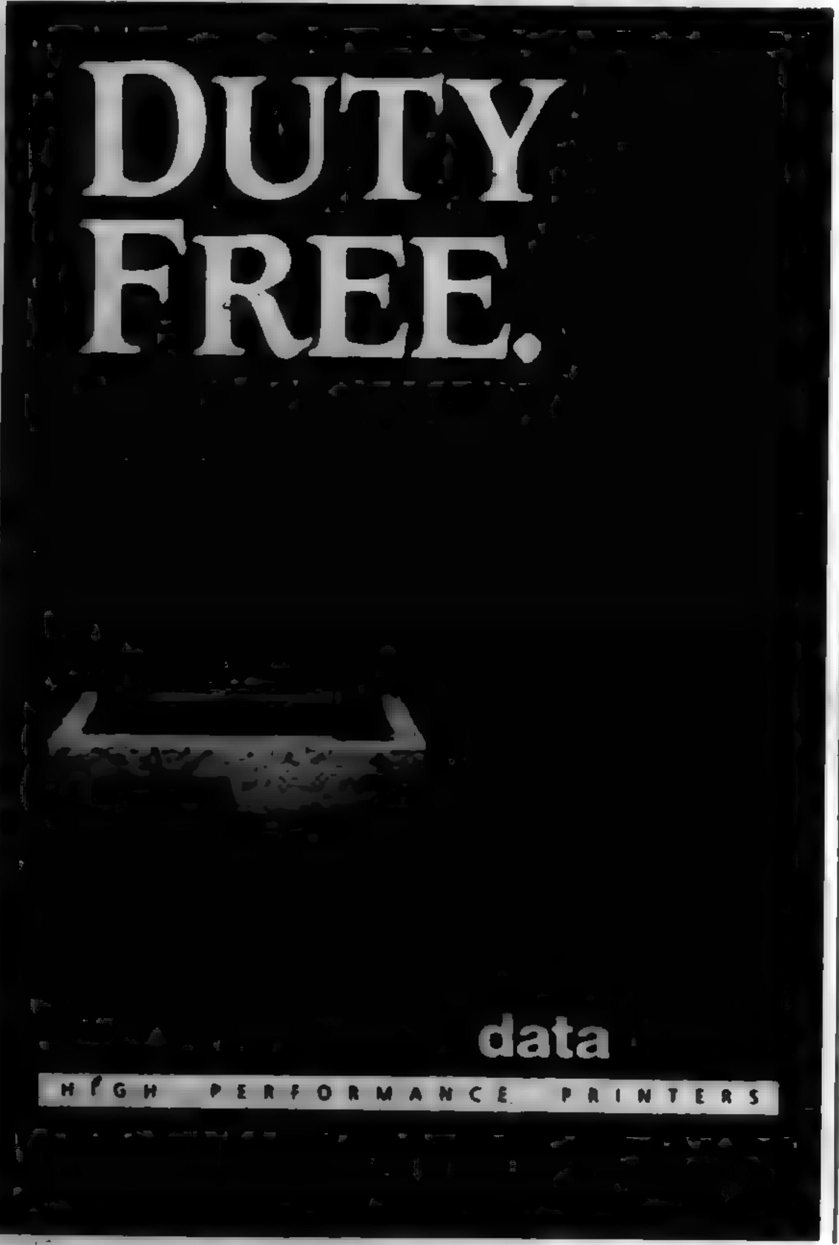
■

Don't look for products using the technology in the very near future, but researchers at MIT claim to have produced the smallest transistors ever made of silicon and, possibly, of any other semiconductor. The metal oxide semiconductor field effect transistor, or Mosfet, developed using X-ray lithography in the MIT Department of Electrical Engineering and Computer Science, features a channel length of 600 angstrom — about 2 millionths of an inch. According to MIT, the transistors now in commercial use are 17 times the size of the Mosfet.

During development work, the transistors displayed velocity overshoot — also called ballistic transport — where electrons move along a small channel length without colliding with the atoms of the semiconductor material. Velocity overshoot could mean a higher frequency of operation, according to MIT. The researchers have returned to work to reduce the amount of impurities in the transistors and raise the temperatures at which they operate.

■

Those looking for a little more insight into the future direction of IBM's Token-Ring network announced last week (see page 1), might find it this Wednesday morning when Bob Steen, manager of IBM's Systems Network, is scheduled to address the Localnet '85 show at the New York Hilton. Steen reportedly will discuss the actual product announcement and future developments.



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From page 1

Net architecture does not connect mainframes

and hardware planning for F. W. Woolworth Co. in New York.

Johnson said he does not think he would buy a Token-Ring just for Personal Computers. He said he needs to interconnect micros but with departmental devices like IBM System/36s and System/38s. "I don't think IBM has its act together on departmental clusters yet," he said.

Some users said they were disappointed that the Token-Ring did not offer direct host connection or a means to support 3270-type peripherals. One user who asked not to be identified, a senior systems consultant with a Massachusetts-based life insurance company, said the gateway approach used to tie the Token-Ring to the 370 world was inadequate. "Gateways don't support the speeds I need," he said.

Lack of terminal support is discouraging to many users. "We hoped they would address 3270 devices," said Albion Fitzgerald, senior technical consultant to a campus networking project at New York University. But timing is even more critical, Fitzgerald said, and the network's protracted gestation has forced the university to seek alternatives.

Fitzgerald said he believes the IBM network announcement is too late to affect the university's plans, but he applauded IBM's endorsement of a twisted-pair wire alternative for the Token-Ring and use in its Cabling System.

After testing its feasibility, the school was proceeding with plans to connect its IBM 3278 terminals to IBM 3274 controllers over twisted-pair wire. Now the university can do that with IBM's blessing and support.

Other users admitted they were treading water, waiting for IBM to make its network splash. "We've held off long-term acquisitions waiting for IBM, preferring monthly or yearly leases as opposed to long-term, three- to five-year leases," said James E. Buffington, communications specialist with Owens-Corning Fiberglas Corp. in Toledo, Ohio.

> ”
>
> *Users were disappointed that Token-Ring did not offer direct host connection or support for 3270-type peripherals.*

The network that some of these users were expecting may be a while in coming. "This product still does not satisfy the needs of IBM's mid- and large-scale system users — [its] main revenue source," claimed Eric Killorin, president of Hyatt Research Corp., a research and publishing company in Andover, Mass. "Its not enough to support just Personal Computers."

As released, the IBM Token-Ring does not even measure up to the microcomputer nets of some of the competition. The most glaring hole, according to consultant Kutnick, is the lack of a file-serving provision. "Everything on the network is owned by the individual," he said. "I have to give you authorization to have access to my files."

The open architecture of the Token-Ring may help to chink quickly these gaps. Indeed, it is the belief of Mark Stahlman, a research analyst with the Wall Street firm Sanford C. Bernstein and Co., that local networks are not a strategic priority for IBM.

"IBM is not going to pursue aggressively the local network business," Stahlman said. "Instead, it will attempt to build an industrywide standard around the token ring and rely on independent network suppliers to flesh out the product capabilities."

But bringing the Token-Ring into IBM's mainstream Systems Network Architecture (SNA) will be the mainframe maker's task, noted Dave Terrie, an independent network consultant in Boston. "IBM has the basic tools — Advanced Program to Program Communications and LU6.2 — but it still has to do a lot of software development before it can open the SNA portion of the network," Terrie said. "It's going to take a year before you see any significant software for an SNA Token-Ring."

On the positive side, Kutnick said the Token-Ring will be easy to implement. By the time it is ordered, delivered and installed, IBM will have likely announced more network products, such as a System/36 connection, the consultant predicted.

An unknown at this point is the fate of the IBM PC Network. This 2M bit/sec. broadband net is slightly less expensive than the Token-Ring and supports fewer devices, leading many analysts to predict that it will fade away.

"Once IBM sells its current PC Network inventory, I wouldn't be surprised to see the product dropped or at least repositioned," said Kim Myhre, director of communications industry research at International Data Corp. in Framingham, Mass.

On the day of the IBM net announcement, many of the major networking companies unveiled Token-Ring-compatible networks, including Ungermann-Bass, Inc. and Proteon, Inc. (see story below). Other firms, such as 3Com Corp., said they will develop compatible products.

Major IBM information processing competitors, such as Digital Equipment Corp. and Wang Laboratories, Inc., said they will wait to gauge user demand before they will decide whether or not to build gateway products between their networks and IBM's new offering.

■

Independents climb on token-ring bandwagon

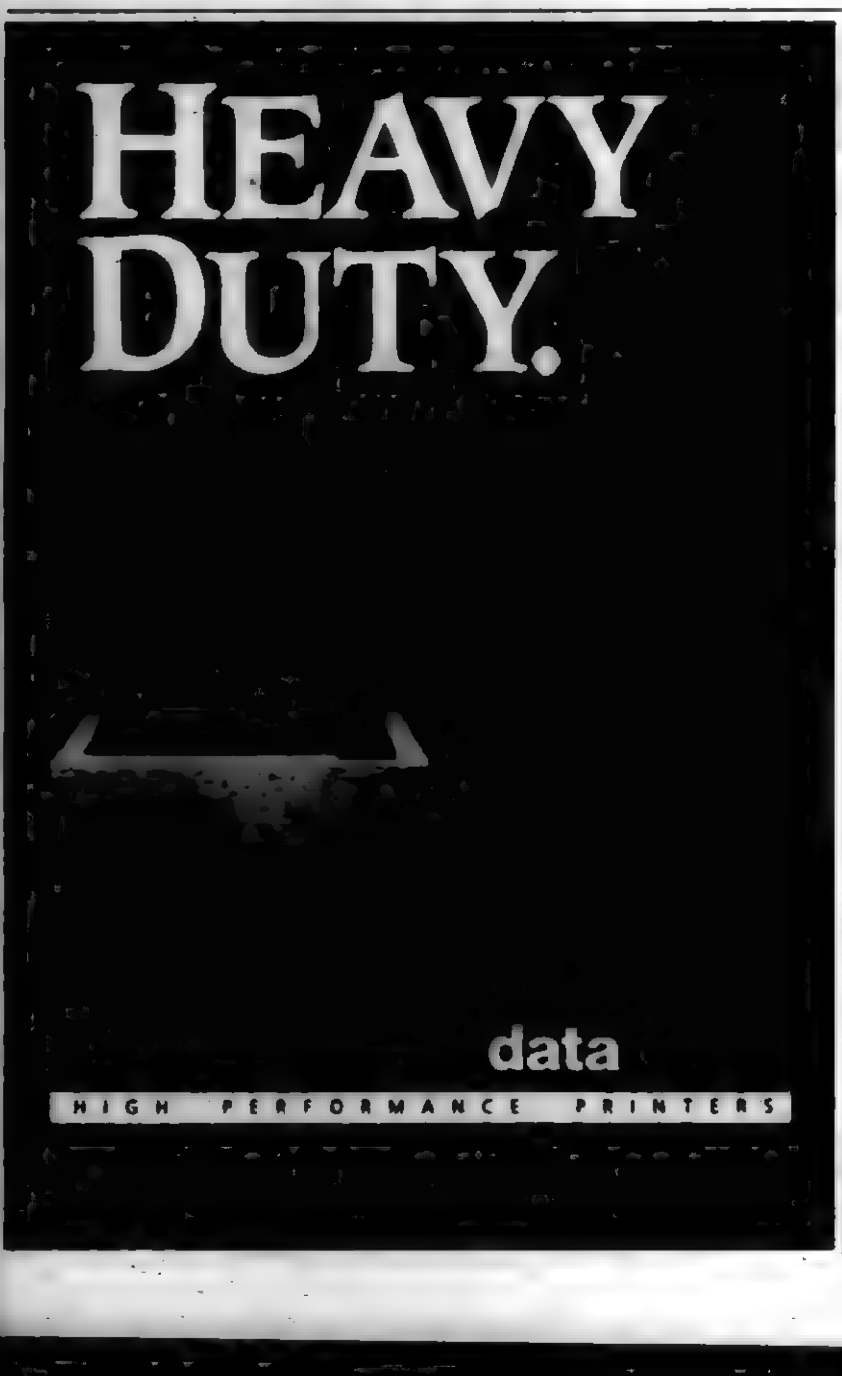
By Eric Bender

Independent local-area network vendors applauded the open-architecture approach of last week's token-ring network announcement by IBM and were quick to climb aboard the bandwagon. Many suppliers disclosed plans for compatible offerings in the first or second quarter of 1986.

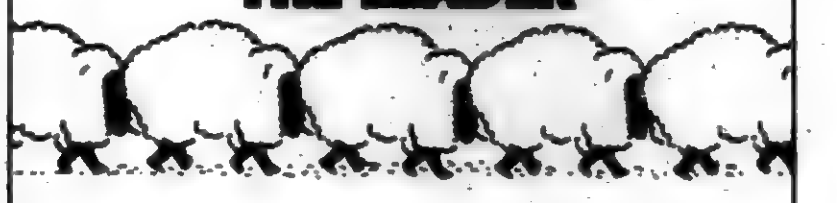
"This really is a watershed announcement — as important an announcement as the IBM [Personal Computer] itself," maintained William Krause, president of 3Com Corp. in Mountain View, Calif. He called the token ring "the cornerstone of IBM's future computing architecture" and said the introduction "removes the last cloud of uncertainty" hovering over IBM's networking plans.

Last week's move also drove home the need for multiple-network environments, Krause commented. "Customers had received the impression that they were going to solve their

Continued on page 11



WHY FOLLOWERS OFTEN LOSE SIGHT OF THE LEADER



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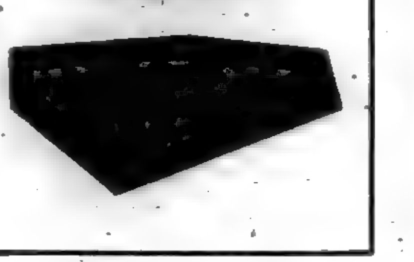

From page 10

Independents go to token rings

galactic networking problems with one global homogeneous corporate network," he said. "Now IBM has made it clear that there will be a lot of heterogeneous nets."

The Token-Ring will spark "a huge surge of interest" in networking, with third-party vendors helping to spread the standard, predicted Harry Saal, founder of Nestar Systems, Inc., of Palo Alto, Calif. Unlike the case with other Big Blue nets, IBM will give third-party vendors "every possible piece of information" on the Token-Ring, Saal said.

"IBM contacted significant network vendors some time ago and advised them of what they were doing in the token-ring area and solicited interest," remarked Herb Martin, executive vice-president at Corvus Systems, Inc. in San Jose, Calif. These vendors have been working on token-ring implementations for several months.

As did industry analysts, net suppliers commented on the current Token-Ring's missing pieces — particularly the lack of host attachments. They also took a few potshots at the IBM PC Network, suggesting that the availability of the Token-Ring will make the earlier network less attractive.

However, "the rumors of the death of the PC Network are vastly overstated," remarked Ken Biba, senior vice-president of Sytek, Inc. of Mountain View, which supplies PC Network cards to IBM.

Biba noted that IBM statements of ongoing commitment to the PC Network as a peer-to-peer work group net. He added that it can be expanded to support 1,000 units, as opposed to the 260-node limit of the Token-Ring.

Among the first independent net vendors announcing plans to support the Token-Ring were Bridge Communications, Inc. of Mountain View; Corvus; Nestar; Novell, Inc. of Orem, Utah; Proteon, Inc. of Natick, Mass.; 3Com; and Ungermann-Bass.

■

IBM ring net now runs only micros

By John Dix

NEW YORK — IBM's token-ring network unveiled last week supports only Personal Computers in its initial release and provides host links through gateways.

Unlike the previously available IBM PC Network, the new IBM Token-Ring Network is intended to be a general-purpose local network, fleshed out over time to support other IBM systems.

The IBM Token-Ring Network uses the IBM Cabling System wiring scheme. However, a twisted-pair wire option was announced to provide a less expensive cable alternative to the shielded wire previously offered.

Conforming to the IEEE 802.5 standard, the baseband Token-Ring is a 4M bit/sec. star-wired ring network that uses a token-passing access method. It supports up to 260 IBM Personal Computers, portables, XTs or ATs.

Hardware components of the IBM Token-Ring Network include a Network PC Adapter card and the Network Multistation Access Unit, an eight-port wire concentrator. The adapter cards are based on a token-handling chip set manufactured by IBM.

Personal Computers with adapter cards are linked to the Network Multistation Access Unit through the Cabling System. Although star-shaped, the network provides a logical ring. The token — a special message that gives the possessor the right to begin communications — revolves around the ring from a node to the access unit back out to the next node.

Required software includes the latest level of DOS. Like the PC Network, the Token-Ring supports IBM's Network Basic Input/Output System (Netbios) high-level programming interface. Applications written to Netbios can operate on either the PC Network or on the Token-Ring.

New with the Token-Ring is Advanced Program-to-Program Communications for the Personal Computer. This provides a Systems Network Architecture (SNA) LU6.2, PU2.1 applications program interface to the network.

Announced with the Token-Ring were two new gateway programs and Token-Ring versions of previously available gateways.

The IBM Token-Ring Network/IBM PC Network Interconnect Program is a software product that enables the two nets to be coupled. The program runs on a Personal Computer, which is dedicated to the gateway task. The program carries a one-time charge of $495.

IBM's Asynchronous Communications Server Program provides a gateway between the Token-Ring and/or PC Network and ASCII applications via switched, asychronous communications links. The program runs on a Personal Computer and supports two simultaneous dial-up lines per server. The server can be used to establish outbound calls to ASCII applications or field incoming calls, IBM reported. The program has a one-time charge of $495.

Capitalizing on gateway developments made available with the PC Network, IBM said the Series/1 PC Connect Program will be available for use with the Token-Ring in the second quarter of 1986. Another host link method is provided through the IBM PC Network SNA 3270 Emulation Program which has been tested on the IBM Token-Ring.

Prices for the Token-Ring Network, which is scheduled to be available in the first quarter of 1986, are $695 for the PC Adapter card and $660 for the Multistation Access Unit. With software an exemplary eight-station Token-Ring network would cost $820 per station.

IBM stressed the open architecture of the Token-Ring.

IBM Token-Ring-compatible adapter components are available from Texas Instruments, Inc. The TI TMS380 Token-Ring Local-Area Network adapter chip set is the result of a joint development program between TI and IBM, announced in 1982.

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From page 1

Third-party service firms in parts blockade

peripherals. Service on IBM hardware will account for 76% of the $170 million spent on third-party maintenance in the U.S. this year, according to Input, Inc., a Mountain View, Calif., market research firm.

IBM received generally high marks on cooperation levels from third-party service vendors contacted by *Computerworld*. "We have the same access to IBM parts as the IBM engineers do," said Brian Osborne, a marketing representative for Sentinel Computer Services, Inc. in Oak Brook, Ill. "We believe they think that we're good for them. We keep people with IBM by keeping their older IBM machines running. Then they'll go to IBM for new purchases, and that fits IBM's main goal — to sell."

In this sense the consent decree, ironically, may actually bolster IBM's dominance of the systems marketplace. With the proliferation of multivendor DP shops, users who wish to keep third-party service as an option could choose a hardware vendor that makes parts available to alternative service providers.

Without that option, "If your [hardware vendor] has maintenance problems, you're locked into them, and no one else will touch the machine," said John Barnhart, computer operations manager at Citytrust in Trumbull, Conn. "My whole thrust is availability, and I'm budget conscious. Third-party people offer good, competitive pricing. I would think [a vendor's refusal to cooperate with third parties] would be a drawback."

At the Anchor Savings Bank in Wayne, N.J., Vice-President Joel Talka insisted on the right to choose his own maintenance vendor in a recent contract for Docutel Corp. automated teller machines. TRW, Inc., Docutel's authorized service provider, "is good, but they're expensive," he said. "We just wanted to have that option, as we will with most of our future equipment, depending on the situation."

But Talka said he ran into a brick wall when he attempted to contract service on Anchor's Diebold, Inc. ATMs to Technical Support Services, Inc., an Ossining, N.Y., third-party provider that services Anchor's IBM 3600 and 4700 series machines and terminals. "We'd like a third party on the Diebold machines, but they basically refuse to do it," Talka said. "On terminals, we'd love to have a single third-party vendor. Every time IBM raises the price [of service], you're saving more money."

Diebold may be changing its tune, however. Technical Support Services' first inquiry in January about servicing Diebold machines received a reply from Diebold that stated, "We are not interested in doing business with competitors to our service business." But now, 10 months later, Technical Support Services and Diebold are working on an agreement whereby Technical Support Services will service a Diebold customer. The key to the change, according to Technical Support Executive Vice-President Douglas Press, was the initiative of the customer.

> *'Third-party people offer good, competitive pricing. I would think [a vendor's refusal to cooperate with third parties] would be a drawback.'*
>
> **— John Barnhart**
> **Citytrust**

"After several conversations, [a Diebold executive] said that if the Diebold customer sent a letter expressing its interest in [Technical Support service], they would cooperate," Press said. "It looks very promising right now. The key was the customer-generated letter. Customers [who want third-party service] have to get out there and exercise some freedom."

Technical Support Services President Tom McLaughlin said his customers have also expressed an interest in his company servicing NCR Corp. ATMs. But NCR responded in writing that it "did not have a program in place to sell ATM or financial terminal support material to third parties." A second inquiry received the response, "A business venture between our organization and [Technical Support Services] would need to result in satisfactory benefits for both organizations."

NCR "flat out refused in any shape or form to even consider developing a relationship on parts," McLaughlin said. "I think it's a restraint of trade. The customer owns the machines."

An NCR spokesman did not return phone calls seeking an explanation of the company's policy regarding third-party vendors. But a large bank user of NCR 279 Tower terminals said NCR's unwillingness to train Technical Support Services technicians prevented the bank's goal of a single third-party service provider for its terminals.

"Any time you could have one service vendor, that would be desirable," said Sam Triplett, vice-president of telecommunications for First Florida Bank in Tampa, Fla. "I wanted to obtain better service for the equipment — [about 200 NCR terminals] — and I've been very satisfied with [Technical Support Services] on our IBM terminals."

Chet Brown, manager of new ventures for the National Service Division of Xerox Corp. in Rochester, N.Y., said his company has had trouble getting parts from Wang Laboraties, Inc. and Hewlett-Packard Co.

"Most contracts enable the customer to procure parts and maintenance; it's a matter of how far the customer wants to push that clause and push the manufacturer to do it their way," Brown said. In one instance, Xerox was seeking a large contract to service all the systems of a multinational manufacturing firm, intending to consolidate its maintenance. Xerox offered to subcontract service of the HP systems back to HP's service division, but the minicomputer vendor declined.

"HP would unequivocally not cooperate in that regard," Brown said. "The customer could have leveraged his business [with HP] but chose not to push the conflict."

Mark Lee, manager of third-party programs and services for HP, said the Palo Alto, Calif., vendor provides service information only to its customers and authorized dealers. "We have a very good service organization that we feel is capable of servicing our installed base," he said. "Truthfully, there really doesn't seem to be that much of a market" for third-party maintenance of HP systems.

Cooperation levels can depend on

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many factors, including the evolution of a company's markets.

Business attitude not adopted

"In contrast to [Digital Equipment Corp. and Data General Corp.], we never adopted a business attitude to sell boxes to system integrators," said Don Fitch, director of business management for Wang's Customer Services Operation.

"Wang has always supported its own installed base. We consider our documentation, training and diagnostics proprietary and not available." Spare parts are available to third-party service firms, according to Fitch, at full list price.

Xerox's Brown noted that there are usually third-party sources of vendors' parts at discount but often not in quantities needed by third-party service companies. If a vendor will not offer documentation or training to service a particular system, there are sometimes third-party training organizations that will. "In most cases, it's a matter of legwork — doing the work to get around the lack of cooperation," Brown said.

'It's reinventing the wheel'

At Precision Methods, Inc. in Lorton, Va., members of the engineering department will sometimes teach themselves how to service a component on which the vendor has refused to provide diagnostic information. "To a degree, it's reinventing the wheel," said Ogden Thompson, marketing manager of the 12-year-old disk and storage maintenance firm. "It's trial and error and can be a long haul sometimes, but eventually we make it."

Like most third-party service firms contacted by CW, Thompson is resigned to the fact that hardware vendors will continue to vary widely in their levels of cooperation.

"I'm rather surprised when we don't run into it," he said. Cooperation "is like giving your competition a helping hand, so I can understand it. It's just part of the deal. You have to find a way to get the information that you need."

"If you don't have a supply source for parts or information, it is real difficult to do the job," said Bill Fedell, director of marketing communication for TRW's Customer Service Division, the largest third-party service provider in the U.S. "But it seems to us that when you put up that kind of barrier, there are inventive people capable of getting around it."

If the popularity of third-party service continues to grow, an increasing number of users may look at the availability of that maintenance option when choosing a hardware vendor.

"I would have to take that into consideration in my decision to buy," said Robert Smith, operations manager for the California Dental Service in Sacramento. Smith uses Sorbus, Inc. to service his IBM 3350 disk drives, 3420 tape drives and 3211 printers and IBM to service the organization's 3083, 4381 and 3725 processors.

"They've worked very well together," Smith said. "I came here from an ultraconservative, all-Big Blue insurance company, and I anticipated a potential problem but had none. This is the best of both worlds — good service and a lower premium."

CW News Director Peter Bartolik contributed to this story.

NCR, AT&T profits, increase for quarter

Both AT&T and NCR Corp. last week reported increases in profits and revenue for the quarter just ended, but AT&T's results were below company expectations and slack demand forced a writedown of older products.

AT&T's earnings gain came despite a $97 million writedown of the value of older inventoried consumer and business telephones. But a nonrecurring tax gain of $30 million was also taken during the quarter.

AT&T posted a profit of $378 million, or 33 cents per share, for the quarter, up from $317 million, or 28 cents per share, in the same period last year, the first year when the telecommunications giant was hampered by post-divestiture growing pains.

AT&T's revenue advanced to $8.93 billion from $8.01 billion in the year-earlier quarter.

AT&T below long-range goals

AT&T Chairman Charles L. Brown said the results were below the company's long-range financial goals. According to Brown, the demand for AT&T's older products had slackened considerably, necessitating the inventory writedown.

NCR Corp. last week reported that third-quarter revenue and profits were up 8% over figures from the year earlier period, with an increase in international operations more than offsetting a decline in domestic orders.

AT&T reported a 19% gain in profits on a 12% advance in revenue for the same period.

Dayton, Ohio-based NCR said revenue was a record high $1.04 billion for the quarter, up from $956.7 million a year earlier. Profits were $71.7 million, or 72 cents per share, compared with $66.3 million, or 65 cents per share, a year earlier.

The year-earlier figure does not reflect an extraordinary profit of $30.6 million, or 30 cents per share, that resulted from a change in tax law applying to profits on overseas sales.

The company said international orders showed very substantial gains in U.S. dollars but that U.S. orders declined from the record level set last year, reflecting a general softness in the marketplace.

— **Peter Bartolik and Clinton Wilder**

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CCA unwraps relational DBMS, productivity tools

Race for leadership in DBMS mart goes on

By John Gallant

CAMBRIDGE, Mass. — The struggle for supremacy within the independent data base management system market continued to heat up last week as Computer Corporation of America (CCA) unwrapped a new release of its Model 204 relational DBMS and an enhanced set of programmer productivity tools.

Just one month after rival Cincom Systems, Inc. released what it claimed is a completely new relational DBMS [CW Sept. 23], CCA made the first of several moves in a planned series of product unveilings designed to bolster its position in the independent IBM mainframe DBMS market.

According to International Data Corp. (IDC), a Framingham, Mass.-based market research firm, CCA's Model 204 is the fifth most widely installed independent DBMS on mainframes. IDC said Model 204 was installed at approximately 275 sites as of year-end 1984. A CCA spokeswoman claimed the year-end figure was higher — 325 sites — and said Model 204 is currently running at 450 user sites. By comparison, Cullinet Software, Inc.'s IDMS/R — the most widely used independent DBMS — had more than 1,200 installations at the year's end, according to IDC.

Many analysts lauded Model 204 as, technically, a superb product, which uses a so-called inverted file system architecture to support relational data management capabilities. But CCA was criticized for not offering a complete suite of productivity tools — an area of intense user concern — and for failing to promote the DBMS actively. Model 204 was developed in 1975 but was not made generally available until 1980.

Release 8.1 of Model 204 and Release 2 of CCA's Workshop/204 productivity tool package, combined with a new marketing strategy, are intended to make the company a stronger contender in the increasingly competitive DBMS market, according to Adam Rin, vice-president of product planning and development for CCA. The company was acquired last year by Toronto-based Crowntek, Inc., which made the company the base unit of its CCA Software Products Group. Since the beginning of 1985, Rin said, CCA's sales have increased by 60% over those of the previous year.

Rin said Release 8.1 of Model 204 enables users to access data stored in IBM VSAM files and to exploit the extended addressing space of IBM's MVS/XA.

In addition, Release 8.1 supports the enhanced release of CCA's User Language fourth-generation language, which is a component of the Workshop/204 package. User Language has been upgraded to allow for structured programming. He said Release 8.1 improves Model 204's performance, productivity and flexibility.

There were four major enhancements in Release 2 of Workshop/204, which includes User Language, a data base definition facility, an automatic screen and program generator, a screen painter, an editor, a query update facility for prototyping and a symbolic debugger.

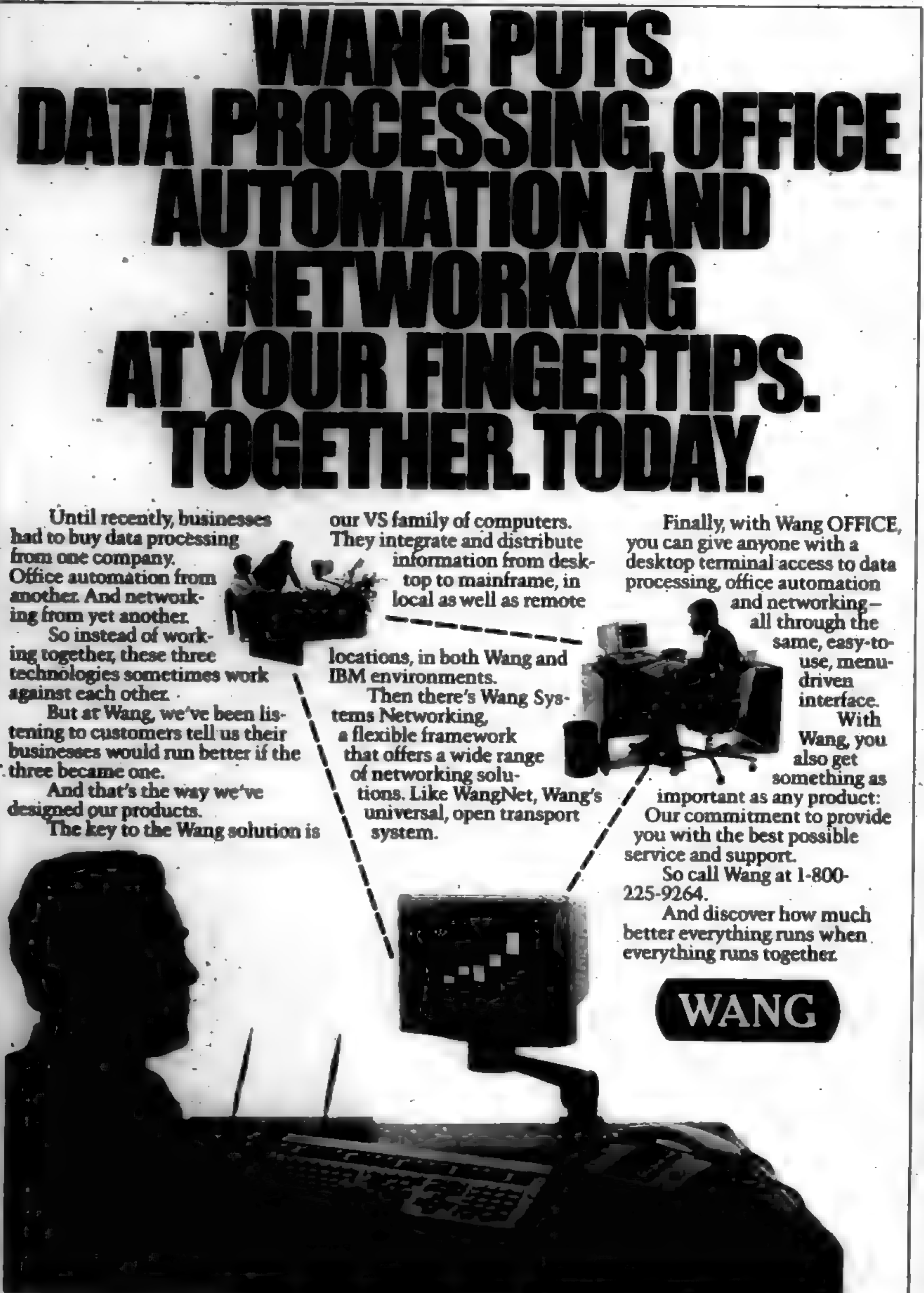
Those enhancements included the following:

- ■ User Language now offers block structures, enabling developers to write modular, structured programs. The fourth-generation language also provides access to VSAM and sequential data sets so applications can use data outside Model 204.
- ■ Workshop/204 now supports automatic generation of screen and source code once a view has been defined to the data dictionary. Through this enhancement, Workshop/204 can be used to generate screen definitions and programs for the addition, deletion, updating and display of records.
- ■ Workshop/204's file management facility now enables developers to define file and field entities to Dictionary, CCA's active data dictionary product, using a form interface. (This capability is supported by the newly upgraded Release 3 of Dictionary, which CCA also unveiled last week.) The file management facility optionally synchronizes Dictionary with the data base files in real time.
- ■ A test facility has been added to Workshop/204 that enables applications to be run in test mode for symbolic, interactive debugging. The facility provides access to data and programs for interactive modification during the test.

In addition, Rin said, in November CCA will introduce an IBM Personal Computer version of Workshop/204 that will enable programmers to use the micro to develop, edit and perform syntax and error checking on mainframe programs that can then be uploaded to a host for testing and execution.

The product will enable users to download host programs for modification on the microcomputer.

Release 8.1 of Model 204 is being shipped now at a cost of between $150,000 and $200,000, depending on host operating system. Release 2 of Workshop/204 will be available in December priced between $100,000 and $125,000.



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Prime adds power with replacements of 2550, 9650

By James Connolly

NATICK, Mass. — With claims that it is moving the power of its computer room systems into the office environment, Prime Computer, Inc. today is set to announce replacements for its 2550 and 9650 superminicomputers.

The announcement of the 2655, designed for use in an office environment, and the 9655, a computer room version of the 2655, is an apparent attempt to improve Prime's price:workstation ratio in the computer-aided design and manufacturing (CAD/CAM) market and to aid the latest Prime drive into the office automation market.

Compared with their predecessors, the 2655 and 9655 are said to offer 10% to 50% improvements in performance while costing the same as and occupying the same two 30- by 21- by 31-in. cabinets as the older machines did. Company officials said the performance was accomplished with high-speed logic elements and a two-stage pipeline design.

A spokesman estimated the processor speed for the new systems was 1.3 million instructions per second (MIPS) for each, compared with 0.85 MIPS for their predecessors. The systems, which fit into the middle range of Prime's product line, also are said to have 50% faster CPU speeds in engineering applications and to provide 10% to 20% performance gains as full systems in engineering and commercial data processing markets. The systems, with up to 4M bytes of random-access memory (RAM), also allow for twice the main memory of their predecessors, using 256K-byte RAM chips instead of 64K-byte chips.

Prime also said that while the older systems supported four CAD/CAM users, the new systems will support six users; and while the 2550 and 9650 supported about 30 general-purpose computer users, the new systems handle 64 users. The 2655 and 9655 match the speed of Digital Equipment Corp.'s VAX-11/780, while exceeding the multiuser performance of DEC's office environment Microvax II, Prime said.

Slow in introducing OA software?

One superminicomputer market analyst observed that Prime has been slow in introducing OA software in a tight office market. A company spokesman noted the announcement was made only two weeks after Prime introduced its Information Connection integrated word processing, spreadsheet and business graphics package. However, software to upgrade Prime terminals to IBM Personal Computer XT-compatible micros and software to support personal computer-to-host file transfers are still in the test stage.

An existing 2550 or 9650 can be upgraded to a 2655 or 9655, respectively, through a board swap for $22,000, Prime said. The I/O controllers, peripherals and software in the 2550 are compatible with the 2655.

Available now, a typical 2655 configuration includes a processor with 4M bytes of main memory, a 315M-byte Winchester disk, a streaming tape drive, a console and Prime's Primos operating system. That configuration costs $99,200. A spokesman said two additional 315M-byte drives can be added in a third cabinet without increasing the office noise level.

In another announcement scheduled for today, Prime is expected to announce an agreement for 3M Corp. to package the 2655 with 3M software and peripherals as a document retrieval sytem.

MSA may lose $3.5 million

Quarterly loss lower than anticipated

By James A. Martin

ATLANTA — Management Science America, Inc. (MSA) said last week it expects a third-quarter net loss of $3.5 million, or 20 cents per share, compared with the $10 million to $12 million loss the company had earlier projected.

Losses were less than previously announced as a result of additional contracts closed during the reporting period's final days and lower expenses than expected, the company said.

Operating revenue for the period ended Sept. 30 was $30.9 million, up 8% from $28.5 million for the 1984 third quarter.

Expenses were $38.5 million, up from $34.5 million in the 1985 second quarter as a result of increased advertising and marketing efforts in anticipation of the normally strong fourth quarter.

The company had an overall loss for the third quarter of a year ago of $1.8 million as a result of $713,000 in income from continuing operations and $2.5 million in losses from discontinued operations.

Although fiscal year 1985 earnings are expected to be significantly less than the 77 cents per share that MSA earned from continuing operations the year before, the company said it expects to post an overall profit for the year.

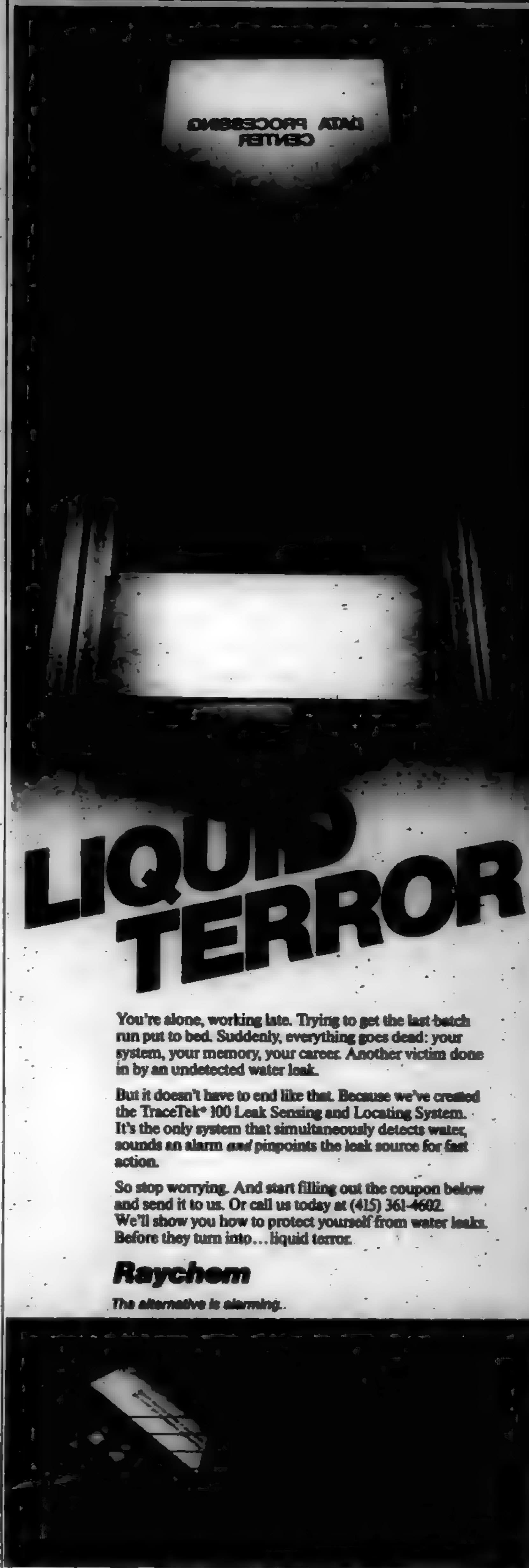
Slowdown in customer spending

Earnings have declined below forecasts owing to a slowdown in customer spending in a weakening economy, the company said.

MSA's third-quarter losses were indicative of an industry slump that "will take some time [for MSA] to work out of," according to Kenneth Burke, an analyst with Alex Brown and Sons Research, a Baltimore investment firm.

He added that he would be very surprised if MSA did not show a profit for 1985 at year's end but added that earnings per share could be as low as 40 to 50 cents.

MSA's cash and investments in the third quarter were $92.5 million.



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VIEWPOINT

EDITORIAL

The token passes, reactions begin

The two loudest reactions to IBM's announcement of a token-ring network last week were that it was 1) too little and 2) too late. Given that IBM is no doubt preoccupied with whatever next week's announcement will be, we will volunteer to rebut these reactions.

Too little? Only because the token-ring architecture introduced last week is so limited in today's terms, in the context of long pent-up industry and user hopes, and because the token ring does little more than its PC Network brother. Forget this, and look at the promise. Given its track record with products such as Systems Network Architecture (originally its *single* network architecture), IBM can be expected to flesh out the token-ring architecture and, over time, produce what will likely become the best and most widely used computer network.

Too late? Yes, for some users who can no longer wait until next year's projected delivery date for the token-ring product. But not late from IBM's perspective — and this is IBM's ball game, after all. Nor was it late for the third-party network vendors who last week began jumping on the token-ring bandwagon en masse. Confidentially, we expect to see IBM's holdout competitors scurrying for that very bandwagon in the near future.

Trade, politics and a dose of reality

One sure way to tell when politicians are running for cover is to note the degree to which references to "philosophical views" and "profound beliefs" increase in news reports. You can see it happening now, with communiques from Capitol Hill reporting on erstwhile free traders seeking the snug haven of protectionism. All because of a profound shift in political philosophy, of course.

The current trade debate has no more to do with philosophy than does deciding where to go to lunch. It is a matter of economic reality that translates quickly into political reality.

Far be it from us to delve into the complexities of international trade and propose the perfect solution to the U.S.-Japan electronic trade imbroglio. What we do know is that there is one criterion by which we must judge any proposed U.S. trade restrictions: That is, will they work? Will they help beleagured U.S. industries compete as well as establish the groundwork for long-term stability in the marketplace?

Both means and ends must be clear in the minds of those who now propose solutions. Is our goal to stem the flood of Japanese-made computers into the U.S.? If so, fine, but what will that policy do to the economic health of such companies as Amdahl Corp. whose IBM plug-compatible mainframes carry a made-in-Japan tag everywhere but on the label?

And are U.S. companies that seek Japanese partners prepared to deal with opposition from political and industrial forces in Japan, opposition IBM now faces following its alliance with Nippon Telegraph and Telephone Corp.?

These are not matters of philosophy, and our political representatives should not pretend otherwise. International trade is shrinking the world and expanding the village. That is the reality with which we must deal.

LETTERS TO THE EDITOR

New use of old science fiction term leads to confusion about robotics

It was pleasing to see the Update, "A look at robotics in the U.S." [CW, Oct. 7], lead with a quote from one of Isaac Asimov's classic science fiction works. As the present resembles science fiction more and more, from space shuttle flights to laptop computers, the mainstay of my youth suddenly has gained an aura of respectability.

However, I do wish to dispute the statement in the article: "Science fiction has, in fact, cast the field of robotics into confusion and misunderstanding . . ." First of all, let's clarify which was here first.

Until recently, the field of robotics existed nowhere except in science fiction. This turf has been definitively staked out for 50 to 100 years. Research, design and manufacturing of robotics products is not nearly as old.

More to the point, however, is the shifting meaning of the word "robot." Robotics is related to the Czech word for "worker."

Robots in science fiction have tended to be thinking machines that usually, but not always, looked like people. As a general rule, be it box shaped or human shaped, the key factor was some degree of free will, conscious thought, emotion, soul or some other human attribute.

The bulk of the robots described in the article are nothing of this sort; they are freestanding, specialized devices that manipulate parts and tools and are increasingly being coupled with artificial intelligence-based systems for perception and thinking — but Robby the Robot, much less C3PO or R2D2, they ain't.

It isn't science fiction at fault here. It is the new use of a term that has had an established definition elsewhere.

— Daniel P. Dern
Cambridge, Mass.

DATA PAST

Ten years ago

BOSTON — A report published by the U.S. Department of Labor predicted that the number of jobs for clerks and unskilled workers would decline faster in New England than in the rest of the U.S. by 1980 because of increasing automation in the area. The report, however, forecast a healthy growth in opportunities for computer programmers, analysts, operators and other DP specialists because of the heavy concentration of high-tech industry in that part of the nation.

CAMBRIDGE, Mass. — The membership of the Association for Computing Machinery topped 30,000, making it one the world's largest information processing organizations. This was in contrast to 1974, when membership figures were holding steady at 28,000 in the face of a 20% growth rate in the industry.

The increased numbers were attributed to the professional group's budget surplus and its more efficient handling of questions, problems and complaints.

MINNEAPOLIS — Xerox Corp. and Honeywell, Inc. signed a letter of agreement to allow Honeywell field specialists to service Xerox computers. The proposal outlined that Honeywell would handle all contracts with Xerox customers and would provide marketing, sales and maintenance support to Xerox users. Xerox software and hardware engineering was scheduled to continue through 1976, according to the agreement, and after 1976, Honeywell would take over that activity.

WASHINGTON, D.C. — President Gerald Ford nominated a chairman and members to the National Commission on Electronic Funds Transfer, a study group he signed into existence in 1974. According to White House sources, the commission was formed to study and recommend administrative action to develop public and private electronic funds transfer systems.

TULSA, Okla. — Just 72 hours before the U.S. Supreme Court was to decide whether to hear the case, Telex Computer Products, Inc. negotiated a settlement of its antitrust suit against IBM. The settlement released Telex from an obligation to pay IBM $18.5 million as a result of IBM's countersuit on trade secret charges. The pact also barred Telex from bringing those charges against IBM in the future.

VIEWPOINT

DBMS success relies on management methods

THE DATA CENTER
John P. Murray

Movement to a data base management system environment requires a change in the manner in which the systems and programming staff does its work if the potential of the DBMS is to be realized.

One of the benefits of the DBMS is the ability to build an environment where answers to business questions can be obtained rapidly and easily. There is no question about the ability, through the use of a good DBMS and fourth-generation programming language, to produce those results. However, in many installations the disparity between that which can be accomplished and that which is actually accomplished is often great. This disparity is both unfortunte and avoidable.

Part of the problem has to do with the continued imposition of third-generation system design and programming techniques in a fourth-generation environment. This goes beyond technique to ways of thinking. What sometimes occurs is a reluctance on the part of those within the systems and programming section to accept a changed environment and to adjust their methods and approaches to make effective use of the DBMS and the fourth-generation programming language.

That reluctance is understandable. Many of those in the systems and programming section have been completely in charge of the design and programming aspects of the system work for a considerable period of time. The requirement to change, to relinquish a portion of that control, cannot be expected to come easily.

The result is the continued development of systems in the old, third-generation manner. At best, the benefits of the fourth-generation processes will never be fully realized. At worst, a currently undesirable situation will only continue to deteriorate, in spite of the availability of new tools and techniques. Eventually, hostility will develop between members of the systems group and those of the data base group.

This will present the management of the information processing department with a predicament, and if progress is to be made, management must provide support to the DBMS group.

If the new techniques available through the DBMS are not supported and used, the same inadequate approaches to system design and programming will continue. In fact, things will become worse because the installed DBMS and fourth-generation programming languages will simply become a facade. Better to continue as before than to proceed incorrectly.

Before there were good DBMS packages, the available technology constrained design and programming options. The development of the DBMS environment changed that situation. Failure to deliver information with more speed, flexibility and ease is not the failure of the DBMS but of those who cling to old-fashioned, incorrect techniques.

Many reasons will be cited for resisting the use of a DBMS: for example, not wanting to create new data elements or being forced to use existing files because they better fit the needs of the clients. The alternative offered will be some separate system that will end up as an appendage of some existing system or systems rather than as a part of an integrated DBMS.

In addition, the fourth-generation programming language will often be used the same as Cobol has been used in the past. Because insufficient thought and experimentation will be given to the appropriate ways in which to use this tool, the results in many instances will not be satisfactory.

In some environments, these poor results will then be used to prove that the fourth-generation programming languages are not as good as Cobol. What this actually proves is that those who have used this tool have not used it correctly.

The introduction of a DBMS and a plan to make effective use of its features often sets the stage for political hostility within the information processing department. Members of systems and programming will sense a diminution of their power and authority, in favor of the DBMS group, and to a certain degree they will be correct. But, if the DBMS effort is to be successful and if the goal of improved delivery of infomation is to be achieved, the DBMS group must possess sufficient authority to produce the desired results.

The MIS profession should be past arguments about the value to be found in the installation of a good DBMS and fourth-generation programming language. There is more than ample evidence to support the value of such products. The issue should now be to adopt the appropriate management techniques to ensure success. The ultimate degree of success is contingent upon the willingness of the management group to encourage members of systems and programming to change their ways of thinking.

Murray is director of management and information services for American Breeders Service, a DeForest, Wis., division of W. R. Grace & Co., and is the author of Management Information Systems as a Corporate Resource.

Getting down to the business of software

READER'S PLATFORM
David A. Feinberg

Imagine returning to work after lunch and having your manager shepherd you into the office before you can even take off your coat. Turns out there is a critical problem with some of the department's software. Failure to correct it will prevent the company from meeting a major, top-level milestone. Your manager says the importance of the problem calls for the best available people.

Flattered, you agree to fix the problem only to discover that it will take about a week to do the work. When you report this back to the boss, you are told the application has to be working by the next morning, or the company will lose millions of dollars.

After 42 consecutive hours, 61 cups of coffee, 18 candy bars and three packages of gum, the problem is fixed, and your two top people stagger toward home with everyone's thanks ringing in their ears. After a respite of a day or so to catch up on sleep, they return to work only to discover once again that you have been gathered into your manager's office . . .

Software engineers and managers are celebrated for being able to make any program work. It doesn't matter whether the software is an accounting package or an operating system. If it doesn't function as documented, software personnel will empirically determine the correct performance.

An intriguing proposition arises from this situation: what would happen if data processing personnel just quit jury-rigging the programs? Would the computing world as we know it come to an end?

The problem, as all who have worked their way around misfunctioning software know, is to establish the proper foundation for operating in a more appropriately disciplined manner. Based on a recently completed experiment, at least one technique for constructing such a foundation is now available.

The experiment was conducted during the procurement of a special-purpose compiler required to generate highly optimized executable code for an embedded real-time computer. To ensure that the compiler met all of its critical requirements, two actions were taken beyond those normally used for third-party software acquisition.

First, the detailed specifications for the compiler, including the initial users' manual, were written into the procurement contract document. Additionally, all specifications for the embedded computer as well as all descriptions of interfaces among the computer, its peripherals and the compiler were also included in detail. It made for a whale of a contract, but as a result, all of the requisite technical information was there in one place along with the other usual contractual materials.

Second, a new Term and Condition clause was included in the standard contract. It simply stated, "In cases of any discrepancy or conflict between the operation and/or performance of items provided as part of this contract and the technical documentation contained herein, the documentation shall have precedence."

Satisfying results

The results were most satisfying. The compiler, after the usual early debugging phases, turned out to be a masterpiece. It met or exceeded all of the requirements placed on it. Moreover, it performed as the documentation specified.

As is typical with third-party software acquisitions, a number of technical issues arose during the course of development and checkout. As a result of the expanded contract contents and provision, typical negotiating dialogue tended to sound something like the following:

Buyer: "Since work started, we've found a more efficient interface for the compiler's subroutine calls to the operating system I/O service. We've already implemented the operating system changes, and we want you to make the compiler conform."

Seller: "Yes, it is more efficient, but for us to use it means that we have to change the compiler and, consequently, the interface specification in the contract. That will require a formal contract change. As long as we've got to open up the contract for the technical part, we should probably also adjust delivery dates and cost increases as well. OK with you?"

Buyer: "Uh, no. We need to stay with the original schedule and budget. Go ahead and use the old interface for now, and we'll talk about switching to the new one in any potential contracts."

Of course, the buyer could have elected to accept new dates and costs, and then the new interface would have been implemented.

The dialog also illustrates another underlying power of this new technique: no longer do software engineers and managers have to live with excuses that a program or package is right but the documentation just needs a little cleaning up.

The contract now explicitly defines what should and should not be occurring. Changes are always possible but only by renegotiating appropriate portions of the procurement agreement. This, in turn, keeps everybody — buyers and sellers — on their best behavior and helps forestall major discrepancies, problems and misunderstandings. That's what getting down to business is all about.

Feinberg is an MIS manager specializing in software troubleshooting at Boeing Co. in Seattle.

WORLD DIGEST
CW International
News Network

TOKYO — In the latest wave of international opposition to apartheid, the Japanese government has adopted trade restrictions against South Africa. The restrictions were announced by Foreign Minister Shintaro Abewhich, who said, "All countries should share the burden of tackling and solving this issue [apartheid]."

The restrictions include a ban on all exports of Japanese computer products to the South African army and police. Foreign ministry officials said only South African organizations and groups "directly involved" in the racial discrimination policy will be subject to the export ban.

TOKYO — Nippon Telegraph and Telephone Corp. announced today development of what it claims is the world's first loop architecture for "compound computing." Nippon said the optical-fiber-based architecture enables data exchanges and simultaneous processing between the host computer and up to 127 mainfraimes, terminals and communications control units.

Nippon said significant improvements have been scored in the reliability of the whole system, which includes a backup mechanism to overcome breakdown of any component.

STOCKHOLM — Ericsson Information Systems, Inc., the data processing and office automation division of the Swedish telecommunications and electronics group, plans to resume production of the company's personal computer at the turn of the year.

Ericsson spokesman Gunnar Blacklund said the resumption of production would be preceded by an intensive European marketing effort, with expenses for advertising amounting to a "a few million" in kronor, the Swedish currency.

LONDON — British microprocessor maker Inmos announced last week its Transputer, a 32-bit chip designed for parallel processing.

After a $25 million (U.S.) investment and seven years of research, the Thorn-EMI Co. subsidiary said it is banking on the chip to take it into world markets and back to profitability.

Iann Barron, head of the Inmos design team, heralded the transputer as Europe's answer to the threat posed by Japan's fifth-generation project. A system with 300 of the $500 Transputers would have a performance level equivalent to the world's fastest Cray Research, Inc. computer, Barron claimed.

LONDON — Following similar moves in the U.S., IBM is targeting a major reorganization of its UK sales staff for Jan. 1, according to a source inside the company. The source, who requested anonymity, said plans call for merging of IBM's two major marketing divisions, Information Systems Accounts Marketing and Information Systems Marketing.

The move is part of IBM's new strategy to use its salesmen only for top accounts, while smaller customers are serviced more and more by third parties, which may mean a surplus of salesmen. But IBM has always denied that any selling jobs will disappear and is instead claiming that the company is recruiting staff.

STOCKHOLM — While the American computer market continues to face hard times, there are still no signs of similar decline in West Germany or Sweden, whose markets have posted increases in revenue, spending and exports. During the first half of 1985, West German computer makers registered a 15.6% increase in product revenue, well above the average for other West German industries.

In Sweden, spending on computer equipment remains strong. According to Swedish government figures, Swedish computer exports increased by 33% in the first half of 1985 compared with the same period in 1984. The total value of exports rose to about $400 million, the report said.

CANBERRA, Australia — The Australian federal government's Department of Veteran's Affairs has been accused of wasting $6 million per year because of overloaded computer facilities, a figure said to be increasing at a rate of $200,000 per month.

A report prepared by computing consultants Ferris Norton Associates in association with Stanford Research Institute of California and Touche Ross & Co., an accounting firm, claimed that the department's Amdahl Corp. 5860 mainframe, which drives some 1100 terminals, was not operating at its expected level of capacity and that site facilities were deteriorating.

The department plans to spend $15 million more than the $45 million allocated for the next five years to add to its computing power and to stop waste.

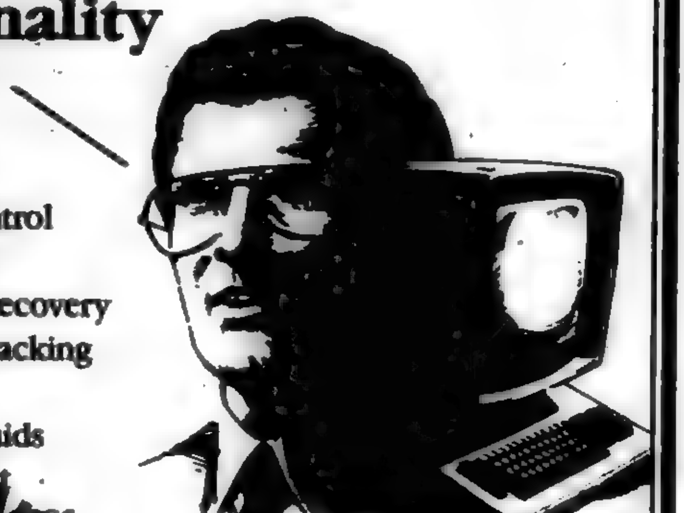
CANBERRA, Australia — Australia's biggest dealer in Texas Instruments, Inc. products has alleged that the Australian Defense Department altered the bidding document for an order of 37 personal computers to read "IBM Personal Computer XT only."

The alteration, according to the dealer, is a restriction of trade and comes in spite of the fact that TI personal computers were approved by the public service unions as being acceptable, and IBM machines were not.

The alteration appears to be in line with an Office of Defense Production policy that requires IBM compatibility, a policy some claim is restricting trade.

TOKYO — As part of its participation in the Japanese government's "Buy foreign" campaign, Mitsubishi Electric Corp. said Thursday that it will purchase $340 million worth of foreign products, mostly office automation equipment and semiconductors, from now until the end of March.

Mitsubishi's projected foreign procurement this year, $308 million of which will be from the U.S., represents a 20.3% increase from the year-before level.



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   - 31. Manager/Supervisor Programming
   - 32. Programmer/Methods Analyst
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   - D. Communications Systems
   - E. Office Automation Systems

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COMMUNICATIONS

DATA STREAM
Paul Korzeniowski
CW Senior Writer

Voice mail suits linger

By Paul Korzeniowski

Robin Elkins was not your average 17-year-old male. Most adolescent men spend their time rooting for the local sports team and testing the patience of their parents — or sometimes the law. Elkins passed his time inventing a technique to digitize audio recordings, a capability with applications in the computer and music industries.

"I was an audiophile and channeled my energies into studying the electronics industry," according to Elkins. This adolescent inclination eventually would lead Elkins into court where he would challenge industry giants, such as IBM, Wang Laboratories, Inc. and Digital Equipment Corp., charging that the voice mail systems of these and other companies borrowed from his invention.

Elkins invented that audio digitization technique in 1972. Uncertain of what to do with it, he heeded the advice of his father and filed for a patent. His initial attempt in 1975 was an eye-opener. A patent brokerage house took his money but never made the filing. "I began to suspect that something wasn't right when the company wouldn't allow me to talk to the attorney who was supposed to be filing the patent," Elkins stated. So he turned to another attorney, who filed the patent in 1976.

In November 1978, the patent was approved. One year later, the inventor discovered what he believed was the first infringement on his patent in a product from Sony Corp. He wrote the company a letter that threatened Sony with legal action if it did not alter its

Continued on page 26

Proteon unshaken by IBM

Confident chairman: Token rings 'old as the hills'

By John Dix

NATICK, Mass. — If IBM's release of its token-passing local network gives Howard C. Salwen the heebie-jeebies, he doesn't show it.

Salwen, chairman of the board of Proteon, Inc., believes that sales of his company's existing, functionally straightforward token-passing ring networks will continue to thrive regardless of IBM's announcement. Proteon will, however, offer an IBM-compatible network now that the IBM has released its specifications.

The IBM look-alike will round out Proteon's product line that today includes two models of the company's Pronet — the 10M bit/sec. and the 80M bit/sec. renditions. Proteon has installed more than 150 Pronet-10s, the lower speed net, according to Kim Myhre, director of communications industry research at International Data Corp. in Framingham, Mass. The 80M bit/sec. net was introduced more recently.

Salwen, chairman of Proteon, Inc.

Pronet initially was developed while Salwen and some of his consulting colleagues were working on a joint development project with MIT in Cambridge, Mass. The university's campuswide network is based on the results of that effort. MIT receives royalties for its contributions to Pronet's development.

Contrary to popular belief, the basic concept of token-passing ring networks used by Proteon and proposed by IBM is not new. "Token rings are as old as the hills," Salwen said. "The first ones were built as long ago as 1960." Even the idea of counter rotating rings — which provide alternate signal paths in the event of a link failure — dates back 25 years, Salwen claimed.

Ring architectures are well understood and simple, Salwen said. Simplicity is a Pronet selling point. The ring topology enables Proteon to deal exclusively with one-way or simplex signals. Removing the electronics necessary to pump data in two directions over the same wire reduces network complexity and cost. These simplex signals can be modulated easily onto any

Continued on page 26

Multidrop net manager out

The latest entrant in the network management arena is Teleprocessing Products, Inc. based in Simi Valley, Calif. The company has announced its Multidrop Network Management system, which consists of a digital termination unit, a central diagnostic facility based on an IBM Personal Computer XT and a line multiplexer.

The package works with modems equipped with the company's digital termination equipment, TP-502 channel service unit/data service unit. Modems can transmit data at speeds from 2,400 to 9.6K bit/sec. on networks supporting IBM's Systems Network Architecture or Synchronous Data Link Control protocols, Teleprocessing Products said.

Multidrop Network Management supplies 14 types of testing functions including lockout, remove loop-backs, data terminal equipment loop-back, lockout test, front-panel status, alarm status and alarm acknowledgment.

The system supplies a number of reports including maximum and minimum response times, traffic status and number of retransmissions. Trouble tickets are stored in the package's data base.

The digital termination unit sells for $1,795; diagnostic software is available for $2,500, and the 3502 multiplexer costs $740.

INSIDE

DG announced a voice mail option for its Comprehensive Electronic Office software, and introduced an integrated voice/data terminal /23

NEW THIS WEEK

- DG introduces a family of modems.
- AT&T enhances the Merlin Communications System
- For more on these and other new products, see pp. 65-78.

INSTANT ANALYSIS

"Token rings [like IBM's] are as old as the hills. The first ones were built as long ago as 1960. Even the idea of counter-rotating rings dates back 25 years."
— Howard C. Salwen
Proteon, Inc.

Security Dynamics releases two-part security system

Spurs battle to keep hackers from data

By Paul Korzeniowski

BOSTON — Techniques to prevent hackers from accessing corporate mainframes often prove to be as ineffective as attempts to stop Rambo from completing his latest mission.

Security Dynamics, a small start-up firm, has cleverly mixed existing technologies in a relatively inexpensive product that may help keep hackers at bay. The product, Access Control Encryption (ACE), consists of two pieces: host hardware or software and credit card-size cards given to each authorized user.

At 60-sec. intervals, each card, equipped with a 4-bit microprocessor, generates a random number shown on an LCD. Whenever a user attempts to log on to a computer, he enters a personal identification number (PIN) and the random number displayed on his card at that moment. The PIN number corresponds to the time and date that Security Dynamics produces the card. The random number, which changes every minute, is generated using an ACE algorithm and PIN.

When a user enters his PIN, the host ACE systems will also generate a random number using the same algorithm. If the user and host numbers match, the user gains access to the system.

The product was introduced with relatively little fanfare at a computer security show in November 1984. At that time, ACE was more an idea of Kenneth Weiss, president of the company, than a tangible product. Weiss has spent the last year filing patents incorporated into the product, building an ACE prototype, hiring a staff, finding beta sites, lining up suppliers of ACE materials and finding hackers to test the system. The work, which has been completed from his three-floor Boston condominium, drained the entrepreneur's bank account of $700,000.

Weiss claimed, in a *Computerworld* interview, that his efforts have not been in vain. He has filed patent applications for the system's design and techniques used to keep the host clocks and card clocks in sync. A staff of approximately 10 people has taken over the lower floor of his condominium designing and debugging ACE software.

Beta versions of the product have been shipped to four sites. Weiss has signed contracts with companies located in the Far East to supply the components needed for each card. A venture capital firm is pumping $3 million into Security Dynamics. Approximately half a dozen companies have placed orders for the device. The U.S. Department of Defense awarded a contract worth close to $750,000 to ACE, providing the system can be delivered next year.

Despite the achievements, the company still has to overcome some obstacles before ACE mirrors Weiss' claims. The beta sites are working with cards approximately 10 times larger than a credit card. Security Dynamics' president claims that the components needed to reduce the card's size are currently used in some of today's ultrathin calculators, and his offshore suppliers will ship the necessary components in January

Continued on page 23

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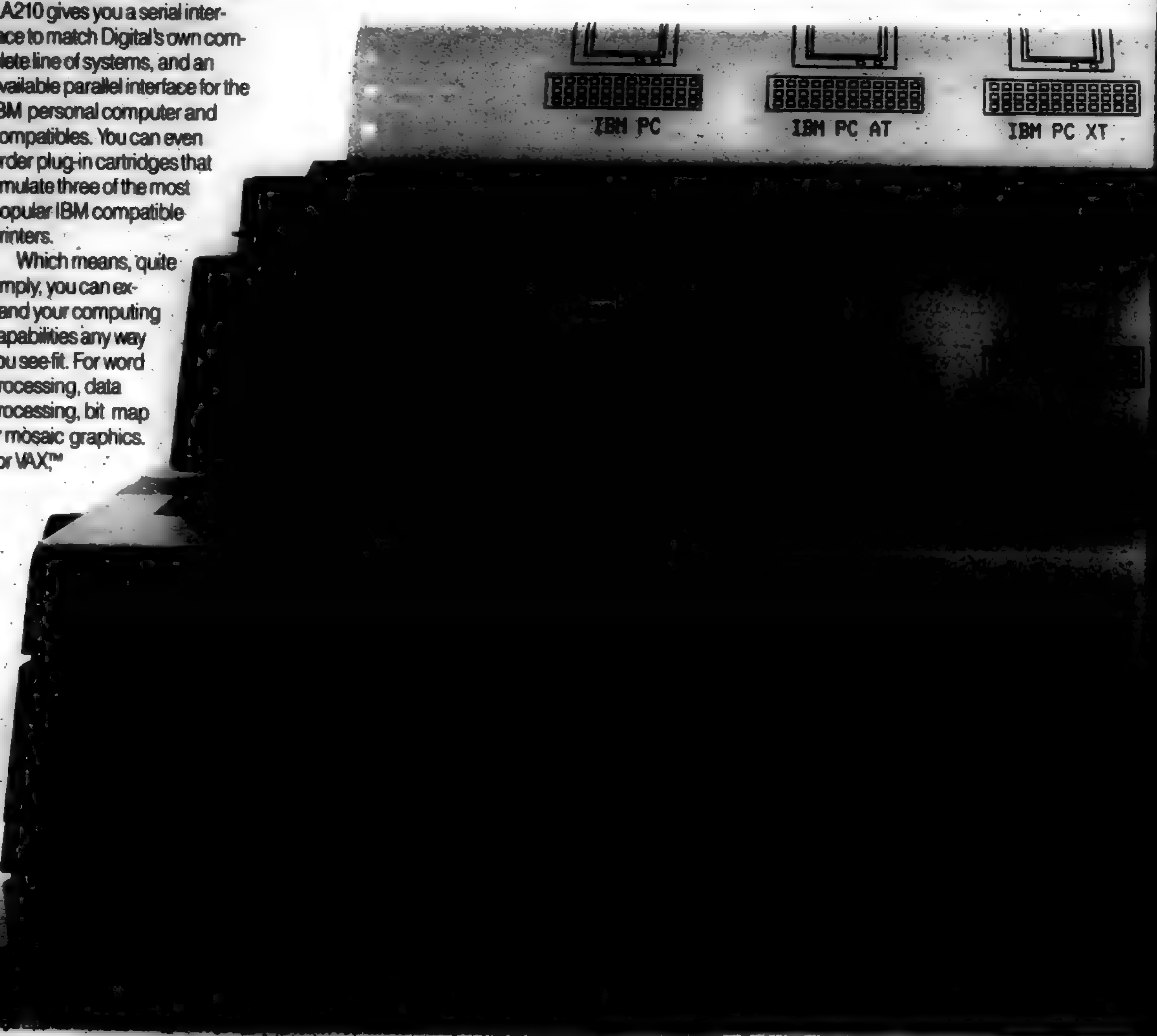

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plus Digital's VT100™ line drawing set. And it gives you a choice of more than 35 optional faces and fonts – Courier, Orator, Gothic, APL, and italics as well as special custom fonts – through plug-in cartridges that let you vary your type face even more. Finally, the LA210 lets you print bold or condensed and change faces or fonts on a dynamic character-by-character basis. So your output is truly customized to suit just about any presentation you have in mind.

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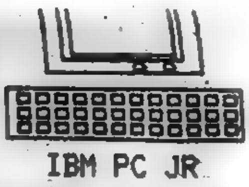

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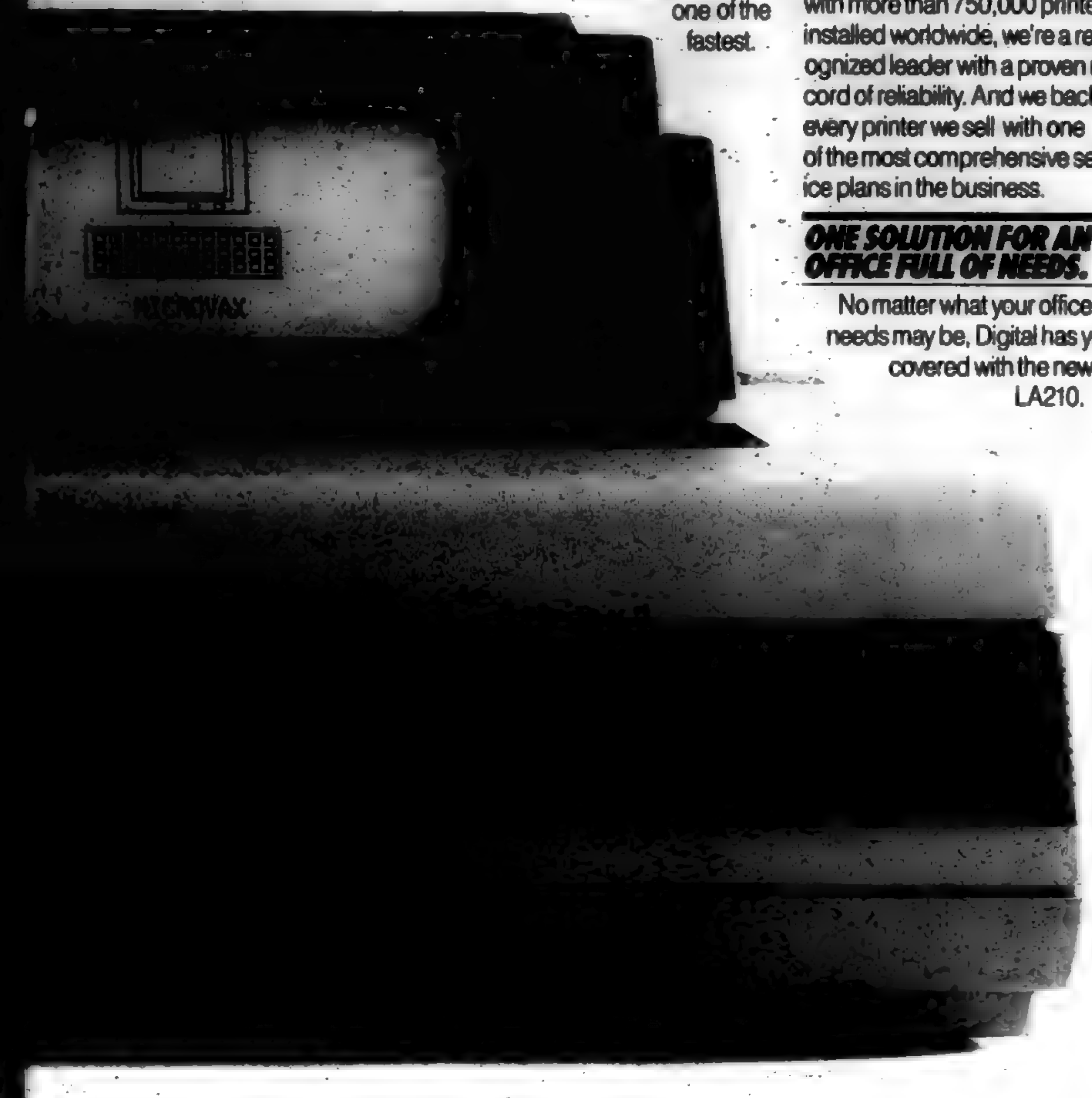

Add the optional bi-directional tractor, and you can easily handle superscripting and subscripting and full page reverse for multiple column printing.

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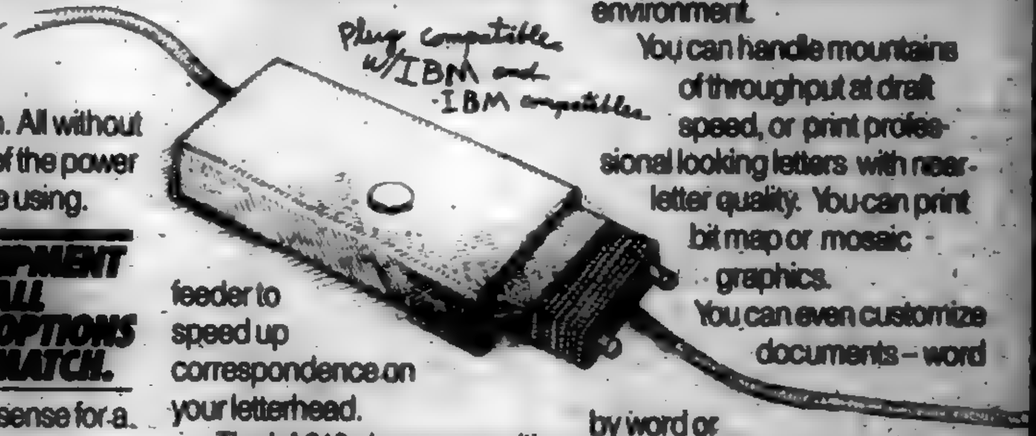

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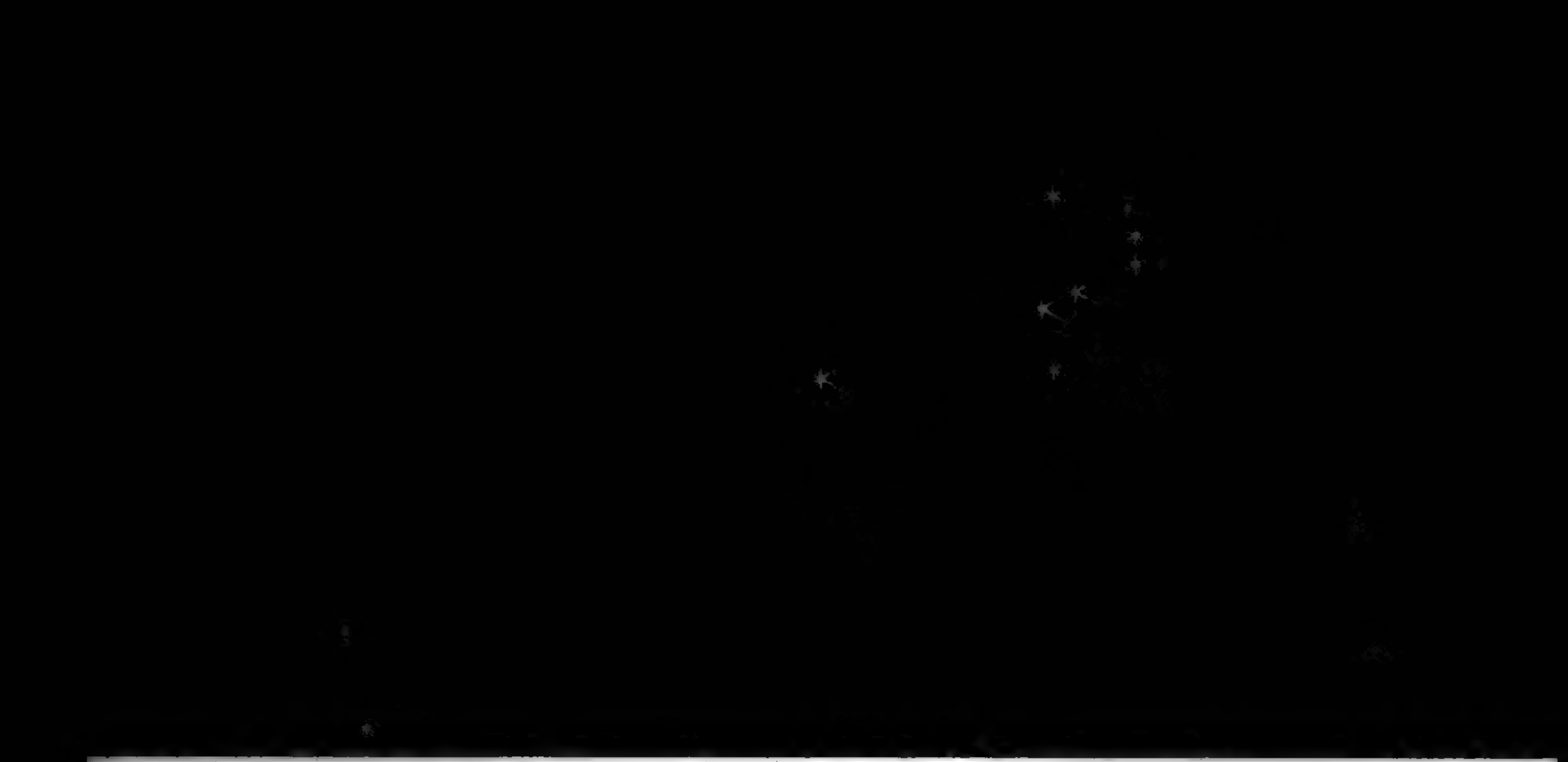

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DG launches CEO mail option, voice/data terminal

By Donna Raimondi

NEW YORK — Data General Corp. of Westboro, Mass., announced a voice mail option for its Comprehensive Electronic Office (CEO) software at Info '85 last week. At the same time, the company released an integrated voice/data terminal.

Voice mail will be an optional feature to the electronic mail portion of CEO. Unlike the voice mail systems from the manufacturers of private branch exchanges, DG's system will be incorporated into its minicomputers, storing digitized voice on an associated disk.

The option requires the installation of a 15-in. Voice Mail Controller (VMC/2), a $10,000 communications board compatible with any of DG's Eclipse MV family of minicomputers that provides the telephone-to-processor interface. The controller has two telephone ports and looks to the attached PBX like a standard analog telephone set.

CEO users can access the system from any standard tone-dialing phone, using the telephone keypad to enter voice mail commands such as a request to replay messages. A revised version of the CEO software is necessary, but there is no charge for that, the vendor said.

The controller provides a speech store-and-forward capability accessible to authorized users from any tone-dialing telephone. The option enables voice messages to be received, filed, forwarded and deleted. It also makes it possible to distribute messages to mailing lists. Messages can be flagged as urgent, confidential or certified. Voice comments can be attached to files, messages and documents being mailed or forwarded.

Processors can be configured with up to three VMC/2 boards for local voice mail support, or a single processor can contain up to eight VMC/2 boards and can be used as a voice mail server for a network of Eclipse MV family systems.

Also released was the Dasher D555 integrated voice/data workstation, said to combine telephone and workstation functions. The ANSI-standard text and graphics terminal supports DG's voice/data products, including the VMC/2 controller.

The attached telephone is a two-wire AT&T Bell Laboratories 2500-compatible analog tone-dialing unit that supports call forwarding, call waiting, conference calling and quick calling. The workstation contains an internal phone list of up to 40 entries and is capable of dialing more than 250 digits with one command.

The D555 costs $1,595 and is not a requirement for the newly announced voice/data system, the vendor said. The workstation features a 9-in. monochrome screen and a tuck-away ASCII keyboard with full-size keys.

From page 19

Security Dynamics releases system

1986. Two months will be required for Security Dynamics to program the cards, and first shipments are scheduled for March.

Weiss stated that ACE can support half a million users. Beta sites are working with only 10 to 30 cards so no one can be certain that the software is robust enough to support a large number of users.

Another claim is that the product can be integrated into virtually any operating environment that uses traditional enter and exit commands. But two DP professionals at large corporations that have seen ACE demonstrated were not convinced that the product could be as easily tailored to an operating environment as Weiss stated.

Weiss said that beta users are using ACE in IBM MVS and CICS operating environments.

If Security Dynamics succeeds in shipping its product next year, ACE may establish a new standard for security packages, offering a number of advantages over existing packages. The tool is easy to use, can be carried by remote workers, and the five- to eight-digit password is, according to Weiss, virtually inpenetrable.

Also, ACE is relatively inexpensive. There are two ways to implement it — with a black box that stands between the host and the incoming lines or as host software. Prices for the box range from $5,000 to $25,000; host software costs $50,000. Cards come with one-, two- or three-year batteries and range in price from $34 to $58.

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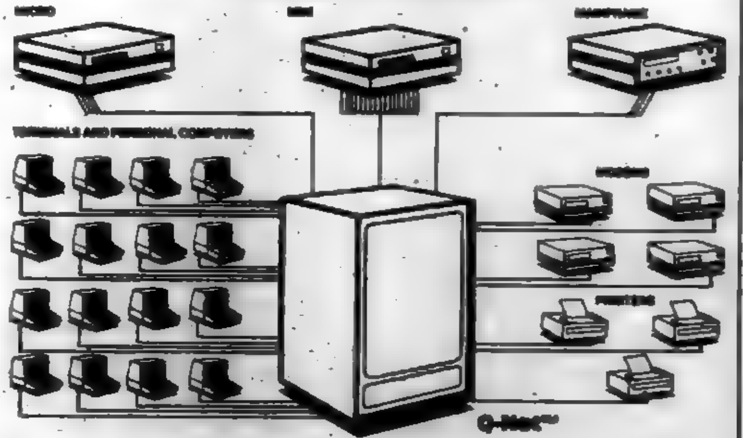

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From page 19

Voice mail suits linger

product or pay him royalties. Sony ignored the letter.

A number of other companies developed products that Elkins believed infringed on his patent. He had discussed his invention with leading figures in the digitized voice industry, and they spread word to these companies. The firms claimed that they developed their products independent of his invention.

For six years, Elkins waged a lonely battle, firing off letters to more than 40 firms he thought were robbing him of just compensation.

"I couldn't afford an attorney," he stated. "The firms I talked with wanted at least $10,000 before they would take my case. They were leery of taking a case against such large companies. I couldn't find anyone who would work on a consignment basis." Another problem involved the technical issues in the case, something that a judge or a jury might not understand.

Finally, the Fort Lauderdale, Fla., firm of Feldman and Levy, PA answered Elkins' call. In June, the firm filed a patent infringement lawsuit claiming that Rolm Corp.'s Voicemail incorporated Elkins' design.

In September, the case was settled out of court. Elkins signed a licensing agreement with IBM, Rolm's parent company, enabling the firm to use his patent. The inventor said that the settlement vindicates his claim that larger companies are infringing on his patent.

An IBM spokesman said that Voicemail did not infringe on anyone's patent. But why did the company settle with Elkins? "The settlement was in the best interest of both parties," he claimed, but refused to clarify that statement.

Since the IBM suit, the law firm has brought suits against Wang and DEC. Elkins claimed that Wang officials invited him to the company, showed him their equipment, tried to convince him that it did not infringe on his patent and offered to settle the case out of court.

He refused. "Wang did not offer me enough money," he said. "They were offering $25,000 to $50,000 and various pieces of hardware. That amount was not enough. Wang is going to make a lot of money off of those products."

Wang has filed an answer to the suit and plans to let the court decide if there was an infringement. It is not seeking an out-of-court settlement, a company spokesman said.

Wang's product is based on technology from VMX, Inc. Calls to VMX's patent attorney went unanswered. But an August press release from VMX stated that VMX was the pioneer in voice-messaging technology. Twelve companies, including IBM, have signed licensing agreements with VMX.

A DEC spokesman claimed that it is not DEC's product that infringes on the patent but a product from Voicemail International, Inc. of Santa Clara, Calif., that works with the DEC product. The company plans to incorporate that information in its answer to the charges, which will be filed in two weeks, and is not interested in an out-of-court settlement.

Voicemail International claimed that it had a patent for its technology and that the product does not infringe on anyone else's design.

From page 19

Proteon unshaken by IBM release

media, including baseband and broadband coaxial cable, fiber-optic cable or microwave radio links, Salwen said.

While Proteon's networks use the same architecture and access methodology as defined by the IEEE 802.5 standard, the company drives its nets at higher than recommended speeds.

The 802.5 standard — which Salwen claims was heavily influenced by IBM because of its ardent participation in the standard-making process — specifies a 4M bit/sec. signal rate. Proteon's most popular product is 2½ times faster.

Proteon will match the speed of IBM's Token-Ring Network, but Salwen remains a proponent of 10M bit/sec. and faster local nets. He says an IBM Personal Computer XT user connected to a Novell, Inc. disk server over a Pronet-10 can save a file faster than if that user tried to save the same file on an internal XT drive.

That capability is actually made possible by the fact that Novell's operating system is geared entirely to disk I/O, but the point is that the network does not stand in its way.

According to published reports, IBM's 4M bit/sec. net — which adheres to the 802.5 standard it put so much effort into — will achieve an estimated 200K to 250K bit/sec. throughput.

Salwen, like the heads of so many other small companies, likes to wave off the competitive threat of IBM with the assertion that its market entrance will validate the technology and the industry. But Proteon will have an initial market advantage because, as Salwen points out, IBM will not build bus interface units for competitors' information processing equipment.

Proteon already builds interface units for Digital Equipment Corp.'s Unibus and Q-bus, Motorola, Inc.'s VME bus and Intel Corp.'s Multibus.

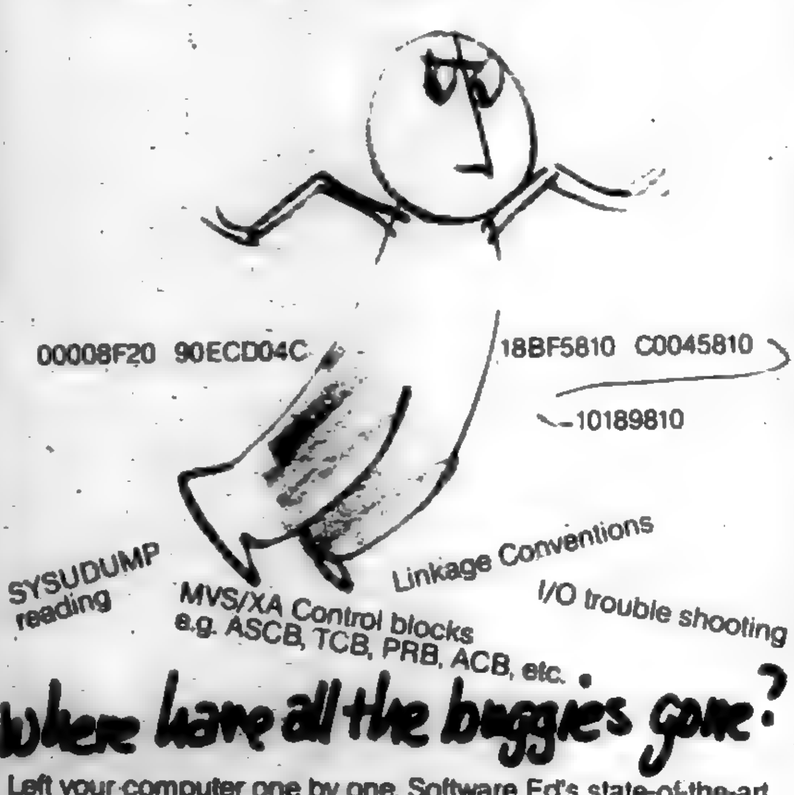
It can be expected that this advantage will wane over time as third-party manufacturers step in and fill the gap, much as the add-on market for IBM's Personal Computers exploded.

But Proteon will still have some tricks up its sleeve. Besides the media flexibility the company offers, options such as its intelligent fiber-optic link will appeal to users. These fiber links are driven by microprocessor-based devices and used to interconnect wire concentrators, the hubs used in most ring architectures.

In the event of a fiber-link failure the intelligent terminating devices close relays in the concentrators at both ends, thus enabling continued operation in those domains.

After such a failure the fiber-optic drivers continually try to reestablish the circuitry by sending out periodic, self-generated test signals. When and if the circuit is reestablished the drivers then open both relays, bringing up the link.

Perhaps Proteon's largest market advantage is that its token-ring networks are available today and they are reputedly easy to install and easy to operate.



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SOFTWARE & SERVICES

SOFTALK
John Gallant
CW Senior Editor

Pricing in the Twilight Zone

The reader is asked to conjure up the black-and-white image of a tight-lipped Rod Serling, his arms folded across his chest, the smoke from his cigarette lazily wafting into the gloom overhead. Serling begins:

Tonight you are invited to journey down a road that leads to frustration and stagnation.

They say the grass is always greener somewhere else. But there are times when just getting from here to there seems to be more trouble than it's worth. A change can look so right, a new strategy so inviting. Often, however, the obstacles impeding that change, stalling that strategy, appear insurmountable.

Case in point — the pricing strategy of most software vendors. A strategy that has its roots firmly planted in the Twilight Zone.

The scene now shifts and the tale unfolds . . .

For one reason or another, the software industry has evolved into a loose collection of players that, with a few notable exceptions, demand that customers pay up front for the right to use their products.

Customer X wants to use Vendor Y's data base management system. So, Customer X plunks down, say, $250,000 on Day 1 and Vendor Y goes off smiling — for a while anyway. For all the years that Customer X uses Vendor Y's DBMS, he receives maintenance, upgrades and enhancements until the day finally comes when Vendor Y says, "No more" and drops the DBMS from its roster of supported products.

During all those years, Vendor Y earns only marginal revenue in the

Continued on page 31

With a little help from GE

A talk with Robert Healy of Software International

INTERVIEW

Robert Healy, Software International

With the help of General Electric Co. and a more than $6 million development push, Andover, Mass.-based Software International Corp.'s name and product line are back in the applications market limelight. Software International's introduction of its Masterpiece series mainframe applications was only the most recent sign of the company's revitalization, which began in 1981 when GE purchased Software International.

At the company's users group meeting held earlier this month in Washington, D.C., *Computerworld* Software Editor John Gallant spoke with Robert Healy, senior vice-president of marketing and planning for Software International.

Healy discussed GE's influence on Software International, the state of the applications market and what it takes to succeed as a software vendor.

What changes have occurred at Software International since GE took over in October 1981?

There is a good deal of GE management now in the company. GE is one of the world's largest companies and it is noted for its management skill. There are people in key positions that have the experience that comes from working within a large company. That brought a new level of professionalism to [Software International].

Also, GE has deep pockets. I would say that, given the financial track [Software International] was on, it is questionable whether the company would even exist today if not for GE.

Why do you say that?

[The company] was losing a lot of money and without a Masterpiece-type suite of products, [it] would not be able to go out and stand toe-to-toe with a

Continued on page 29

Notes from the software front

Net change. The **Computer Dealers and Lessors Association, Inc. (CDLA)**, based in Washington, D.C., said its CDLA/Net nationwide electronic bulletin board will now be marketed and managed by **Exchange Data, Inc.** CDLA/Net, which has a basic monthly usage charge of $200, offers electronic mail capabilities and

Continued on page 30

Global banking system debuts

Burroughs Corp. of Detroit introduced a 12-module software system last week aimed at the international banking community.

Burrough's Global Wholesale Banking system, running on its B-1900 series mainframes, addresses a variety of key applications in international banking, including foreign exchange, institutional lending, trade financing, accounting, transaction processing and statutory reporting. The system is built around a core module, dubbed Global Wholesale Management, which establishes operating guidelines for the international

Continued on page 28

INSIDE

D&B Computing Services announced a link between its Nomad2 fourth-generation language and IBM's DB2 relational data base management system /28

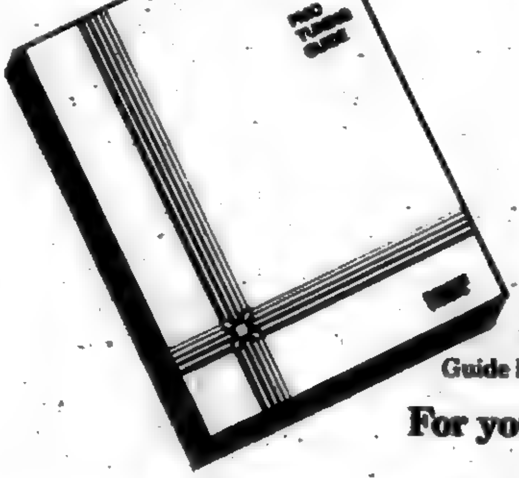
NEW THIS WEEK

- CDC enhances Cyber-Epic system
- Massoglia & Associates introduces two packages for IBM System/38
- For more on these and other new products, see pp. 65-78.

INSTANT ANALYSIS

"We predict IBM's 1985 revenue from software to be roughly $4.4 billion. Based on its pattern of about 35% compound annual growth, IBM's 1990 software revenue will be close to $20 billion."

— Bob Djurdjevic
Annex Research



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Read-write interface out connecting Nomad2, DB2

D&B Computing Services Co. of Norwalk, Conn., has announced a link between its Nomad2 fourth-generation language and data management system and IBM's DB2 relational data base management system, which runs in IBM MVS environments.

Announced at the recent Nomad2 International Users Conference in Rancho Mirage, Calif., the DB2 link is a read-write interface that treats DB2 tables as masters in a standard Nomad2 data base. The capability is said to allow users to combine the IBM tables with Nomad2 masters and segments into a single Nomad2 data base.

D&B Computing also announced a framework for establishing read-only interfaces to both user-written and other vendors' DBMS. Dubbed General Exit/Database Interface (GEDI), the framework allows users to develop interfaces to specific DBMS. The first GEDI interface is being supplied by D&B for Software Corporation of America's Model 204 DBMS, Version 8.01 in VM and MVS environments.

With the DB2 interface, users can issue commands without leaving the Nomad2 environment by prefacing the commands with "DB2." The interface also provides automated facilities for creating schemas from DB2 tables that prepare them for access by Nomad2. A Schema Reorg function allows users to alter DB2 tables without having to dump and reload data. The same function can be used to convert Nomad2-formatted data for use by DB2.

GEDI reportedly supports Nomad2 security features, but it does not provide access to foreign data dictionaries.

Delivery is scheduled for first-quarter 1986. Pricing for the DB2 interface has not yet been set.

DEC introduces software for Microvax II desktops

Digital Equipment Corp. of Maynard, Mass., has announced that application software, based on its RSX-11 operating system developed for its PDP-11 minicomputers, can now run on the Microvax II desktop minicomputer with Version 2 of the VAX-11 RSX package.

VAX-11 RSX Version 2 is said approximately to double the performance capabilities of the initial version. VAX-11 RSX runs under the VAX/VMS operating system, and it enables any VAX computer from the Microvax II to Vaxcluster systems to be used to develop programs for PDP-11 minicomputers, PDP-11 microcomputers and Professional 300 series desktop computer systems.

The updated RSX enables users to run RSX-based PDP-11 programs on their VAX systems with little or no modification. Programs developed using VAX-11 RSX can be targeted to run on any of the following PDP-11 operating systems: Micro/RSX, RSX-11M-Plus, RSX-11M, RSX-11S and P/OS.

VAX-11 RSX Version 2 is licensed from $800 on the Vaxstation II to $4,000 on other VAX configurations. The product is available now.

From page 27

Global banking system debuts

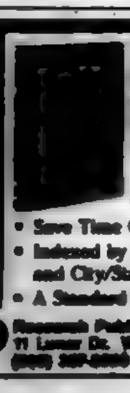
bank and forms the basis for the integration of the other modules.

Using information gleaned from Global Wholesale Banking, a spokesman said, international and wholesale bankers can evaluate and control exposure risk through the system's exposure projection, consolidated reporting and limit control capabilities. Dealers can also obtain real-time data on positions and exposure by client, country or currency type.

Information on such areas as contracts, general ledger structure, accounting models, rates, agents and security levels is maintained within Burroughs' Data Management System II data base management system.

Global Wholesale Banking application modules include foreign exchange, money market, real-time dealer/trader, interbank certificates of deposit, treasury notes, commercial loans, bills and acceptance, documentary letters of credit, statutory reporting for the Bank of England, U.S. statutory reporting, multicurrency client and general ledger accounting.

The system is available now at $220,000 for all 12 modules.



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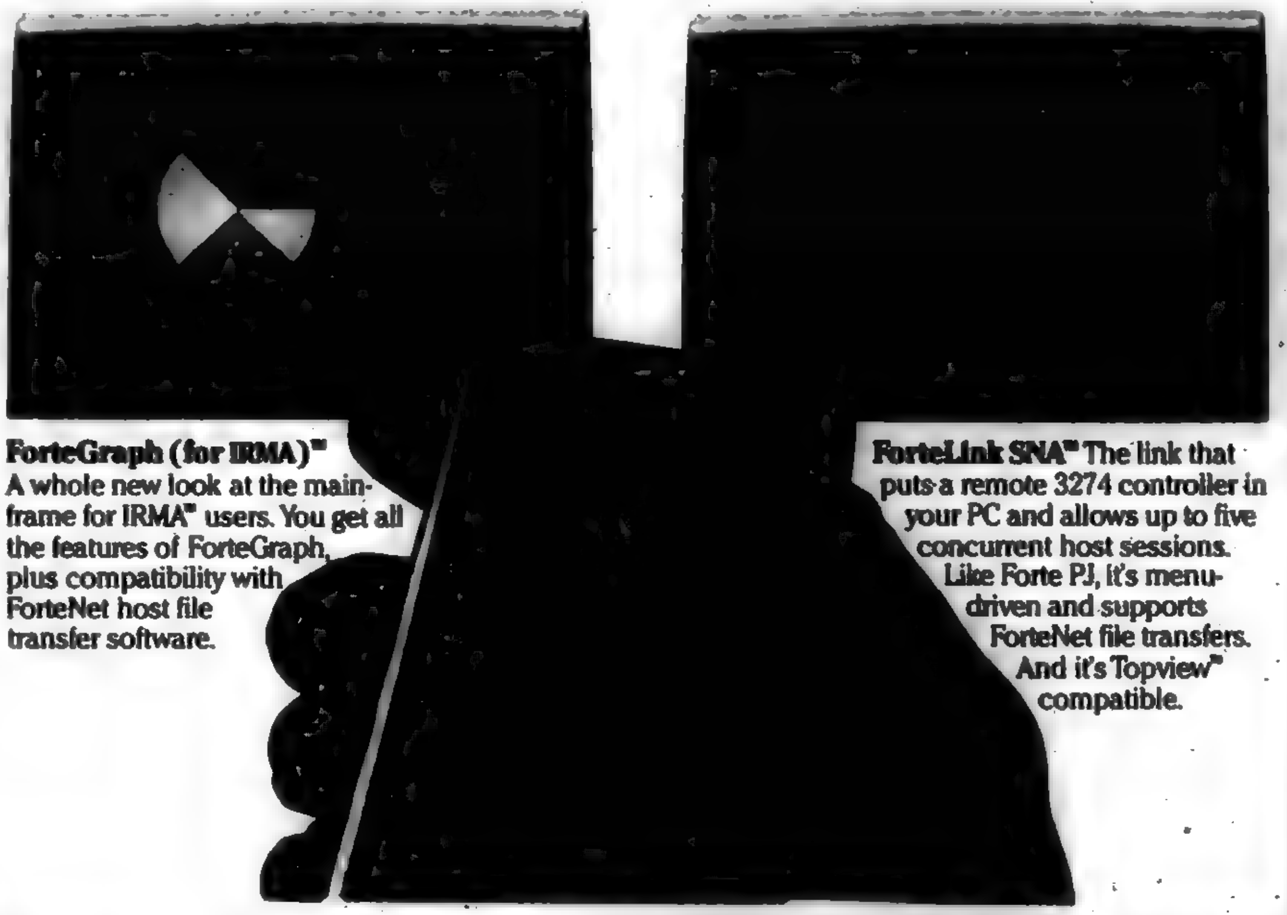

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ForteGraph (for IRMA)™ A whole new look at the mainframe for IRMA™ users. You get all the features of ForteGraph, plus compatibility with ForteNet host file transfer software.

ForteLink SNA™ The link that puts a remote 3274 controller in your PC and allows up to five concurrent host sessions. Like Forte PJ, it's menu-driven and supports ForteNet file transfers. And it's Topview™ compatible.

From page 27

A talk with Robert Healy

[Management Science America, Inc.] and a [McCormack & Dodge Corp.]. [Software International] was slipping back into second-tier status.

Has Software International considered wading into the data base management systems market?

[The company] is an applications expert. DBMS is a marketplace that is maturing in the sense that I don't believe there is room for another new player. I think that ground is pretty well staked out. It would be strictly by acquisition that we would play in that market.

We've heard that lately some of the big vendors that offer a full range of products are losing out in a lot of deals to more specific niche companies.

Certainly vertical market players have always been strong and always will be. But frankly I see the trend being just the opposite. I think that one of the problems niche vendors face as they build their strategies is that the price of poker has gone way up, in light of offerings like Masterpiece and [M&D's] Millenium. I think it will become increasingly difficult for small niche players to be successful.

Will they have a couple of years to thrive while the big players are delivering on their promises?

I don't think it is going to take that long for delivery. We will be delivering [Masterpiece applications] within 90 days. Once people buy into a Masterpiece-type concept, once they have put in a key application like general ledger, it becomes very tough to go with, say, another vendor's accounts payable package. That becomes a much more difficult decision to make. When people made the general ledger decision a few years ago, they just looked at general ledgers. Today, even though they may not know what they are going to do in the accounts payable area, they are looking at an entire suite of products. That makes for a difficult road for vendors hooked into a single-product sell.

How has the slump affected the software industry in general and Software International specifically?

There is a softness. Decisions have been pushed out. Because revenues have not been quite as vibrant as everyone had planned, there have been some cutbacks in research programs and in advertising. Development money is where the pressure will really become intense on the smaller, independent players that don't have the resources to continue with the same strategy and wait for better times.

[Software International] has been fortunate. We got our arms around the cost side of our business very early in the year. If revenue had gone the way we had hoped, we would have had a super year in terms of net income. Fortunately, because of good planning, when the revenue didn't happen and we found ourselves sitting 10% or 15% behind on the revenue side, we still had our net on track all the way through July. August was the first time we actually started to slip below the the curve and September continued that trend.

Do you have any idea when the slump is going to end?

I am a believer that when you see IBM's mainframe shipments pick up, that probably six to nine months down the road, you will begin to see significant software purchases. Once the machines are in, people start to look at how they are going to add value to them. I think that probably ties in to a recovery in this industry, sometime in early 1986.

It has been said that the idea of a major software company, a $200 million software company, is unproven. Every time someone gets close to that plateau they stumble. As Software International grows, is this something that concerns you?

You are dealing with relatively small companies in the software industry. [Management Science America] and [Applied Data Research, Inc.] are large software vendors in a relative sense. But when you compare them to Fortune 500 companies, they are small enterprises. Management isn't always prepared to deal with the changes growth brings. The GE management within our firm has been down a lot of roads before. These people have dealt with the planning and financial problems that come with expanding from a small company to a midsize company to a large company.

Why is it that at some point along the road everybody seems to trip up, to stall out?

Expanding your product line is not an easy task. Moving from applications to tools, or vice versa, is like changing businesses. That often is not recognized up front and is learned the hard way. The amount of effort required to expand your company is significantly greater than people recognize. . . . It is not that easy to bite off new market segments and just roll out a product and expect that you will be a success.

the Forte Network:

ForteNet™ CMS-TSO host file transfer software for menu-driven transfers of binary and text files in either direction. ForteNet is considered one of the industry's fastest software packages. It's also compatible with Wang, TI, DEC Pro™ and Telex links to IBM mainframes.

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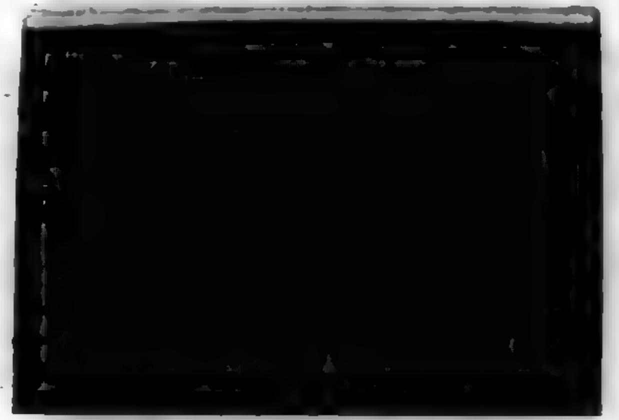

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From page 27

Notes from the software front

provides information on tax and legislative issues, industry news, trend reports and other surveys and sales opportunities. It will be linked to Exchange Data's existing Lease-Net, a data base service for equipment lessors, to provide financial data on public companies and sales, use and rental tax rates.

■

36 special. **Cincom Systems, Inc.** of Cincinnati and Larkspur, Calif.-based **Fusion Products International, Inc.** signed an agreement whereby Fusion will integrate its Fusion/36 decision support system with Cincom's Total data base management system for the IBM System/36. Fusion/36 offers query, report writer and data dictionary capabilities.

■

Languages to go. **Ryan-McFarland Corp.**, the Rolling Hills Estates, Calif.-based vendor of the RM/Cobol and RM/Fortran compilers, penned a distribution agreement with **First Software Corp.**, the nation's second largest software distributor. The agreement involves all versions of the compilers.

■

Ada developments. Santa Clara, Calif.'s **National Semiconductor Corp.** and Chantilly, Va.'s **Verdix Corp.** have inked a licensing agreement that will provide versions of the Verdix Ada Development System for National Semi's Series 3200 32-bit microprocessor family. National Semi will serve as an OEM for the versions. That company will also offer a cross-compiler for Digital Equipment Corp. VAX/VMS computers and Verdix will provide a custom runtime system for the Series 3200.

Also, **Softech, Inc.** of Waltham, Mass., won a more than $5 million, 22-month modification to its original contract with the **U.S. Army Communications Electronics Command** at Fort Monmouth, N.J. The contract extension involves Softech's Ada Language System (ALS) Ada programming support environment, built for the Army in 1984. Softech will retarget ALS to a bare VAX — one with no operating system — and to the Intel Corp. 80286 microprocessor.

■

For your information. **Sperry Corp.**, Blue Bell, Pa., has contracted with Newton, Mass.-based **Numerix Corp.** for the joint development of hardware and software interfaces between the Numerix Mars-432 array processor and Sperry's 1100 series computers. The interfaces, scheduled for April 1986 availability, will boast a data transfer rate to and from the Sperry computer of up to 5M byte/sec. and will enable a number of users to share the array processor. They will also allow several Mars-432s to be configured into one 1100 series system to boost system capability.

■

Of international interest. **NDX Corp.** of Rolling Hills Estates, Calif., has signed England-based **Admiral Computing Ltd.** to market the NDX Createbase family of information retrieval software in the UK, Europe and the Far East. The NDX products run on Tandem Computer, Inc. processors and IBM MVS- and CMS-based systems.

■

New arrival. The Washington, D.C.-based consulting firm **ICF, Inc.** has formed a wholly owned subsidiary called **Phase Linear Systems, Inc.**, which will distribute software developed by ICF for its clients. The first applications Phase Linear Systems will offer are for IBM mainframe users.

Healthy interest. St. Paul, Minn.-based **Code 3 Health Information Systems/3M** and **IHC Affiliated Services, Inc.** entered into a joint marketing agreement regarding Code 3's medical software, including its Codefinder, DRGFinder and CPTFinder systems, for the IBM System/38.

Code 3 and IHC/ASI recently completed development of the software, which is interfaced to the IHC medical records package.

M's the word. Westboro, Mass.-based **Data General Corp.** will make the **Intersystems Corp.** M package available through DG's Independent Software Vendor program.

M combines an American National Standards Institute version of the Mumps programming language with utilities and data management software.

M is scheduled to be available for DG systems in early 1986.

HOW TO
MAKE A
GREAT
IMPRESSION
AT THE
OFFICE

From page 27

Pricing in the Twilight Zone

form of maintenance fees. In Year 1, when Vendor Y was sitting on the $250,000 from Customer X, Vendor Y's balance sheet looked great. But in Year 2 and beyond, Vendor Y's balance sheet shows no new income beyond the maintenance fee, which is quickly absorbed by R&D and support projects.

That pricing strategy puts a lot of pressure on Vendor Y. Vendor Y must continue to sell the DBMS to keep the coffers full and the balance sheet rosy. Also, Vendor Y must sell more and more copies of the DBMS to continue to grow as the owners, stockholders or investors demand. And Vendor Y must continue to improve the product — an increasingly costly enterprise — to continue to sell it.

Vendor Y also has to start thinking about new products. In fact, Vendor Y has to do a great deal more than think. Vendor Y must come up with new products — and ones that are going to sell well — if Vendor Y hopes to stay a player in the software market. Unfortunately for Vendor Y, development and success in the software world is quite expensive and chancy at best.

What's worse, Vendor Y can never really be sure how much money will be available for R&D, marketing, sales, advertising and so on because Vendor Y cannot say with any certainty how many DBMS or other products will be sold in a given year. The fate of all of Vendor Y's plans rests on sales and the dollars coming in up front. When the market turns sour — and it turned sour this year — Vendor Y's cash flow is reduced to a trickle, and Vendor Y must take knife in hand and trim, trim, trim. That trimming, which at some point must impact R&D, doesn't do much for the long-term health of Vendor Y.

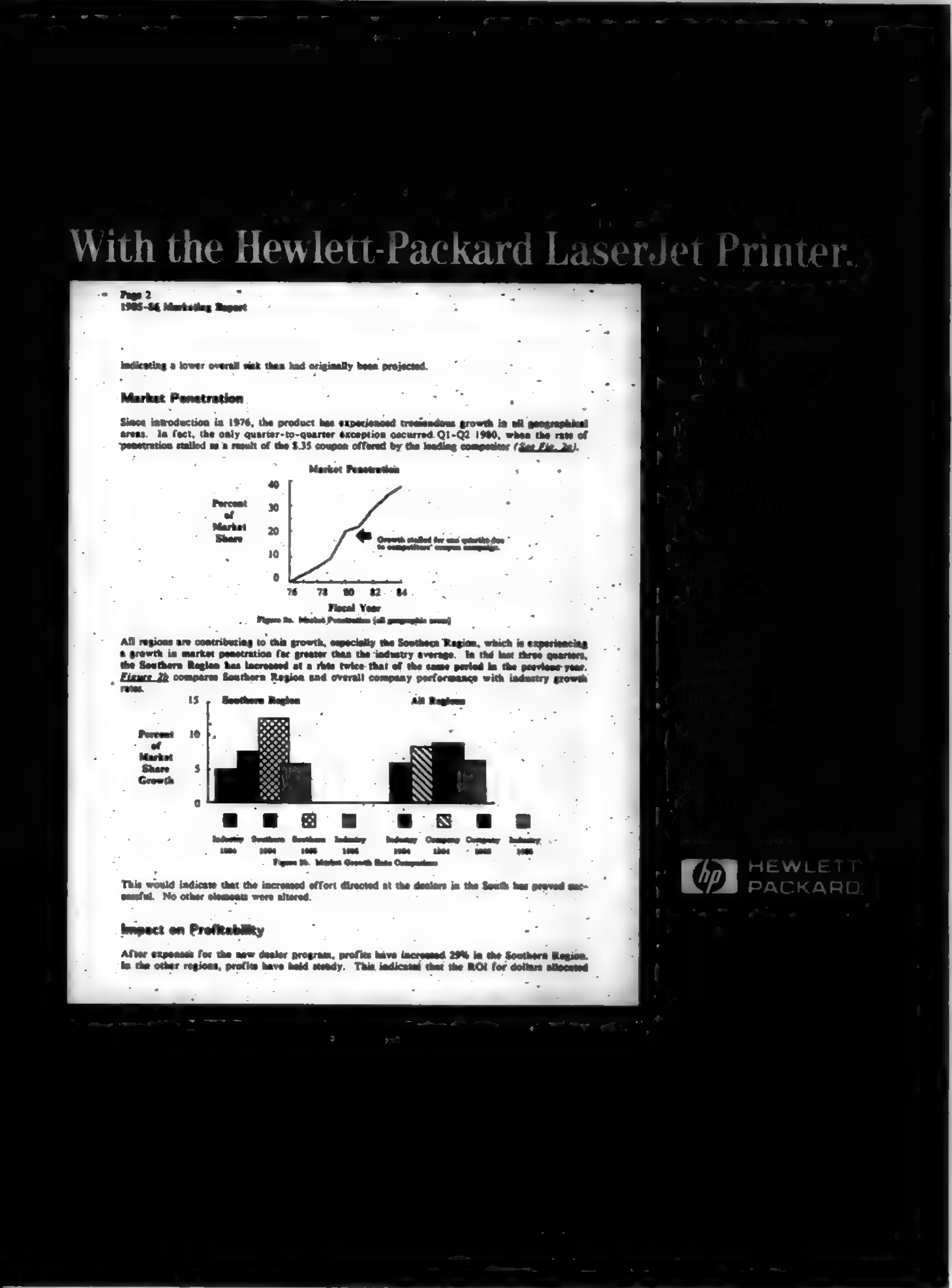
Why should Customer X care about Vendor Y's financial woes? Because, ultimately, the welfare of users depends on the health of vendors in the software industry. Customer X needs new applications to run on his new hardware — which, by the way, Customer X won't buy if there is no new software to run on it. And, because the business world is getting more competitive, Customer X needs Vendor Y to come up with ever better software systems if Customer X wants to maintain an edge over competitors. Alas, real advances in software technology cannot be made if development programs swell back and forth with the financial tides.

Realizing this, Customer X and Vendor Y agree that it might be better if Customer X paid Vendor Y a certain sum each year for the right to use the DBMS, say, $50,000 annually. Vendor Y would have a steadier income stream and could plan more effectively. If Customer X used the DBMS for 10 years, Vendor Y would double its revenue from the product over that span of time. Customer X wouldn't have to shell out $250,000 up front — ouch! — and could drop, without having paid out the full price, the DBMS later if it wasn't what Customer X really needed or wanted.

> ”
>
> *Real advances in software technology cannot be made if development programs swell back and forth with the financial tides.*

The problem is in the getting from here to there. If Vendor Y moved to an annual lease basis, Vendor Y's balance sheet will take a beating in the first year. Long-term benefits aside, a lot of people interested only in the year-to-year financial health of Vendor Y are going to look askance at the new strategy.

The annual lease pricing pasture certainly does look greener. But the fence that separates Vendor Y's yard from that pasture seems so high. If Vendor Y decides to take the lumps and climb that fence, Vendor Y can take heart from one fact. Another vendor — IBM — has embraced the short-term lease policy for most of its software products. And everyone knows who is the most successful software vendor in the world.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Page 2
1985-86 Marketing Report

indicating a lower overall risk than had originally been projected.

Market Penetration

Since introduction in 1976, the product has experienced tremendous growth in all geographical areas. In fact, the only quarter-to-quarter exception occurred Q1-Q2 1980, when the rate of penetration stalled as a result of the $.35 coupon offered by the leading competitor (See Fig. 2a).

Figure 2a. Market Penetration (all geographic areas)

All regions are contributing to this growth, especially the Southern Region, which is experiencing a growth in market penetration far greater than the industry average. In the last three quarters, the Southern Region has increased at a rate twice that of the same period in the previous year. Figure 2b compares Southern Region and overall company performance with industry growth rates.

Figure 2b. Market Growth Rate Comparison

This would indicate that the increased effort directed at the dealers in the South has proved successful. No other elements were altered.

Impact on Profitability

After expenses for the new dealer program, profits have increased 29% in the Southern Region. In the other regions, profits have held steady. This indicates that the ROI for dollars allocated

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Birmingham, AL, Nov. 7
Secaucus, NJ, Nov. 7
Albany, NY, Nov. 12
Ft. Lauderdale, FL, Dec. 5

MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Microsoft tries a power play

"There's a lot of inertia in the business," said Ida Cole, Microsoft Corp. applications vice-president. "We've got to give people a reason to change."

Microsoft hopes that one of the best reasons will be its Excel software, which squeaked in just ahead of its delivery deadline by shipping on the last day of September. An integrated financial analysis package, Excel is impressing many early reviewers, and it carries a clever banner into battle with Lotus Development Corp.'s 1-2-3 — Excel is "for those who understand the uses of power."

Much of Excel's strength and many of its flaws come from its delivery on the Apple Computer, Inc. Macintosh, which is "part and parcel of the product," Cole said. She acknowledged two obvious points: "The soap-opera press that Apple has gotten in the past several months does not warm the Mac in the hearts of corporate America," and Apple has been tardy in delivering related equipment.

The following are other notes from the Microsoft front:

- Cole described site licensing issues as "a bag of worms" but added that such licenses could turn into a good deal for both customer and vendor.

"Microsoft has not signed a true site license agreement in which, for some incredible sum of money, [it] signs over the right to duplicate [its] disks," she said, but the Bellevue, Wash., company is keeping a close eye on such agreements. Some companies, like Rockwell International Corp., have "very good controls" in place to administer site licensing, she said.

Continued on page 38

Remote micros connect for electronic meetings

By Charles Babcock

NEW YORK — Network Technologies International, Inc. has introduced a multiuser, on-line package for holding meetings via scattered microcomputers, while keeping an electronic record of the proceedings, according to officials for the Ann Arbor, Mich.-based start-up company.

A second recently released product allows lawyers in scattered locations to jointly create and edit a document.

The first package, Eforum, is being marketed by General Electric Information Services Co. of Rockville, Md., to the 6,000 corporate users of its Mark-Net telecommunications network. AT&T Communications of Basking Ridge, N.J., has acquired the rights to market the second package, Docuforum, to corporation lawyers, company spokesmen said.

Eforum runs its communications management on a host computer under AT&T's Unix operating system. But on the workstation version, participants may join the meeting by logging in on their IBM Personal Computers or Microsoft Corp. MS-DOS machines. A word processing package built into Eforum can interface with MS-DOS or IBM's PC-DOS and transmit standard ASCII files over a Unix network.

In addition, a user may interface with Eforum through his own word processing system, if that system happens to be Multimate International Corp.'s Multimate, IBM's Displaywrite or Micropro International Corp.'s Wordstar, and call up files from them while logged in to the meeting, according to Jeffrey Elpern, Network Technologies' vice-president for marketing.

As opposed to videoconferencing, not all meeting participants need to be on-line at the same time. The host computer can advance meeting agendas and comments to participants when they log in with the correct password, Elpern said. The software was designed to permit an exchange of information and ideas among members of a scattered group in different time zones or

Continued on page 38

Funk enhances Sideways tool

Version features three file printing programs

Funk Software, Inc. of Cambridge, Mass., has announced an enhanced version of its Sideways spreadsheet printing utility for the IBM Personal Computer.

Version 3 divides the software into three separate programs for printing files from Lotus Development Corp.'s 1-2-3, Lotus' Symphony or other compatible spreadsheet, word processing or scheduling programs, according to a Funk Software spokesman.

The version, scheduled for shipment Oct. 25, reportedly enables 1-2-3 users to read worksheet file formats directly.

The software also enables the use of a Lotus-like menu to retrieve and display worksheets, select printing options, paint a range or print out, according to the vendor.

Print options

Print options for 1-2-3 files reportedly include borders on three sides of a page, bold, expanded or underlined type and skip-over/print-through paper perforations.

For Symphony users, all formatting and printing features are said to be available from the standard Symphony menu.

Funk spokesmen said that other features of Version 3 include the ability to print IBM's extended ASCII character set.

Sideways Version 3 is priced at $69.95. Current users may upgrade for $20, according to the vendor.

INSIDE

Prime introduced the Performer, an OA workstation that can act as a terminal or a stand-alone system /34

NEW THIS WEEK

- IBM released APL and VS APL for the Personal Computer AT/370
- Version 3 of PC Paintbrush was released by ZSoft
- For more on these and other new products, see pp. 65-78.

INSTANT ANALYSIS

"Two of this century's greatest mysteries were solved in the past few weeks. We now know where lies the Titanic, and we now know what all of IBM's networking plans are."

— **William Krause**
3Com Corp.

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS

Prime OA workstation debuts as stand-alone, terminal

Prime Computer, Inc. of Natick, Mass., recently announced an office automation workstation that can run in stand-alone mode or as a terminal for its 50 series network.

The Performer workstation, an enhanced Convergent Technologies, Inc. NGEN terminal, is said to be priced 40% below Prime's 2-year-old Producer 100 workstation. Based on the 16-bit Intel Corp. 80186 microprocessor and running Convergent's CTOS operating system, the Performer reportedly runs dedicated word processing, business graphics and Microsoft Corp. Multiplan spreadsheet software in either stand-alone or network mode.

The Performer is available in a wide variety of configurations spanning a broad price range. A spokeswoman for the minicomputer vendor said the Performer will not run most IBM Personal Computer-compatible software without porting.

Mass storage options

The workstation features mass storage options expandable to 84M bytes and memory expandable to 1M byte. Fifteen-in. color and 12-in. monochrome monitors are also available.

Additional memory is obtained by plugging 256K-byte expansion cartridges into slots in the processor module. Storage options include a 5¼-in. floppy disk drive, one or two 10M-byte Winchester hard disks and one or two 32M-byte disk expansion modules. The current Producer 100 is expandable only to 16M bytes.

A fully configured cluster Performer workstation supports six users as opposed to the five supported on the fully configured Producer.

The Performer is priced at $3,545 for a diskless base configuration. Add-on prices are $1,895 for the 15-in. color monitor, $595 for the 256K-byte expansion cartridge, $3,999 for the 32M-byte disk expansion and $195 for Multiplan software.

The business graphics software and graphics controller are priced as a separate package at $1,195, the vendor said.

The Performer workstation is scheduled to be available in November.

Access tool out for Macintosh

Tri-Data Corp. of Mountain View, Calif., has announced the Netway 1000A communications server, a system combining hardware and software designed to enable users of Apple Computer, Inc. Macintoshes on an Appletalk network to access an IBM host computer.

Priced at $2,525, the Netway 1000A emulates an IBM 3274 controller, allowing Macintoshes on Appletalk to operate as 3278 Model 2 terminals. The Netway 1000A allows up to 16 Macintosh systems to access the IBM host simultaneously.

Unix, GCOS get IBM link

DTSS, Inc. of Hanover, N.H., has announced a micro communications product designed to connect IBM Personal Computers to AT&T's Unix and to Honeywell, Inc.'s GCOS operating systems.

Datapass offers error-checked uploading and downloading of binary or ASCII files across public networks, across local-area networks or over phone lines.

Supported host systems include Unix System III, System V and Berkeley 4.2, GCOS 3 or GCOS 8 and DTSS proprietary operating systems.

Datapass can also be used for personal computer to personal computer communications.

The product offers terminal emulation, key-selectable sign-on sequences, programmable soft keys, automatic restart and recovery of interrupted transfers and full access to DOS functions without loss of the host connection.

Users can save or print terminal sessions, utilize multiple communications ports and create macros to reduce repeat transactions to a single keystroke.

Pricing for Datapass is $695 for the Unix host, $4,900 for the GCOS and DTSS hosts and $160 for the micro diskettes.

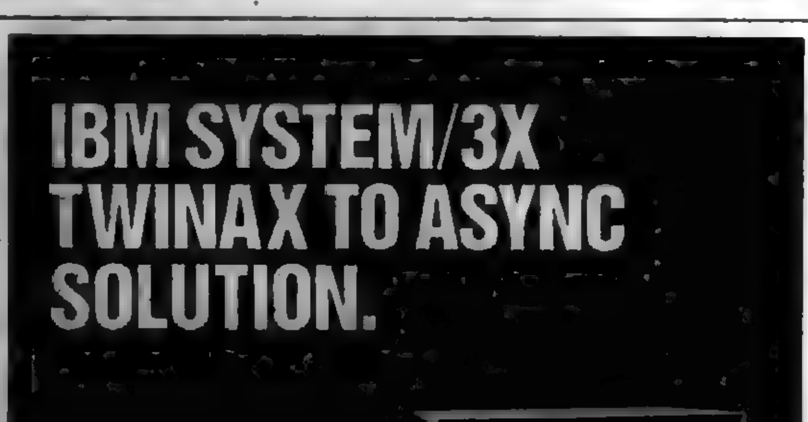
IBM launches Printer Option

IBM has announced the Printer Option, a circuit board and cable that reportedly allows the IBM Actionwriter 1 typewriter to serve as a letter-quality printer for IBM micros.

The option allows the typewriter to print using its normal correspondence print wheel at speeds up to 13 char./sec. The product uses a parallel interface and has light indicators for on/off, on-line/off-line and paper.

Users can reportedly switch the typewriter from typing to printer mode and back with one button.

Cost of the Printer Option is $260.



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MICROCOMPUTERS

From page 33

Remote micros connect meetings

at different times of day.

An attendee may periodically call up the latest comments or the entire transcript as other participants add their comments to the proceedings, Elpern said.

Eforum lists for $150 for the single-user workstation version. A multiuser version for the AT&T 3B2/300 computer costs $2,500 and for the 3B2/400, $5,000. The latter theoretically will support up to 2,000 users, but Elpern acknowledged that performance depends on intensity of use and number of users.

In addition to the Eforum software, a user will need a host computer as well as a micro for each participant. The host can be one of several machines capable of running Unix, including AT&T's 3B line or a Digital Equipment Corp. VAX. The smallest host possible is an AT&T Unix PC, which can support from 20 to 50 users. Eforum customers also may rent host time from Network Technologies at $26 per hour.

The second product, Docuforum, was conceived by AT&T Communications after the firm researched the needs of corporate legal departments. Network Technologies developed a prototype of the concurrent multiuser, text editing package to run under Unix, and the package is still capable of being accessed by IBM Personal Computers or compatibles.

After reviewing the prototype, AT&T Communications and Network Technologies signed a contract through which Network Technologies would develop the product and AT&T would have exclusive rights to market it to corporate legal departments. Network Technologies plans to market it to other potential users, Elpern said.

Docuforum reportedly permits lawyers in different locations to produce, comment on and edit text and exchange the resulting document with other lawyers. List prices for Docuforum are $4,000 on a 3B2/300, $7,500 on a 3B2/400, $12,000 on a 3B5 or DEC Microvax, $20,000 on a 3B15 or VAX 750 and $38,000 on a VAX 780-785.

Elpern said Network Technologies has raised $20 million to develop and market Eforum, Docuforum and successive products.

From page 33

Microsoft tries a power play

■ Despite all the talk this year about the Association of Data Processing Service Organizations, Inc.'s proposal for a lock-and-key setup, there are no near-term plans to launch the idea with any Microsoft applications.

■ "The religion at Microsoft is graphical user interfaces," Cole said. In her view, IBM microcomputers suitably equipped with add-on boards finally offer that at an affordable price, and Microsoft's Windows operating environment ("which cost us a bloody fortune") will be the key. Sometime next year Microsoft will offer Excel-like software for the IBM Personal Computers and other machines under Windows.

■ At Microsoft, "we have not yet come up with true IBM mainframe communications links," she said. However, the recent move in local-area network applications is a step in the right direction, and offerings from third-party vendors are beginning to fill in the gaps between Microsoft packages on the desktop system and mainframe applications, she maintained.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

What's a 'microsuper'?

In days of old, say, back in 1970 when engineers sauntered through corridors with holstered slide rules swinging at their hips, large companies and universities had what they called "computers."

Those in the know, people who had access to locked, chilled, glass rooms, called their computer "the system." That was it: slide rules, systems and, of course, paper.

But all of that was before marketing people were invented. With marketing people came distinctions. One company sold mainframes, another minicomputers and, eventually, microcomputers and supercomputers. Perhaps, an argument could be made for each of those four labels.

Then, as technology progressed and the 1970s faded into distant memories, justification for some computer classifications became strained. Marketers for every generation of computers at each level weren't happy with using existing labels or even with having their products called "high-end systems." Thus, supermini, supermicro and, within the past year, minisuper drifted into press releases and sales pitches.

Who knows what sets a supermini apart from a mini? If it is 32-bit processing, then how does a supermini differ from a supermicro? If it's the number of users, how do you tell a supermini from a mainframe? Who cares, particularly when there are more pressing issues in the world: inflation, war, hunger and the lack of good television entertainment?

What computer buyers really want to know is whether a system will address their needs, how fast and reliably it will run their own applications and with what existing products it compares. It is these types of questions that readers of *Computerworld* ask in daily telephone calls and letters to the newspaper.

What computer vendors and their

Continued on page 44

DEC beefs up Microvax II

Increases storage capacity of supermicrocomputer, adds hard-disk controller

Digital Equipment Corp. of Maynard, Mass., has released a new configuration of its Microvax II supermicrocomputer that is said to provide users with as much as 1G byte of mass storage in one system cabinet.

Concurrently, the company announced a faster throughput controller for its 5¼-in., 71M-byte hard disks that is said to increase disk performance for all Microvax II configurations.

The high-end system, housed in a 40-in. cabinet, is the fifth Microvax II system configuration available from the company, a spokesman said. The configuration enables users to connect as many as 33 serial lines to the system, compared with a maximum of 21 lines for earlier versions.

The basic configuration costs $42,506 and consists of a Microvax II processor with 5M bytes of memory, a controller for 456M- and 205M-byte disks, a 95M-byte ¼-in. streaming tape cartridge drive,

Continued on page 40

Financial printing firm will try configuration in typesetting operation

By Donna Raimondi

NEW YORK — It is not every day that a user's needs and a vendor's solution coincide so neatly. For Pandick, Inc., Digital Equipment Corp.'s release of added storage capacity on its Microvax II prompted a decision that could decentralize business applications and cut the cost of typesetting operations in the company.

The financial printing firm has ordered two Microvax IIs with 650M bytes of storage on each for its New York headquarters to verify that the machines will live up to expectations, according to John Reilly, director of business systems. If all goes well, and Reilly said he expects that it will, at least 20 Microvax IIs will be installed to perform typesetting functions — two in each of 10 full production facilities Pandick operates around the country.

The move could cut the company's typesetting and financial computing costs dra-

Continued on page 44

[illegible]

Large systems industry news

The following are observations on developments in large systems:

IBM's entry into supercomputing, with a vector processor for the IBM 3090, brought the usual reaction.

IBM analysts said the product was so-so in performance and overpriced, but supercomputer manufacturers and plug-compatible manufacturers should watch out because IBM is never satisfied with a small chunk of a market. They predicted a line of vector processors running up and down the IBM product line.

The plug-compatible manufacturers such as Amdahl Corp. and National Advanced Systems Corp., which mar-

Continued on page 40

Mid-line Zebra product debuts

General Automation, Inc. of Anaheim, Calif., has unwrapped a mid-level multiuser business computer in its Zebra line of systems. The Zebra 3750 will fit in between the company's low-end Zebra 1750 and high-end Zebra 5500E machines.

The Zebra 3750 runs under Pick Systems' Pick operating system. It includes a word processing system that is part of the Pick system, Raymond-Wayne Corp. of Phoenix's Compu-Sheet spreadsheet and Accu-Soft Enterprises of Sunland, Calif.'s Accu-Plot business graphics.

It features a Motorola, Inc. 68000-based CPU; 512K bytes of memory (expandable to 2M bytes); 64M to 256M bytes of fixed Winchester disk storage; a ¼-in. streaming cartridge tape drive (45M-byte to 60M-byte capacity) for backup; six to 38 asynchronous terminal or serial printer ports; and one parallel printer port.

In its base configuration, the Zebra 3750 costs $29,750.

INSIDE

Adra Systems introduces a Motorola 68010-based CAD system /40

NEW THIS WEEK

- Memorex unveils a Model 2024 printer
- Canon releases its Group III laser facsimile
- Apollo introduces two Tempest workstations
- For more on these and other new products, see pp. 65-78.

INSTANT ANALYSIS

"IBM's competitors face an unenviable task: They are expected by end users to communicate easily with IBM computers, which is something IBM computers themselves are not very good at."

— International Data Corp.'s EDP Industry Report

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*Based on inventory for Vehicle Leasing and Services Division, which does business as Ryder Truck Rental.
source: 1983 Ryder Systems, Inc. Annual Report and Third Quarter Report 1984

From page 39

Large systems industry news

but vector processors for their Japanese-made mainframes, reported that they were thrilled with IBM's price/performance figures. Naturally, they felt they could do better.

Seymour Cray, founder of supercomputer manufacturer Cray Research, Inc., said that his company will respond to IBM's announcement by continuing its effort to sell to the high end of the scientific market. Although Cray Research has some cross-development agreements with IBM, Cray said that his company was not involved in development of the new IBM product.

Answering questions after a presentation to French clients, Cray seemed unperturbed by the IBM announcement but dryly added, "I guess I should get back to work."

■

The vector processor could have sociopolitical repercussions in some organizations. Noting that engineers and scientists have worked for years to acquire their own $400,000 scientific processors, International Data Corp. analyst Frank Gens said those technical users may see their applications moved back to the mainframe. "It raises the question of whether users have to get back into bed with DP," he said.

■

Those who were waiting for IBM to announce a high-end model of the 4381 mainframe said they were unimpressed by the memory upgrades for the 4361. They noted that the added ability for 4361s to use the 3480 tape system was encouraging but that the more important move will be allowing the 4361 to use the 3380 disk drives that the 3480 is designed to back up.

■

Having all those Wang Laboratories users congregated in Boston for the company-sponsored International Society of Wang Users (ISWU) from Sept. 30 to Oct. 2 promoted an independent exposition as well. Wang seemed to ignore a show called Index '85 sponsored by the new Wang User Society of America (WUSA) that was held only three blocks from the main event.

Showgoers did not ignore the independent group, however. "I feel as if I have just discovered America," said an ISWU attendee who happened to find WUSA's Index '85. The Nynex Corp. employee, who did not want to be identified, found a software package at Index '85 that cost $1,400 and will pay for itself in about three weeks, she said. The package — from Easylink Service of Upper Saddle River, N.J. — will reside on the Wang VS 100 and will enable executive secretaries to transmit telexes directly around the world.

The attendee said she was also happy with the official ISWU show. Based on what she and her colleagues learned at last year's ISWU convention, they were able to create systems and communications that made their jobs much easier.

■

Meanwhile, Wang officials said the firm will release a version of its Wang Office product in the spring of 1986. That version will include programming hooks into the communications aspects of the system for application development by third-party vendors and in-house programmers.

The application programming interface subroutines have been released to a group of about 25 Wang-selected third-party vendors already, said Charles Magliato, program manager for Wang Office. The hooks should allow developers to access functions of the electronic mail, messaging and directory services within Wang Office.

The development efforts likely will be geared to departmental office functions of large companies, such as accounting and purchasing; to production applications like spreadsheet, decision support and graphics; and to applications like distribution or legal systems, Magliato said.

Adra unveils CAD system

Adra Systems, Inc. of Lowell, Mass., has released a computer-aided design and drafting system that supports the Iges 3 file transfer protocol.

The Adra 1000 includes a Motorola, Inc. 68010 processor, 2.5M bytes of main memory, a bit-slice graphics processor, a 19-in. 1,024- by 1,024-pixel monochrome display, a keyboard, a graphics table, a stylus and an 800K-byte diskette drive.

The system, which costs $15,750 in single quantities, also includes Adra's Cadra-II design and drafting software. It can be integrated into computer-aided design and manufacturing systems or can function as a stand-alone system.

From page 39

DEC increases storage of supermicrocomputer

an eight-line asynchronous multiplexer and Decnet/Ethernet interface.

The user must choose either the RA81 456M-byte Winchester-type 14-in. disk drive that costs $18,640 or the RA60 205M-byte removable-media 14-in. disk drive that costs $17,140 and an operating system license, according to the vendor.

Up to two 456M-byte disks or one 456M-byte and one 205M-byte disk can be installed in the processor's cabinet. A second standard disk cabinet with three disks can be added for $50,000. This gives disk capacity totaling up to 2G bytes of storage, the vendor said.

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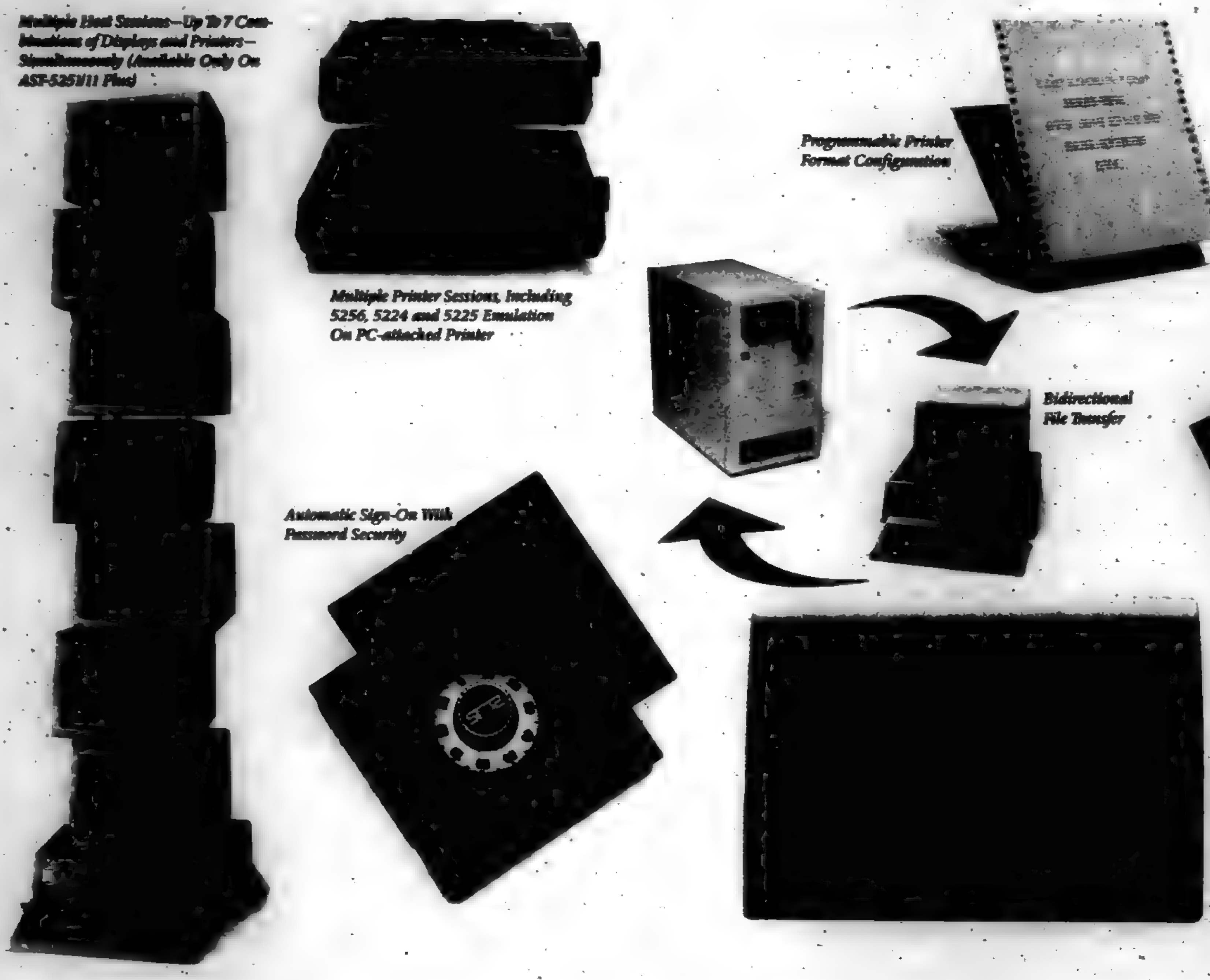
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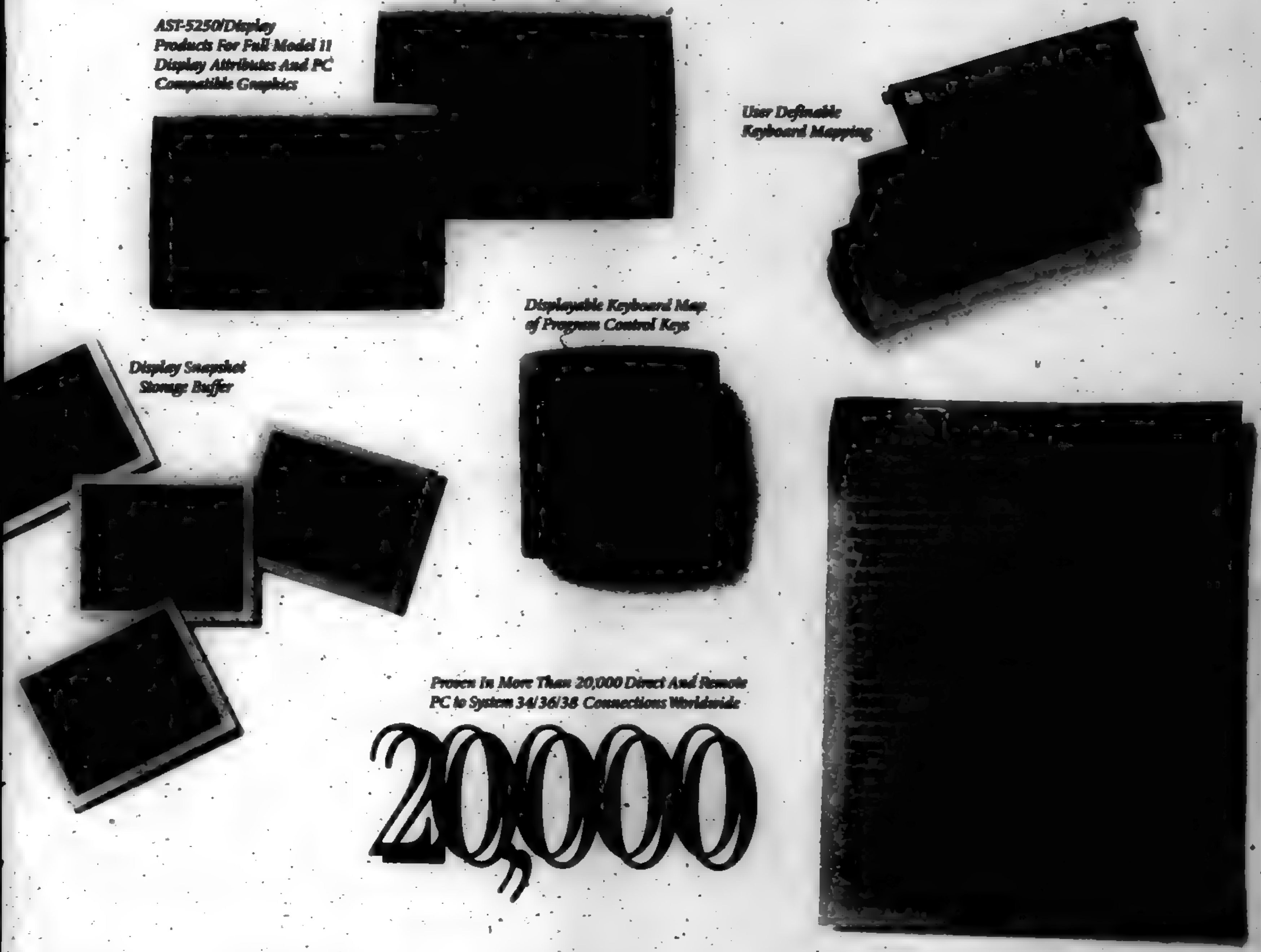
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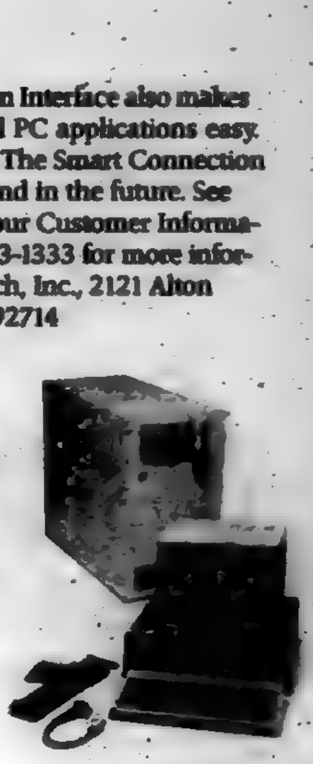

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From page 39

Printing firm to try configuration

matically, Reilly said. It will also cut in half the space needed for his systems.

The Microvax configuration Pandick bought is about half the size and two-thirds the price of similarly configured DEC VAX-11/750 machines, which Reilly had been considering to do the job.

Until now, it has not been cost-effective for the company to implement decentralized business applications. But because of the Microvax's enlarged disk capacity, up to 1G byte in a cabinet, it is now a viable system for Pandick's typesetting needs, Reilly said.

Having the machines in all 10 regions for typesetting would leave enough capacity to add on the Ross Systems, Inc. financial software that currently resides on the company's three PDP-11/70s and on a VAX-11/750 at headquarters.

"We were looking at [distributed VAX-11/750s] two years ago and that would have been very expensive," Reilly said.

Each of the 10 locations now has anywhere from two to six PDP-8s that were installed starting in 1973 for typesetting. The PDP-8s are tied to the main office by leased lines. When the Microvax IIs are implemented, they will be tied together via DEC's Decnet networking facility.

The typesetting itself is nothing but elaborate word processing, Reilly said. Pandick had Datalogics, Inc. of Chicago — a publishing and printing software development firm that has written composition software for Pandick — run benchmark tests to measure the Microvax's typesetting performance. Datalogics compared the Microvax II with the VAX-11/780.

Performance on the smaller machine, using some CPU-intensive standard composition software, exceeded that of the VAX-11/780 by about 5% in CPU time tests and was about equal in clocked time tests, according to Chuck Myers, vice-president of Datalogics.

The Microvax II disks were a little slower than the VAX-11/780 disks, he said, which accounted for the equivalent real-time performance.

From page 39

What is a 'microsuper'?

marketing types have done with their classifications, regarding issues of performance is confuse, not help, the customer.

Recently, one vendor came up with another handful of mud to cloud, rather than clear, the water.

Masscomp, also known as the Massachusetts Computer Corp., announced a new classification of computers — the micro supercomputer.

Masscomp casually dropped names like Cray Research, Inc. while putting its MC5000 series up against almost everything from single-user supermicros to Digital Equipment Corp. 8600s and the still-undefined minisupercomputer class. The implication was that one can now use a $15,000 tabletop system to do the work of a $7 million Cray 1 supercomputer.

The Masscomp ploy was simple: invent a classification and a definition that happens to match its own product line and hope that people will think of Masscomp when they think of micro supercomputers.

Naturally, Masscomp offered performance figures that showed its systems to be best buys. That is the company's right, and it is the type of salesmanship used for thousands of years.

But Masscomp could have done a favor for potential customers or for the casual newspaper reader. All the company needed to say was that it runs compute-intensive and floating-point-applications in a small-scale system and then offer its benchmark results, with a cost comparison to existing systems, such as much of DEC's VAX line.

Masscomp could have made a strong case for its systems just by relying on its facts. Instead, the company played the name game in hopes that the media would jump on board. Masscomp isn't the first to do that and certainly won't be the last. But the company would have done users a service by adopting the stance of *Dragnet*'s Sgt. Joe Friday — "Just the facts, ma'am, just the facts."

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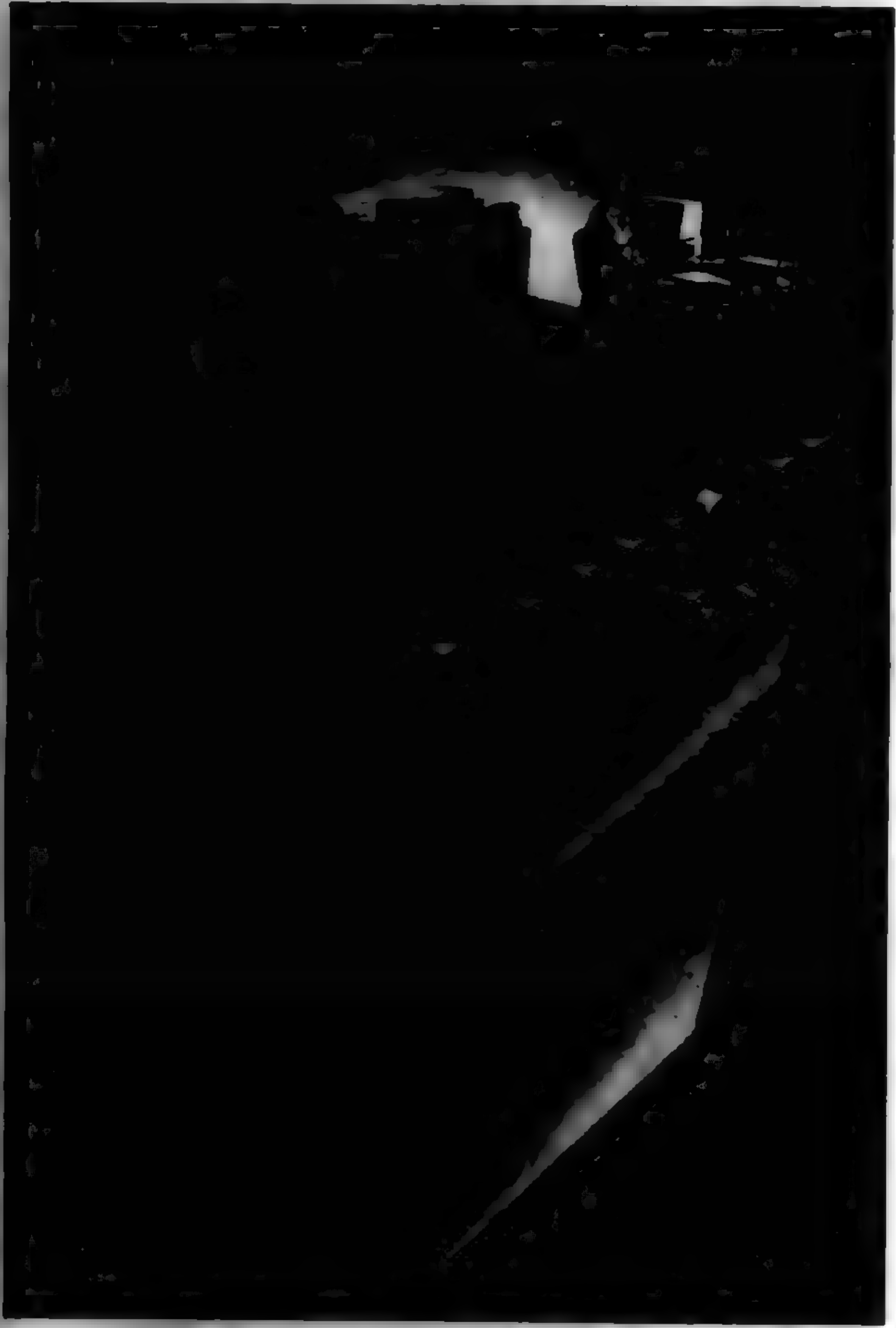

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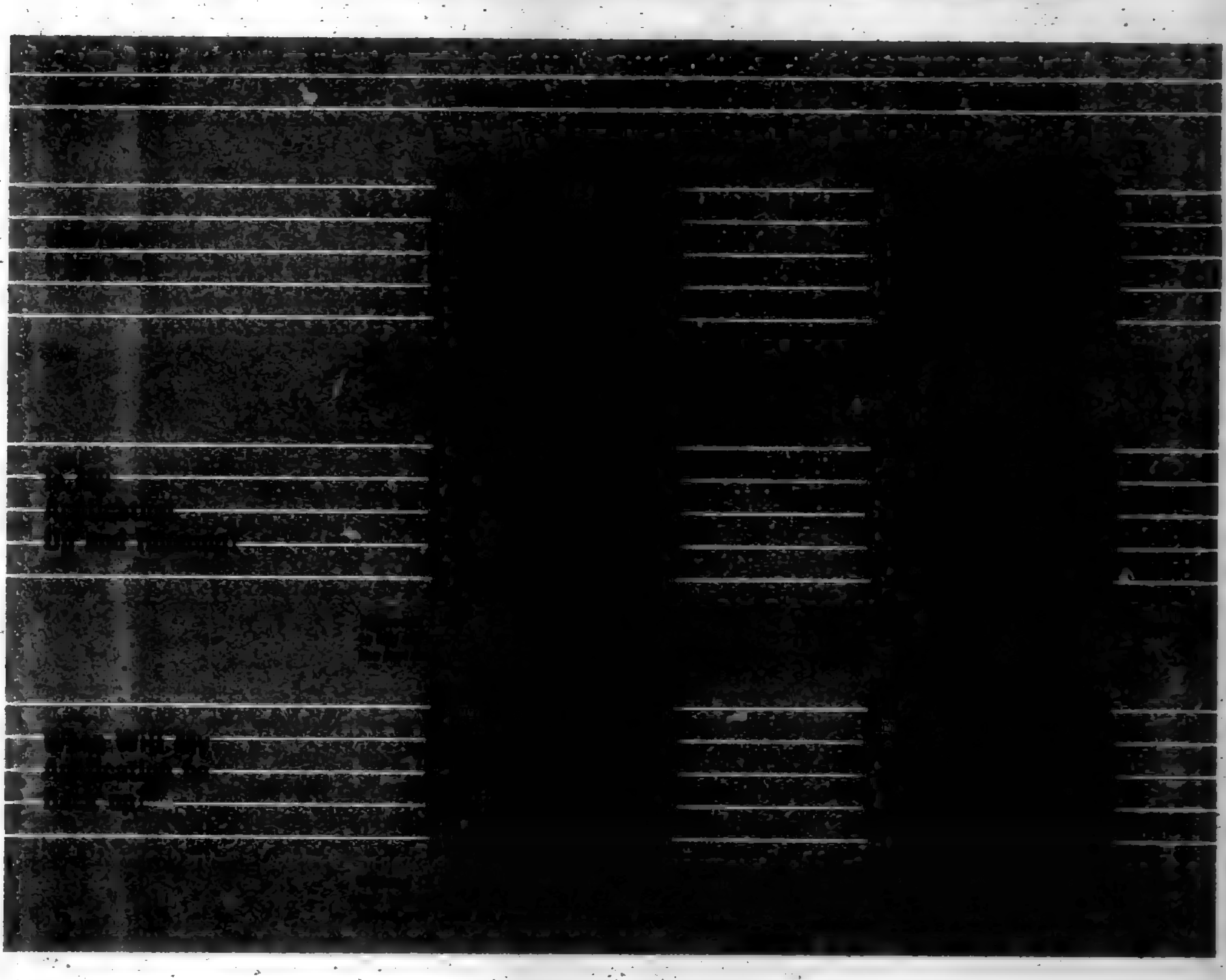

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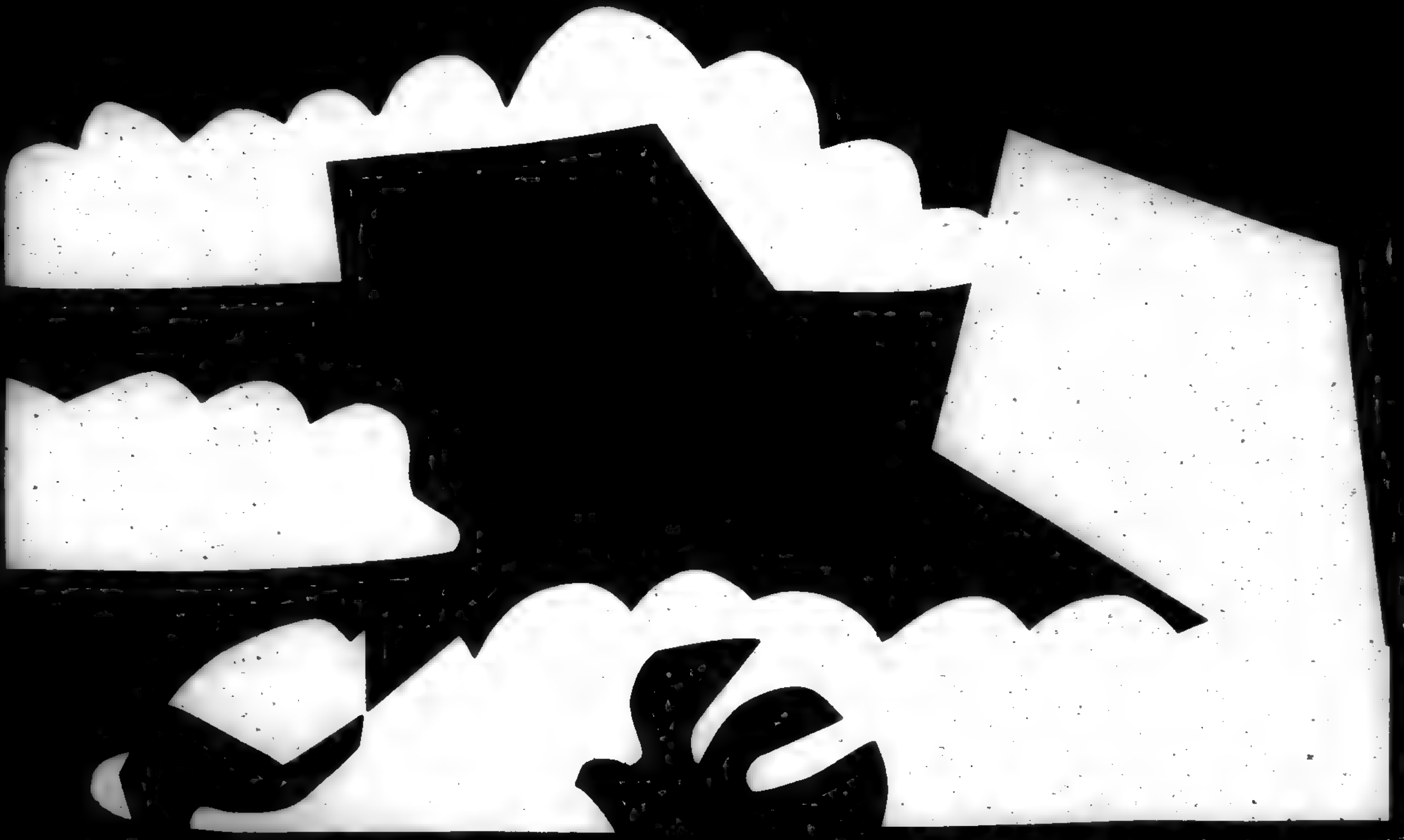

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IN DEPTH

Does your DBMS run by the rules?

To be "mid-80s" fully relational, a DBMS must support all 12 basic rules plus nine structural, 18 manipulative and all three integrity rules. There will be more requirements by the 1990s.

By E. F. Codd

Last week, the originator of the relational model described the 12 rules by which to measure any DBMS claiming to be relational. This week, Dr. E. F. Codd presents the practical consequences of his 12 rules as well as 30 additional features of a relational system. Then he asks vendors to measure up.

Part 2

No existing DBMS product that I know of can honestly claim to be fully relational at this time. The proposed ANSI standard does not fully comply with the relational model, so a DBMS' fidelity to the ANSI standard is no guarantee of relational capability. The standard could be modified, but already vendors are well advised to extend their products beyond the standard to support customers' DBMS needs fully.

In their ads and manuals, vendors have translated the term "minimally relational" to "fully relational," so more stringent criteria must be applied. Twelve rules (below) comprise a test to determine whether a product that is claimed to be fully relational is actually so. A grading scheme used to measure the degree of fidelity to the relational model follows.

A DBMS advertised as relational should comply with the following 12 rules:

1. The information rule.
2. The guaranteed access rule.
3. Systematic treatment of null values.
4. Active on-line catalog based on the relational model.
5. The comprehensive data sublanguage rule.
6. The view updating rule.
7. High-level insert, update and delete.
8. Physical data independence.
9. Logical data independence.
10. Integrity independence.
11. Distribution independence.
12. The nonsubversion rule.

E. F. Codd originated the relational model for data base management. He led the team that designed and implemented the first operating system with multiprogramming capability. This year he established two companies with Chris Date: The Relational Institute and the Codd & Date Consulting Group, both based in San Jose, Calif.

These rules are based on a single foundation rule. I call it Rule Zero:

For any system that is advertised as, or claimed to be, a relational data base management system, that system must be able to manage data bases entirely through its relational capabilities.

This rule must hold whether or not the system supports any nonrelational capabilities of managing data. Any DBMS that does not satisfy this Rule Zero is not worth rating as a relational DBMS.

But compliance with Rule Zero is not enough. Failure to support the information rule, guaranteed access rule, systematic nulls rule and catalog rule can make integrity impossible to maintain. These four rules support significantly higher standards for data base administration and control (authorization and integrity control) than earlier DBMS supported. Users should remember that a data base managed by a relational DBMS is likely to have both experienced and inexperienced users; it must be able to serve both.

Rule Zero not enough

Rules 1 and 4, the information and catalog rules, allow people with appropriate authorization (such as executives of the company) to find out easily via terminal what information is stored in a data base. I have encountered data base administrators using nonrelational systems who were unable to determine if a specific kind of information was recorded in their data base.

Rule 3, which calls for the inclusion of systematic support for unknown and inapplicable information by means of null values that are independent of data type, should help users to avoid foolish and possibly costly mistakes. The treatment of nulls, when aggregate functions such as total and average are applied, holds considerable interest for users. The Oracle DBMS in particular has an outstanding approach to null values. The user may specify whether the aggregate function is to ignore null values or yield a null result if any null value is encountered.

In general, controversy still surrounds the problem of missing and inapplicable information in data bases. It seems to me that those who complain loudly about the complexities of manipulating nulls are overlooking the fact that handling missing and inapplicable information is inherently complicated. Going back to programmer-specified default values does not solve the problem.

Rule 5, the comprehensive data sublanguage rule, is important for several reasons. First, it allows programmers to debug their data base statements interactively, treating them separately from whatever nondata base statements occur in their programs — a significant contributor to productivity. Second, it means that a single tool can be used for defining relations derived from the data base, whatever the purpose. The view updating rule, Rule 6, is vital for the system to support logical data independence.

> ”
>
> *The ANSI standard as now proposed is quite weak. It fails to support numerous features users need to reap the advantages of the relational approach.*

Rule 7, which requires a multiple-record-at-a-time attack on insertion, update and deletion, can help save a good portion of the total cost of intersite communication in a distributed data base. If the system includes a good optimizer (an important component in relational DBMS performance), this rule can also result in substantial saving of CPU and I/O time, whether the data base is distributed or not.

Failure to support independence (Rules 8 through 11) can, and very likely will, result in skyrocketing costs in both money and time. Developing and maintaining applications programs and terminal activities will be more expensive. Managers may even be unwilling to consider changing certain business policies simply because of the anticipated program maintenance costs.

Rule 12, the nonsubversion rule, is crucial in protecting the integrity of

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relational data bases. All too frequently, I have seen situations in which data base administrators with nonrelational DBMS failed to control their data bases adequately; consequently, they could not maintain a state of integrity.

Domains

Many users confuse the domain concept with the concept of attribute of a relation or column of a table. Other people (often the vendors themselves) dismiss the domain concept as "academic." My reply to them is: The atom bomb was also academic!

In fact, the domain concept is very important, practical and simple. A domain consists of the whole set of legal values that can occur in a column. The column draws its values from the domain. Each column of a relational data base has precisely one domain, but any number of columns may share a domain. There are several reasons why domains should be supported.

For example, in a financial data base, there may be as many as 50 distinct columns (possibly, but not necessarily, in distinct tables) defined around the U.S. currency domain. Why repeat the definition of currency 50 times? In data bases supported by nonrelational systems, I frequently observe many inconsistent declarations of value type for fields that were intended to have the same type.

It is unreasonable to expect a DBMS to store all the legal values in a domain, unless there happen to be very few. However, it is entirely reasonable — and very worthwhile — to insist that a DBMS should store certain values:

- For each domain, a description of the type of values in that domain. This information is global since it applies to the entire database, and it should of course be recorded in the catalog.
- For each column, the name of the domain from which that column draws its values. This domain name is a reference to the global definition.

Of course, the domain description can include range restrictions. For example, it could specify that quantities of parts in an inventory must not only be integers, they must also be non-negative.

Furthermore, individual columns may include additional range restrictions where these are semantically justifiable. In this example, the quantities of very expensive parts held in the inventory may be limited to some specified maximum.

One of the benefits of supporting the domain concept is that, in cases where several columns share a common domain, the declaration of the description of the legal values is largely or even completely factored out. For example, when there are 60 distinct columns defined on U.S. currency, the data base is much easier to manage and manipulate if one avoids making 60 distinct declarations for U.S. currency.

Before the relational discipline arrived, users had to make separate declarations, and as a result, many of the 60 in the example would turn out to be incompatible with one another by accident. The factoring of declaration that prevents these errors is achieved in Digital Equipment Corp.'s RDB, which has a concept of "global field definition." But RDB fails to support domain constraints on certain operations, such as join.

Another benefit of supporting the domain concept is that relational operators, such as joins and divides, that involve comparison of values between different columns can be constrained by the system. A DBMS can allow data base values to be compared only when they come from the same domain and are therefore comparable from the semantic viewpoint.

Such a constraint inhibits errors caused by interactive users of terminals who choose columns to be compared in such operations as joins. The wrong answers they obtain from these errors rarely uncover the errors themselves; meanwhile, unwise business decisions may be made based on these wrong answers.

For various reasons, it is important to support as a qualifier in a command what I call "semantic override" — the ability to have the system ignore the usual comparison constraints. Users should be able to authorize this override qualifier separately from the operator involved and should authorize it rarely, reserving it chiefly for detective work.

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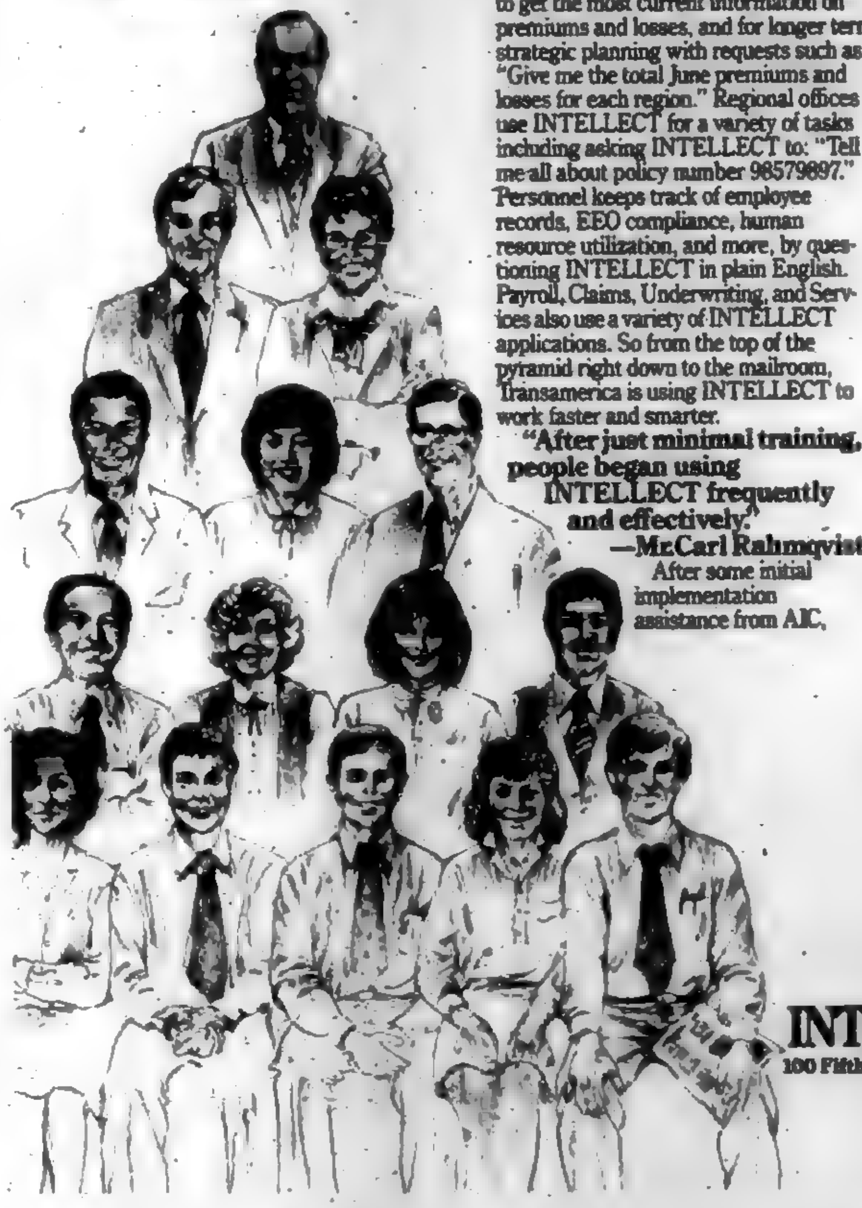

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Even when the domain concept is restricted to assigning types to data, it should not be confused with the hardware-supported data type. Consider the example of a data base listing suppliers, parts and projects. Suppose the hardware-supported data types of supplier serial numbers and part serial numbers are identical: each type consists of fixed-length strings of 12 characters. The system still needs to keep these two data types distinct and remember which columns are defined on one and which columns are defined on the other.

If it can make these distinctions, then when a request comes in to delete or archive all records containing X3 as a supplier serial number, the system can handle such a transaction correctly. The system will not delete or archive any record that contains X3 as a part serial number and that also does not contain X3 as a supplier serial number.

Today, such a data type is often called an application data type. The concept is supported in Pascal but in very few other languages that enjoy current use. The Pascal support does not, of course, include constraints on selects, unions, joins and divides.

The domain concept is basically what makes all the meaningful selects, unions, joins and divides known to the DBMS. Thus, the domain makes the data base meaningfully integrated, and it does so without prejudicing distributability.

Contrast this with CODASYL links and IMS hierarchic links. They represent the CODASYL and IMS concept that a link "integrates an otherwise unintegrated data base," but they have several unfortunate restrictions. Most importantly, they obstruct data base distribution because of the constraints and complexity their data structures introduce into decisions regarding how the data should be deployed.

A second serious drawback of links is that they are only paths. Generation of a result such as a join requires traversal of these paths by the application program. It seems superfluous to cite other difficulties with this concept.

Many relational DBMS and languages including SQL do not support the concepts of primary key and foreign key. I fail to see how these products can support the guaranteed access or the view updating rules without making the system aware of which column(s) constitute the primary key of **each base table.**

Furthermore, I fail to see how these products can support referential integrity or the view updating rule without offering clear support for both primary keys and foreign keys. For example, in SQL, the CREATE TABLE command should be extended to permit the user to declare which column or columns constitute the primary key and which constitute foreign keys. In addition, there should be a new CREATE DOMAIN command in SQL.

Rule	DB2	IDMS/R	Datacom/DB
1 Information rule	Yes	No	No
2 Guaranteed access rule	Partial	No	No
3 Systematic treatment of nulls	Partial	No	No
4 Active catalog based on resource management	Yes	No	No
5 Comprehensive data sublanguage	Yes	No	No
6 View-updating rule	No	No	No
7 High-level insert, update, delete	Yes	No	No
8 Physical data independence	Yes	Partial	Partial
9 Logical data independence	Partial	No	No
10 Integrity independence	No	No	No
11 Distribution independence	Yes	No	No
12 Nonsubversion rule	Yes	No	No
Score (1 for yes, 0 otherwise)	7	0	0

Figure 1

Fidelity

Figure 1 shows fidelity to the 12 rules by IBM's DB2, Cullinet Software, Inc.'s IDMS/R and Applied Data Research, Inc.'s Datacom/DB — examples chosen for their wide differences. These scores represent counts of compliance with each rule (score one for "yes" and zero for either "partial" or "no").

Actually, the information rule is so fundamental to the relational approach that a system's compliance with this rule should receive a much higher score than one. Weighting it as high as 10 would not be excessive. However, I shall avoid assigning different points for different features, just as I avoided a fractional score for partial support of a feature: It is too easy to be subjective in these matters.

DB2 scores quite well on the fidelity evaluation. Very few other DBMS score higher on the 12 rules, although some others score equally well. Both IDMS/R and Datacom/DB allow information to be represented in the order of records in storage and in repeating groups — directly violating the information rule. In the case of IDMS/R, information may also be represented in links between record types (CODASYL calls them "owner-member sets") and also in "areas."

Some vendors of nonrelational DBMS have quickly added a few relational features — in some, cases, very few features — in order to be

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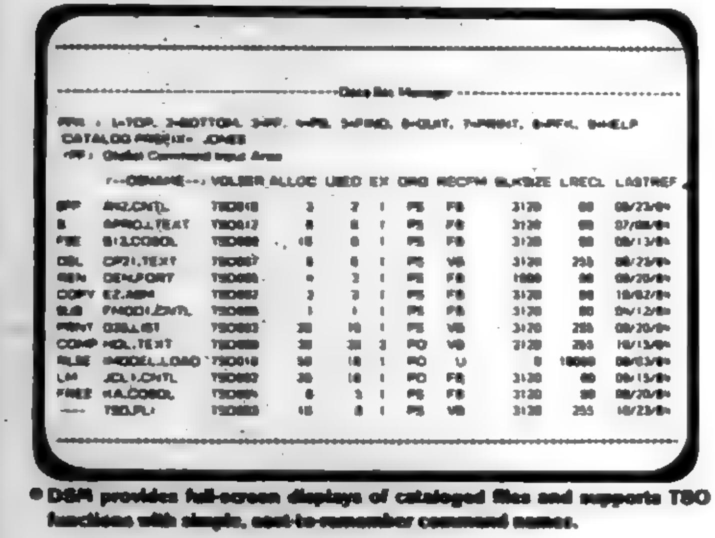

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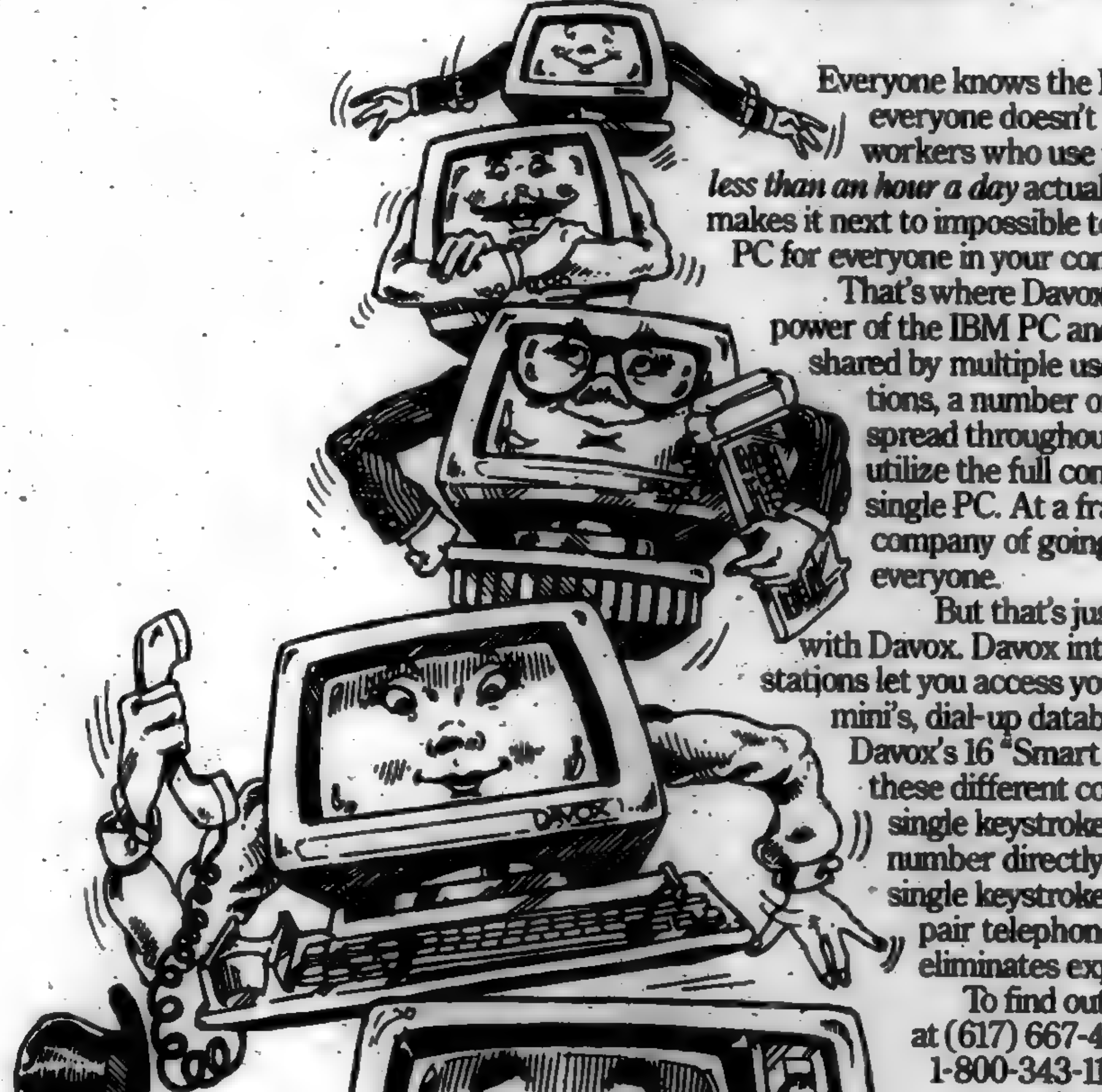

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able to claim their systems are relational, even though they may not meet simple requirements for being rated minimally relational.

These "born-again" systems keep their lower level languages (single record-at-a-time) open to users either to support compatibility with previously developed application programs or because the vendor takes the position that relational operators are applicable to query only.

In view of this, such systems fail to support the nonsubversion rule — a heavy penalty to pay for compatibility. IDMS/R and Datacom/DB are both born-again systems, and both fail to support the nonsubversion rule for integrity.

Features of the model

For a more detailed evaluation of DBMS, users can compare a system to the nine structural features, the 18 manipulative features and the three integrity features of the relational model. Each feature is defensible on practical as well as theoretical grounds.

The nine structural features are as follows:

S.1 Relations of assorted degrees — or equivalently tables with unnumbered rows, named columns, no positional concepts and no repeating groups.

S.2 Base tables representing the stored data.

S.3 Query tables — the result of any query is another table, which may be saved and later operated upon.

S.4 View tables — virtual tables that are represented internally by one or more relational commands, not by stored data. The defining commands are executed to the extent necessary when the view is invoked.

S.5 Snapshot tables — tables that are evaluated and stored in the data base, together with an entry in the catalog specifying the date and time of their creation plus a description.

S.6 Attributes — each column of each relational table is an attribute.

S.7 Domain — the set of values from which one or more columns obtain their values.

S.8 Primary key — each base table has one or more columns whose values identify each row of that table uniquely. The primary key provides the unique associative addressing property of the relational model that is implementation, software and hardware independent.

S.9 Foreign key — any column in the data base that is on the same domain as the primary key of some base relation. The foreign key serves as an important part of the support for referential integrity without introducing links into the programmer's or user's perspective.

Manipulative features

It is important to keep in mind that the relational model does not dictate the syntax of any DBMS language. Instead, it specifies the manipulative capability (that is, power) that a relational language should possess. At the same time, the model does not require the user to request the data base administrator to set up any special access paths, nor does it require the user to resort to iterative looping or recursion or Cartesian product.

The model also does not require the system to generate a Cartesian product as an intermediate result. In early papers this manipulative capability was expressed in two ways: algebraic and logic-based. The two ways were then shown to be of equal power.

This article uses the algebraic method of expressing the manipulative power, for explicative reasons.

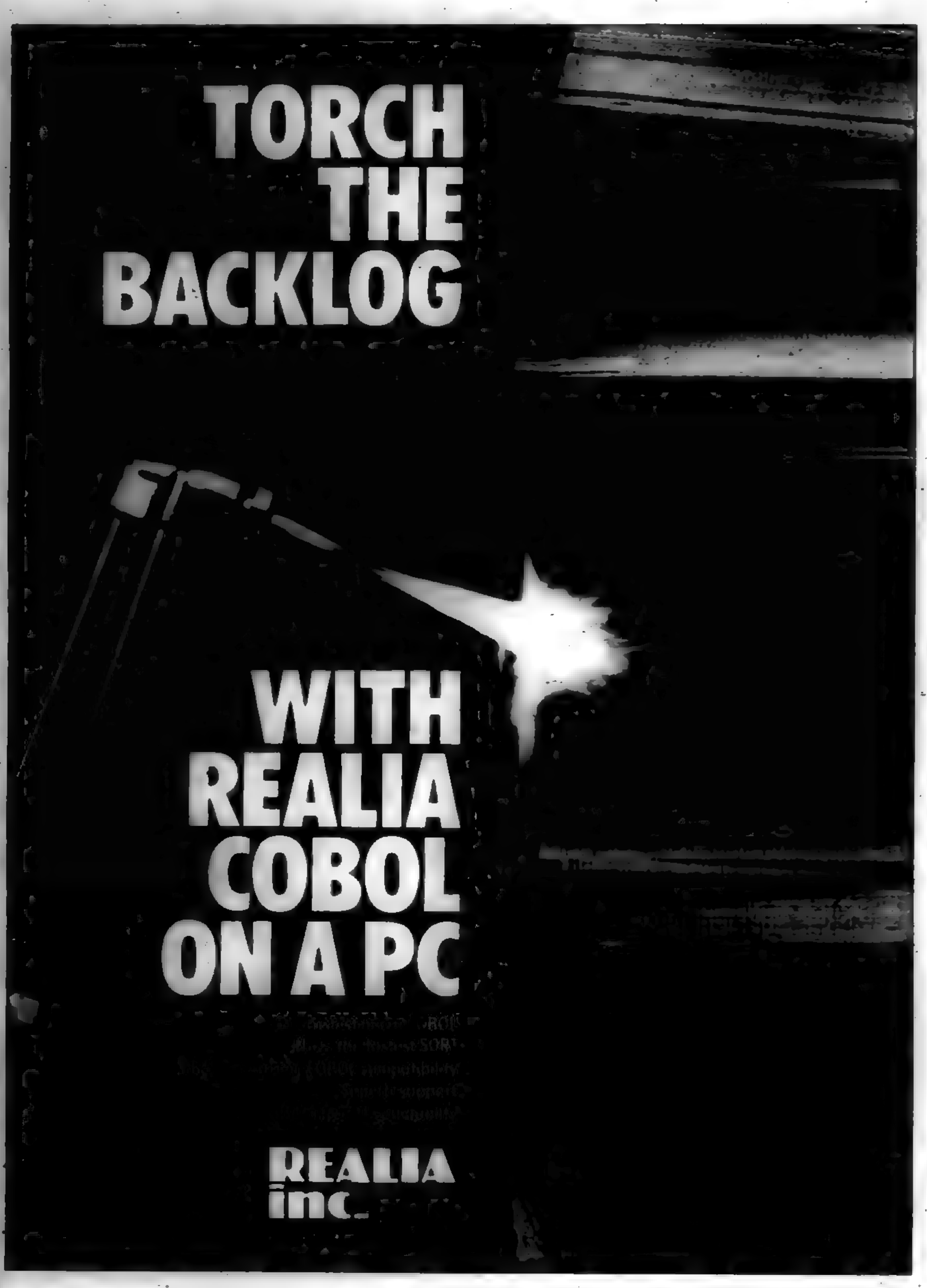
The manipulative features are as follows:

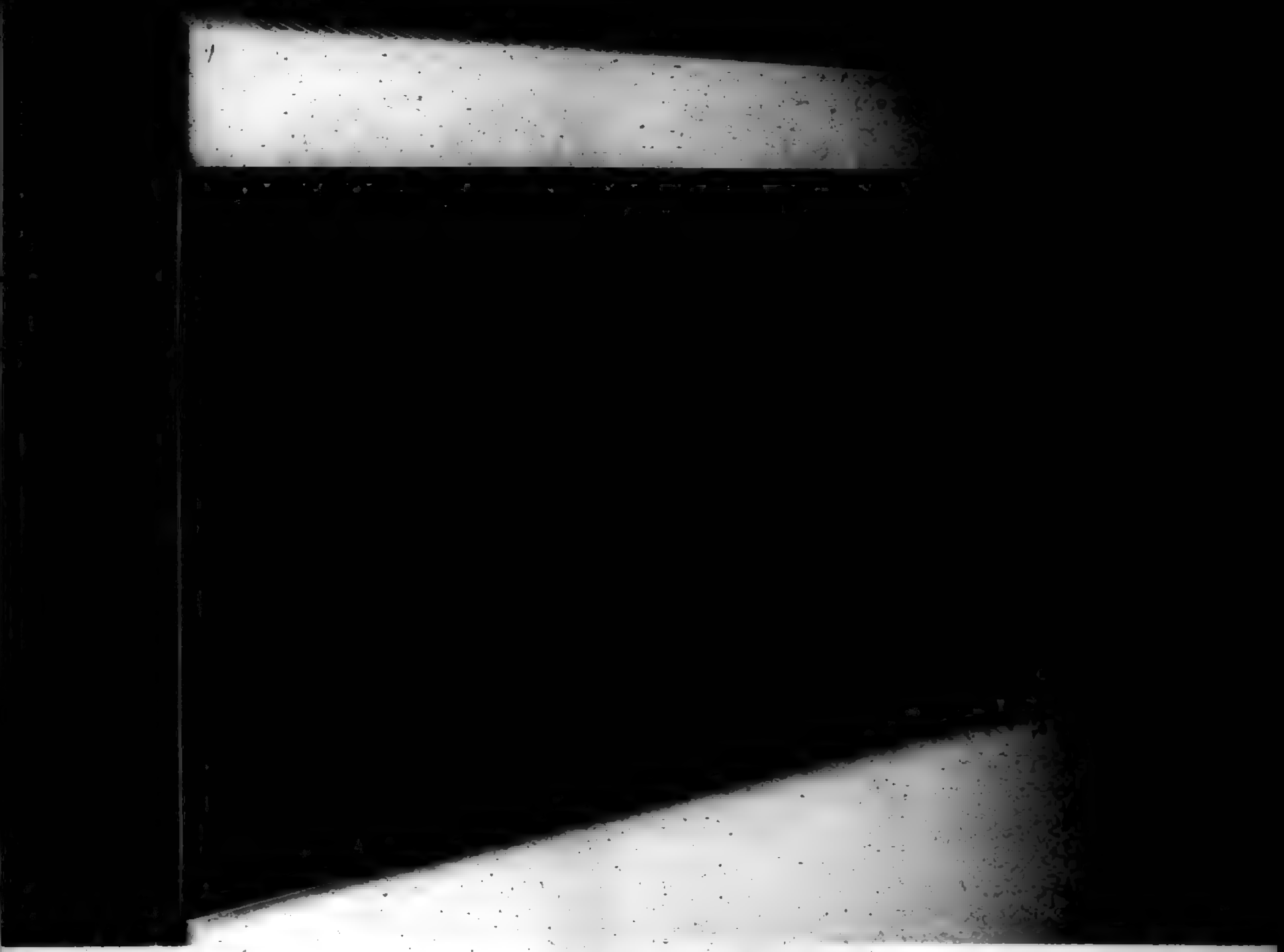
M.1 theta select
M.2 project
M.3 theta join
M.4 outer theta join
M.5 divide
M.6 union
M.7 intersection
M.8 set difference
M.9 outer union
M.10 relational assignment

M.11 theta select maybe
M.12 theta join maybe
M.13 outer theta join maybe
M.14 divide maybe

M.15 theta select semantic override (s/o)
M.16 theta join s/o
M.17 outer theta join s/o
M.18 divide s/o

In the list above, "theta" stands for any one of the comparators: equal, not equal, greater than, less than, greater than or equal to, less than or equal to.





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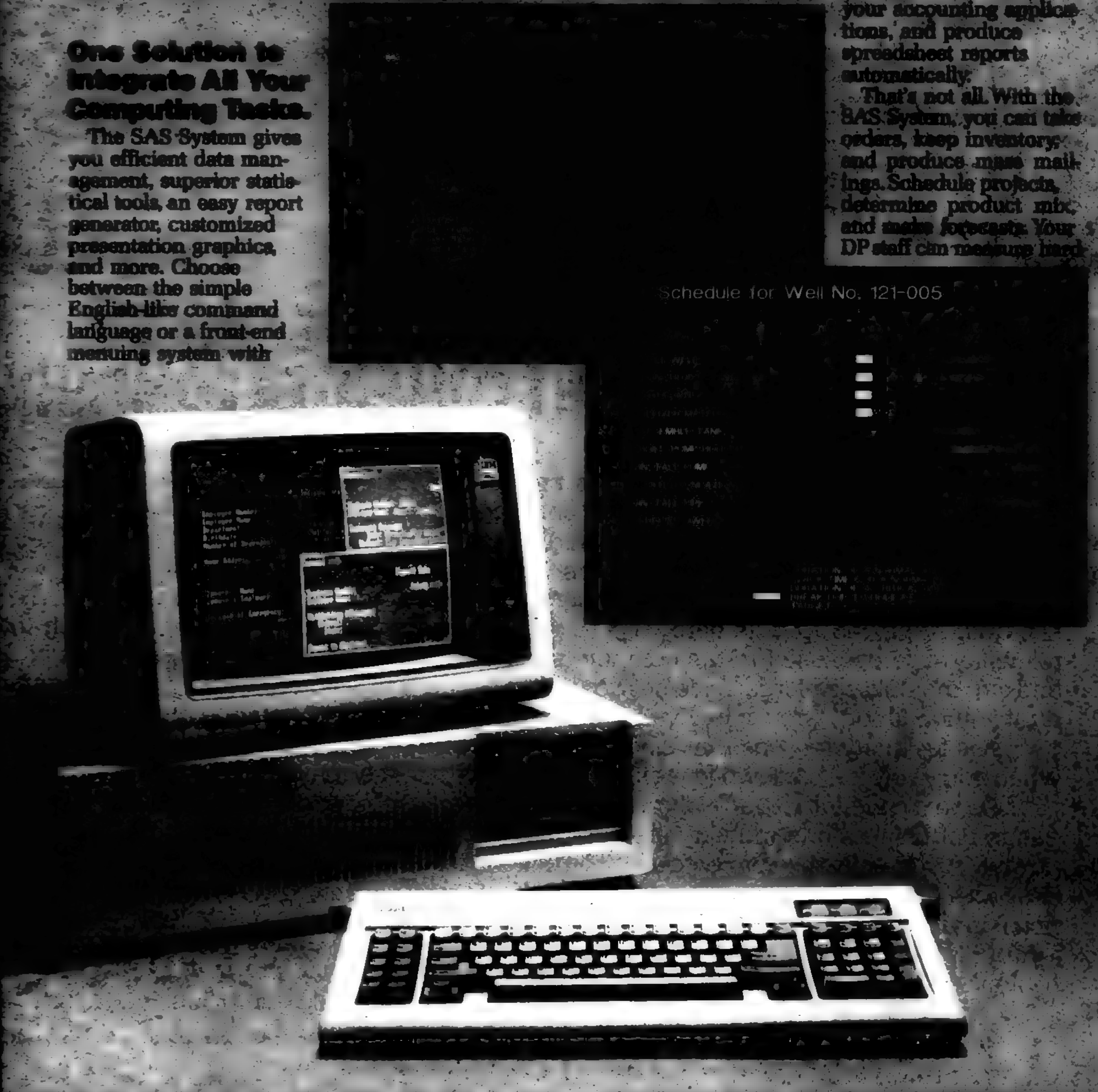

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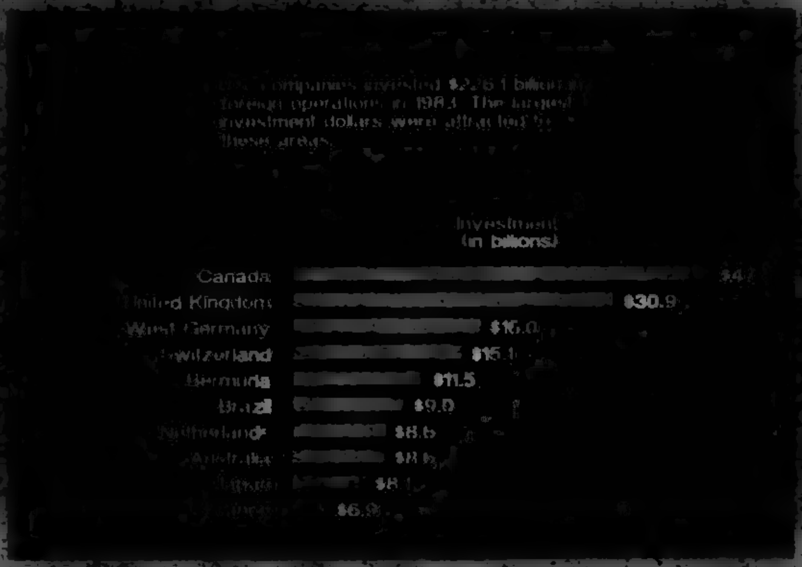
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The integrity features of the relational model must also be followed closely:

I.1 Entity integrity.
I.2 Referential integrity.
I.3 User-defined integrity.

The integrity features cited in I.3 are part of the comprehensive data sublanguage. They support the trigger and assertion approach to defining those integrity constraints that are specific to the particular data base. By contrast, I.1 and I.2 apply to all relational data bases. Examples of these extensions have been published, although not fully implemented, for both SQL and QBE.

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> *Your choice of DBMS now may well determine how readily your organization adapts to changes in the future.*

A simple rating technique

To be mid-80s fully relational, a DBMS must fully support all 12 of the basic rules, as well as all nine structural, all 18 manipulative and all three integrity rules of the relational model — a total of 42 features. I use the term "mid-80s" because it is likely that there will be a few more requirements by the nineties.

To provide a simple method of rating any DBMS on its fidelity to the relational model, treat each rule or feature fully supported by that DBMS as contributing one to the overall score (otherwise the contribution is zero). Then double the total score to obtain a percentage fidelity rating for the system.

If a DBMS were to achieve a total score of 42 out of 42 (and I believe no such DBMS presently exists), add 8 points to that score before doubling it — as a reward for true fidelity. Thus its fidelity percentage would be calculated to be 100.

The resulting fidelity percentage is not highly accurate. In fact, if it falls between 10% and 90%, I would recommend rounding it to the nearest multiple of 10% in order to avoid misrepresenting the accuracy by displaying more than one significant digit.

Evaluation against the model

By today's standards, 46% is a good, but improvable, fidelity percentage. Figure 2 shows the systems DB2, IDMS/R and Datacom/DB evaluated against all 30 features of the relational model. Often the 12 rules are by themselves adequate for comparison purposes. But this more detailed evaluation of the three systems primarily serves expository purposes.

Sometimes users say of a DBMS: "Why should I worry about the degree of its fidelity to the relational model? Surely it is enough for me to know about its fidelity to the ANSI SQL standard."

Unfortunately, the ANSI standard as now proposed is quite weak. It fails to support numerous features that users really need if they are to reap all the advantages of the relational approach.

ANSI's proposed standard for relational systems functions like a convoy, which can proceed only as fast as the slowest ship. The standard is based heavily on that portion of SQL supported by several vendors.

Listing the major differences between ANSI's SQL and, as an example, the SQL implemented in IBM's DB2 shows that ANSI's SQL is even less faithful to the relational model than the vendor's SQL:

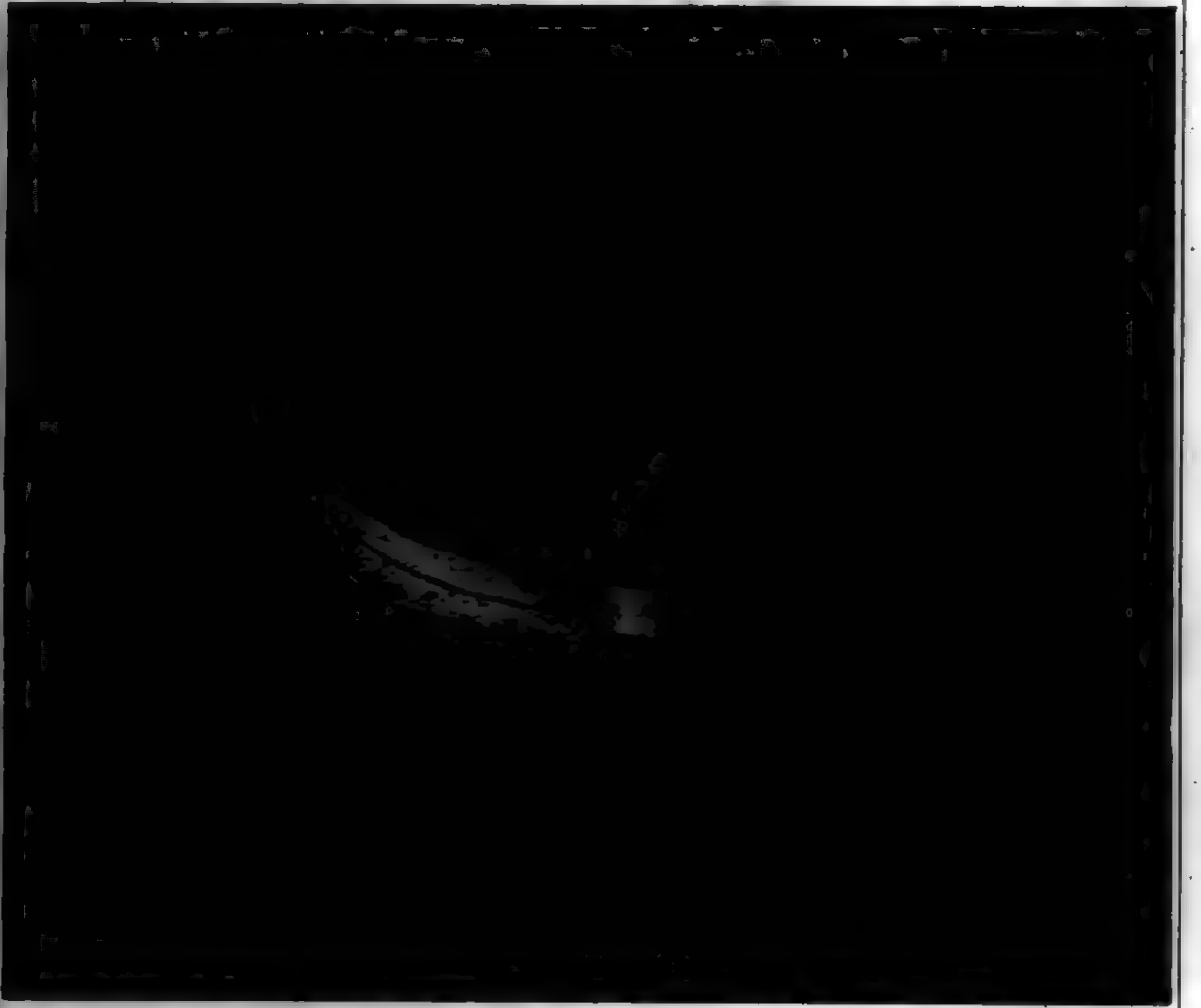
- The draft ANSI SQL does not specify catalog tables and does not allow CREATE or GRANT statements to be included in application programs. Instead, it requires a "schema" that specifies an authorization ID and a list of definitions of tables, views and privileges.
- ANSI does not support "dynamic SQL" — SQL statements that are computed at execute time.
- The set of reserved words in ANSI is significantly smaller than that in DB2.
- In ANSI, the "Unique" attribute applies to a column or combination of columns as it should, whereas in DB2 it applies to an index (which it should not).

The ANSI version, therefore, is inadequate as a tool for evaluating DBMS products. The remarks about DB2 apply to certain other vendors' products also.

My view of these ANSI items is as follows.

- Omitting catalog tables was a poor judgment; the catalog needs to be standardized. The ANSI version looks like a survivor of non-dynamic CODASYL.
- Failure to support dynamic SQL was another poor choice. This feature is needed and is used.
- The smaller set of reserved words places vendors with relational DBMS products that go beyond the proposed ANSI standard in a potentially difficult situation. Several vendors find themselves in this category.
- The ANSI treatment of the "Unique" attribute is good in my opinion. An index is treated by ANSI as a purely performance-oriented tool, so there are no semantic consequences of dropping one.

My main criticism of the ANSI Level 1 and Level 2 proposed standard for relational data bases is that inadequate attention is given to some very important areas. For example, the comprehensive, dual-mode data sublanguage capability that SQL



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(as implemented) already possesses is underemphasized. The entire range of SQL implementations from the large mainframes down to the micro is not adequately addressed.

Finally, ANSI ought to extend presently supported SQL to a version that fully supports the relational model, including distributed data base. At the very least, ANSI should generate a statement of direction adequate to permit vendors to extend the fidelity of their products without risking incompatibility with some future standard.

Extensions of SQL that provide this support now can be forecast in detail and with some reliability. Any standard adopted now should not make these extensions impossible or even difficult in the future.

Three buying factors

Any buyer confronted with the decision of which DBMS to acquire should weigh three factors heavily. The first factor is the buyer's performance requirements, often expressed in terms of the number of transactions that must be executed per second. The average complexity of each transaction is also an important consideration. Only if the performance requirements are extremely severe should buyers rule out present relational DBMS products on this basis. Even then buyers should design performance tests of their own, rather than rely on vendor-designed tests or vendor-declared strategies.

The second factor is reduced costs for developing new data bases and new application programs. Relational DBMS provide significant reduction in these costs, when compared with either the CODASYL or hierarchic approaches. Fourth-generation languages are no substitute, although they may provide some additional productivity.

The third factor is protecting future investments in application programs by acquiring a DBMS with a solid theoretical foundation and reliable support for high productivity and distributability. In every case, a relational DBMS wins on factors two and three. In many cases, it can win on factor one also — in spite of all the myths about performance.

Then the question arises: Which relational DBMS? The system chosen should not only be a DBMS with a good percentage of fidelity to the relational model, but should be extensible at some future time. Ideally a good DBMS will be extended soon to provide 100% support without logically impairing the customer's investment in application programs.

> ”
>
> *At the very least, ANSI should generate a statement of direction to permit vendors to extend their products without risking incompatibility with some future standard.*

Buyers should be cautious with vendors that make strong claims — claiming the system is "post relational" (especially when no definition for this term is supplied), or claiming that the DBMS choice has no importance. In fact, your choice of DBMS now may well determine how readily your organization adapts to changes in the future.

It is time vendors realize that all the features of the relational model are interrelated and interdependent. Missing features leave large gaps in the integrity control and usability of a DBMS implementation.

There is nothing on the horizon right now that looks strong enough and practical enough to replace the relational approach. Moreover, because the relational approach relies on such a solid theoretical foundation, its lifetime will last much longer than the CODASYL, hierarchic or tabular approaches.

I also believe that it will be much easier for relational DBMS users to convert to whatever future approach appears to be superior, for two reasons. The relational approach insists on all information being recorded explicitly. Moreover, the approach has a close tie to first-order predicate logic — a logic on which most of mathematics is based, hence a logic which can be expected to have strength, endurance and many applications. ■

[illegible]

	[illegible]	IDMS R	Datacom DB
Relations	Yes	No	No
Base tables	Yes	Yes	Yes
View tables	Yes	No	No
Query tables	Yes	No	Yes
Snapshot tables	No	No	No
Attributes	Yes	Yes	Yes
Domains	No	No	No
Primary keys	Partial	No	No
Foreign keys	No	No	No
Theta select	Yes	Yes	Yes
Project	Yes	Yes	Yes
Theta join	Yes	Partial	No
Outer theta join	No	No	No
Union	Yes	No	No
Outer union	No	No	No
Intersection	Yes	No	No
Set difference	Yes	No	No
Division	Yes	No	No
Relational assignment	Yes	No	No
Maybe theta select	Yes	No	No
Maybe theta join	Yes	No	No
Maybe outer theta join	No	No	No
Maybe divide	Yes	No	No
S/O theta select	No	No	No
S/O theta join	No	No	No
S/O outer theta join	No	No	No
S/O divide	No	No	No
[illegible] integrity	[illegible]	[illegible]	[illegible]
[illegible] integrity	No	Partial	[illegible]
[illegible] integrity	Partial	No	[illegible]
Total score against relational model (1 for full support, 0 otherwise)	16	[illegible]	5
Total score on 12 rules	7	[illegible]	[illegible]
Grand total score	23	6	5
% fidelity	[illegible]	[illegible]	[illegible]

Figure 2

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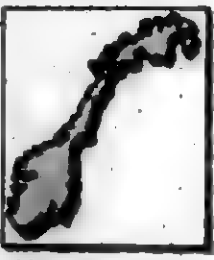

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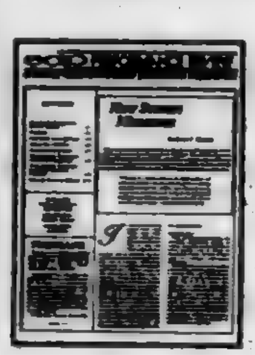

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Accounting for computers

1. Are we spending the right amount on computers?
2. Are we spending on the right things?
3. Why are we spending so much?

When management asks, can you answer?

By Kenneth Rau

If you listen closely, you will find the three questions most often asked by senior managers involved with computers are: Are we spending the right amount on computers? Are we spending it on the right things? Why are we spending so much?

Too often DP managers retreat from these forthright management questions into the safety of hardware and software specifications. It is as if we considered the analytical tools of the accounting profession distasteful and inapplicable to DP.

But such is not the case. Financial analysis, ratios and funding models are powerful tools in the DP manager's hands. Together, they can be used to shed light on many of the mysteries that surround computers in the minds of senior managers today.

Establishing "the right amount" to spend is no mean feat. Over the last twenty years, one rule-of-thumb has surfaced as an industry norm: the 1% rule. This principle holds that on the average, companies can expect to spend 1% of the total corporate revenues on data processing.

Now just because other companies spend this amount doesn't mean that's what your company should spend. It doesn't even mean that if this is what you are spending then you're spending the right amount, but it is a starting point. Just the exercise of comparing a company's spending with this benchmark can be useful as it often raises subordinate questions: How much are we spending on computers? How much spending on computers is going on outside of the DP department? How should we capture and account for expenditures on such items as personal computers, personal computer software, service bureaus, contractors and so on.

Effective use of the 1% rule concentrates on explaining observed variations. Variations from the industry benchmark divide into two types: variations caused by circumstances and variations caused by strategy.

Circumstances frequently associated with spending less than 1% of revenue on data processing typically apply to the following:

- Heavy, capital-intensive industries such as chemicals, metals or oils.
- Mature industries such as automobiles, textiles or machine tools.
- Noncompetitive markets such as agriculture or utilities.
- Cottage industries including hospitals, real estate and some retail trades.
- Start-up companies.
- Very small firms.

Conversely, companies in the service and high-tech industries frequently spend more than 1% of revenue on DP. Competitive consumer environments, particularly those in which DP is a service offering (banking, insurance, airlines), also tend to spend more than the industry average.

Surprisingly, the size of the firm within its industry seems to have only a slight, occasional effect on variations from the spending rule. Smaller firms can get away with spending less, but only for a while.

Spending the right amount

Management strategies, deliberate or de facto, can be more influential than circumstances in affecting spending patterns. Companies that view themselves as leading edge, entrepreneurial or aggressive tend to spend more than circumstances would suggest. Conversely, conservative, methodical companies often spend less. Senior managers, and in particular chief executive officers, who articulate a strategy of spending more (or less) on DP and then follow up with actions can have the most dramatic effect of all on causing variations from the norm.

By helping senior managers understand how much they are spending on data processing, how much they are spending compared with others and why their spending varies, DP managers can relieve their concerns about whether they are spending the right amount. Alternatively, where such analyses produce unexpected results, underlying causal strategies can be exposed, questioned and altered where appropriate.

Financial analysis tools bear interesting and useful fruit when applied to the second key management question: Are we spending on the right things? Determining how the overall investment in DP is allocated among the various options reveals additional implicit strategies and may suggest ways to improve performance.

Kenneth Rau is president of The Winchester Consulting Group. The Woburn, Mass. group acts as management consultant to MIS organizations and performs market research for vendors. Rau is a frequent lecturer on data resource management and micro-to-mainframe links.

IN DEPTH/FINANCIAL ANALYSIS FOR DP

Spending on DP can be viewed in at least four ways: 1) by object of expense, that is, by general ledger line item, 2) by application system, 3) by user area and 4) by activity.

> ”
>
> *Too often DP managers retreat from management questions into the safety of specifications. It is as if we considered the analytical tools of accounting distasteful.*

Spending on the right things

The most common way to report DP spending is by object of expense. Industry averages suggest 40% of DP expense today is personnel related, 33% is hardware related, 13% is software related and 4% is data communications related. The remaining 10% includes supplies, occupancy, allocations and miscellany. By comparing the planned or actual DP expenditures to such averages, managers can determine whether the firm is spending DP dollars on "the right things."

The principle service provided by DP is processing transactions against application systems such as payroll, order entry, funds transfer or material requirements planning (MRP). Recasting the DP dollars by the amount spent per application yields a useful analysis. Its analogy in cost accounting is product costing.

Most medium and larger computers today use system software that contains programs to report on system resources consumed by application, so many companies perform this type of analysis. By dividing total DP operating costs by the percent of resources consumed by each application, DP can produce a crude analysis of cost by application system. Cost per application transaction can also be reported in this way.

By shining a spotlight on the absolute cost of producing an invoice or paycheck, managers can learn and infer a great deal about whether DP dollars are being spent on the right things. A comparison of transaction costs can lead to recommendations for system replacement or even discontinuance. Noting trends in application transaction costs over time and changes resulting from new system acquisitions (hardware or software) provides a high-level measure of whether promised benefits and cost improvements were realized.

Accounting by user area refers to tracking functional areas within the company (accounting, marketing, manufacturing and so on), geographic divisions or businesses. Comparisons of the percent of DP dollars spent by user area with the percent of total corporate dollars spent by user area affords a useful analysis. Management can use the results to formulate specific strategies for aligning DP spending patterns with overall spending strategies.

To answer the question: "Are we spending our DP dollars on the right things?" DP can classify expenditures by activities performed. DP functions typically perform four activities:

- Production — running the existing applications on the computer.
- Maintenance — keeping systems in good repair and capable of satisfying user requirements.
- Development — designing and installing new or replacement systems for the computer.
- Administration — managing, controlling and planning for DP.

Figure 1 depicts industry average spending for these four activities as a percent of total DP spending. The chart also shows expected ratios between key activities.

The suggested ratio of development to maintenance costs of 1:1 is appropriate for a stablized DP function. This ratio favors development in newly established functions where maintenance is not yet a major expense. Whenever this ratio favors maintenance, managers should suspect underfunding of DP. The slanted ratio suggests that old systems are not being replaced and that the organization is milking its installed base of application systems. Left uncorrected, the imbalance puts the organization at risk of losing efficiency and competitive edge.

The ratio between the cost of

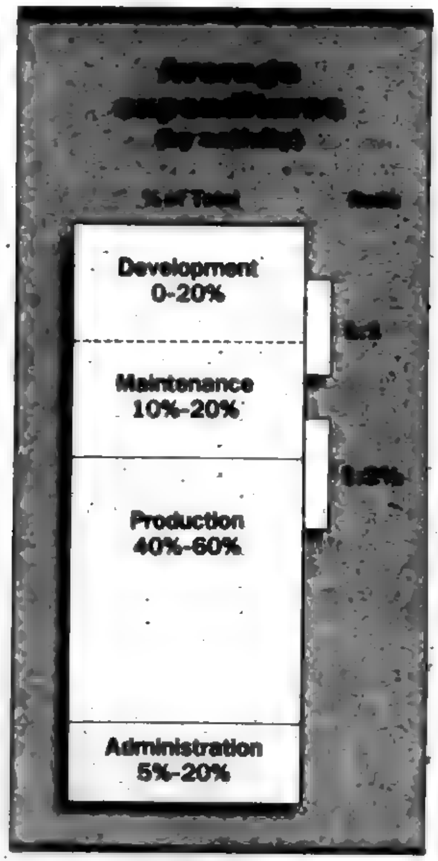
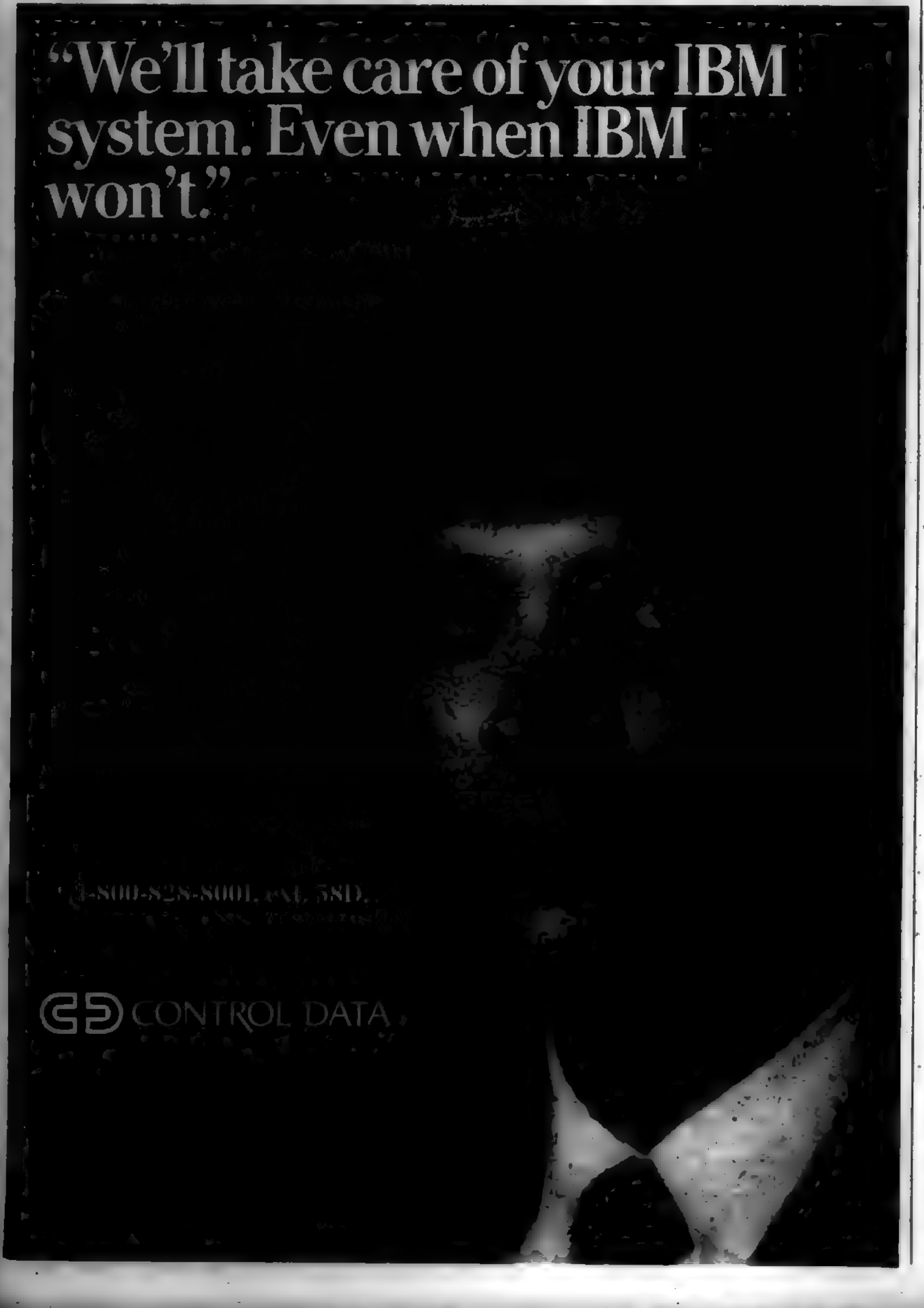


Figure 1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computer operation (production) and the cost of system maintenance should be approximately 2½:1. Much higher ratios suggest application systems are inadequately maintained. Since most application systems go through a "burn-in" period following installation, failure to maintain these systems adequately not only implies deterioration, but can stretch out the time spent on this frustrating trial period. Worse, lack of maintainance can leave application systems in a permanent state of ineffectiveness.

Production-to-maintenance ratios of less than 2½:1 are more common. The need to maintain old, poorly designed and crumbling application systems forces this emphasis. If managers can identify a few culprit application systems, they can recommend their replacement, justifying costs on the basis of improved efficiency. There are strategies for dealing with an entire inventory of senile applications, which can be used alone or in combinations: restricting maintenance/enhancement requests, funding preventative maintenance projects, developing plans for system replacement and accelerating system development activities.

Analysis of DP expenditures by object of expense, user area, application and activity helps managers identify abnormalities and inefficiencies. Corrective action improves DP and organizational performance by ensuring DP resources are expended on "the right things."

Data processing can be viewed as a business within a business. The factory of DP consists of the operations activity. Maintenance activity keeps the factory running and development activity expands, refurbishes and modernizes it. The ratios of Figure 1 define relationships between the activities that can be used to model the function.

MITCHELL J. HAYES

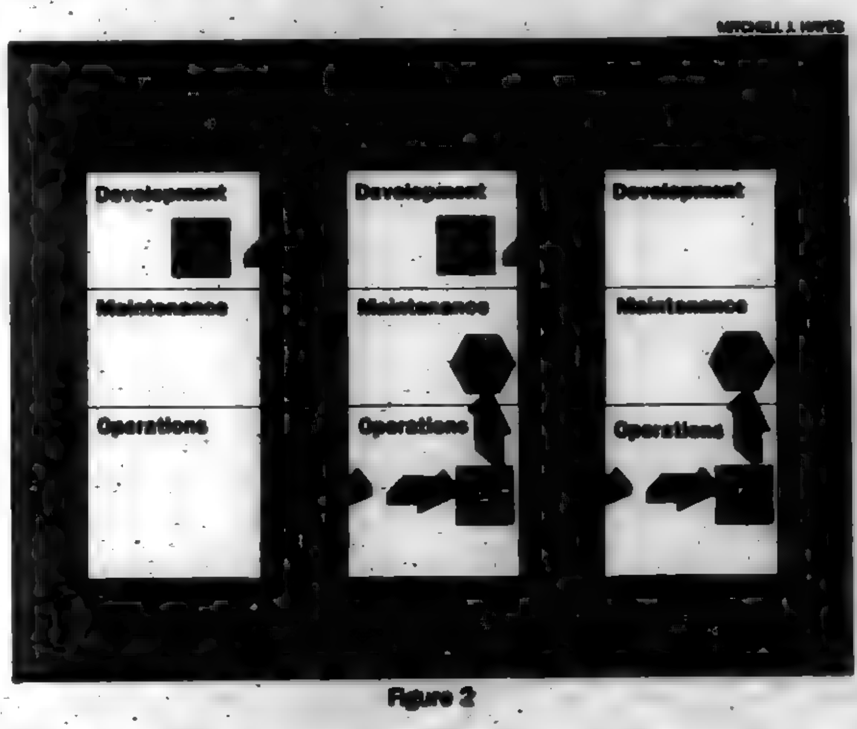


Figure 2

Why are we spending so much?

One additional ratio is needed for sound modeling: the relationship between the development and operations activities. It is this ratio that drives the model. To understand this relationship is to understand why we are spending so much on DP — why that $75,000 capital appropriation of four years ago has grown into an on-going expenditure of a quarter of a million dollars per year.

Spending money on development is analogous to deciding to invest in a new manufacturing plan, introduce a new product or acquire a new business. Development dollars should be viewed as an investment with associated on-going costs: operation and maintenance. In well-run DP development activities, $4 spent in development result in $1 of additional operating cost in each succeeding period throughout the system's useful life (Fig 2).

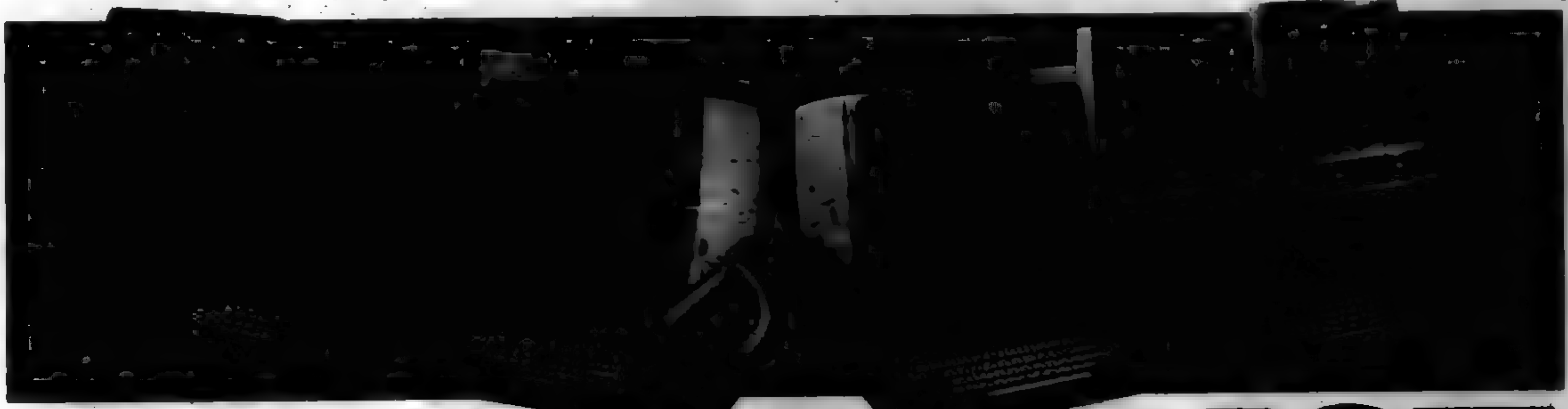
Adding this "development drop-down" notion to the previously discussed ratio between operations and maintenance provides the basic ingredients for a deterministic model of the data processing function. In narrative form, the model states:

"A $4 investment in new systems development in year one will provide a $1 increase in production (operations) cost in year two and beyond. This, in turn, will cause a permanent 40-cent increase in maintenance activity, or $1 divided by two and a half."

Presented to senior management in this way, the model clearly implies a continuing investment in the development activity — growth in total DP expenditures is locked in. In addition to answering the question: "Why are we spending so much?" the model provides a vehicle for managing DP growth in a manner consistent with corporate strategies and objectives.

The organization interested in developing its own unique model must not only identify current expenditures for each DP activitity but also research what the historic ratios of the firm have been. Managers should examine the ratios between development and operation and between operations and maintenance. With use and experience, the organization's unique model can be enhanced and expanded with other factors:

- Growth in transaction volume leading to increased DP operating costs.



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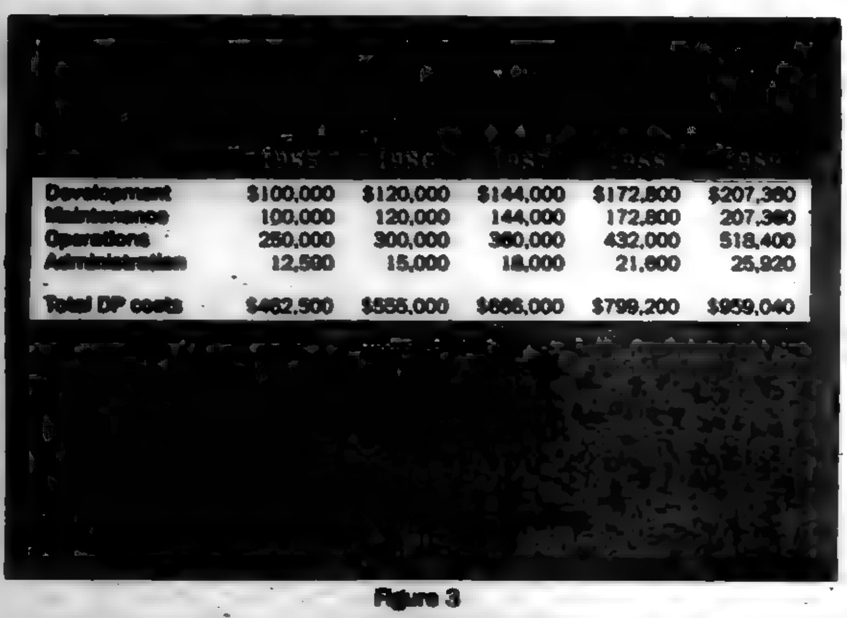

	1985	1986	1987	1988	1989
Development	$100,000	$120,000	$144,000	$172,800	$207,360
Maintenance	100,000	120,000	144,000	172,800	207,360
Operations	250,000	300,000	360,000	432,000	518,400
Administration	12,500	15,000	18,000	21,600	25,920
Total DP costs	$462,500	$555,000	$666,000	$799,200	$959,040

Figure 3

- The relationship of DP administrative costs to total expenses.
- The effect on development drop-down ratio of prototype development, purchased software, data base management system, fourth-generation languages, and so on.

Figure 3 shows a simplified DP funding model as might be produced using any of the popular spreadsheet programs and the generic relationships described above. The model can be used to set strategies and address abnormalities. In combination with a DP systems plan, it can suggest answers to many other senior management questions:

- How long will it take us to complete the system plan? What will be the final cost?
- What is the effect of capping DP spending at its present level? Of capping DP head count?
- How many DP personnel are required to complete the systems plan in five years? What will be the annual DP expenditure in year five?

Getting started

An organization interested in performing the analyses described above should begin by defining and establishing a data base of financial information on the DP function. It may be possible to use the corporate general ledger system for this purpose. Alternatively, a stand-alone system can be built on a personal computer with the help of a data base management package.

The organization should chose a system that allows DP expense (and revenue) items to be encoded and summaries to be reported in many different ways. In addition to the "object of expense" classifications (equipment, supplies, salaries and so on), at a minimum, the system should capture associated attributes including:

- Project/product — development and maintenance activities associated with a specific project; operational expenses with a product, that is, an application system.
- User area — functional area, geographic area and/or strategic business unit.
- Activity type — development, maintenance, production or administration.

> ”
>
> *The ratio between development and operations activities drives the model. To understand this relationship is to understand why we spend so much on DP.*

Historic data should be maintained for comparative purposes, for establishing organization ratios, for trend analysis and modeling.

All of the standard DP financial analyses described in this article are made possible by creating such a data base. These analyses should eventually become part of the periodic DP performance reporting program under the umbrella of "performance management" [CW, August 20, 1984]. More important, the review of these standard generic DP financial reports with management will almost certainly lead to requests for other breakouts, extracts and combinations of this data, tailored to the needs of the organization. A strong data base built around the guidelines above will afford these auxiliary combinations.

Financial analysis, ratios and modeling can make DP more fathomable to senior management. Far from being inapplicable to the DP function, these analyses can be a powerful tool for DP management and provide common ground for interdepartmental communications. Armed with DP reports presented in familiar form — as a financial investment decision — senior managers will, at long last, participate effectively in setting directions and formulating strategies for DP. ■

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NEW PRODUCTS

Cyber-Epic Release 2 launched

Control Data Corp. of Minneapolis has introduced Release 2 of its Cyber-Epic exploration and production interpretation system, an integrated set of applications and interpretation tools for oil and gas exploration, analysis and reservoir engineering.

Cyber-Epic Release 2 integrates every step in the interpretation of data for exploration and reservoir engineering using enhanced tools for two- and three-dimensional seismic modeling as well as advanced capabilities in reservoir modeling and simulation. It offers new software applications and capabilities including Sierra Geophysics' set of 10 exploration applications providing 2- and 3-D modeling, Geoquest International's AIMS III for 2-D modeling and hydrocarbon processing and the VIP-Executive from J. S. Nolen and Associates, for advanced reservoir simulation, modeling and engineering.

Other software packages offered in Release 2 are Terrasciences, Inc.'s Terralog for analyzing data gathered in drilling holes and generating graphics output; CPS-1 from Radian Corp. for processing displays of the surface; CDC's Loglib data base application; and Comex, an integrated system of conversational programs.

Cyber-Epic Release 2 is available on CDC's Cyber 180 computer series, ranging from the Cyber 180/810 model to the Cyber 180/990. It supports the Landmark System Corp. Graphics Interpretation Workstation via an Ethernet link. It also supports the interactive Tektronix, Inc. 4115 High Resolution Graphics Station emulation on the Landmark system, and users can utilize the Landmark 3-D interpretation software directly on data processed on the Cyber-Epic system.

Pricing depends on the software and hardware configurations used. A typical 810 system configuration costs about $250,000. Prices for the software applications range from $10,000 for Loglib to $190,000 for the VIP-Executive.

CAE workstation debuts

Chancellor Computer tool designs circuit boards

Chancellor Computer Corp. of Mountain View, Calif., has introduced a stand-alone computer-assisted engineering (CAE) workstation that, running with the AT&T 6300 personal computer, is used for integrated circuit and printed-circuit board design.

The Chancellor STL-TWO was designed to perform schematic capture and physical layout in a single graphics editor. It has a layering capacity of up to 50 layers, a menu-driven two-letter mnemonic command structure and comprehensive libraries of up to 5,400 parts.

According to the vendor, the STL-TWO has 640K bytes of random-access memory (RAM), a 10M-byte hard disk, a 360K-byte floppy disk and Intel Corp. 8-MHz 8086 and 8087 math coprocessors. It offers a high-resolution graphics subsystem complete with a 19-in. monitor, 1,024- by 768-pixel resolution, a choice of 16 colors, a NEC Corp. 7220 chip to increase speed and performance and 512K bytes of dedicated RAM.

Chancellor Computer's stand-alone CAE workstation

The STL-TWO includes graphics features such as continuous pan and zoom capabilities, five different view and windowing commands and eight drawing and digitizing modes.

The STL-TWO CAE workstation is priced at $14,995.

INSIDE
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Memorex rolls out printer

Memorex Corp. of Santa Clara, Calif., has released a multifunction matrix printer for the IBM System/34, 36 and 38.

The Model 2024 attaches to an IBM 5251 Model 2 or Model 12 controller, to an IBM 5294 controller or directly to the IBM host. It prints near letter quality at 80 char./sec. and draft quality at 350 char./sec. The printer will handle a variety of papers, including fanfold, up to 16-in. wide and up to six parts thick.

The 2024 will print in 10, 12 or 15 char./in. spacing or with proportional spacing. Text can be printed in either of the two standard fonts, in any combination of elongated, boldface or italics.

The printer costs $5,395 in single quantities.

Stand-alone units bundled

General Business Technology, Inc. of Irvine, Calif., has announced that it is packaging its IBM System/34-, 36- and 38-compatible matrix printer and CAT Display Station as one system.

Although still available as stand-alone units, the 5222DP Matrix Printer and 7700 CAT Display Station can now be linked together by General Business Technology's Printer Controller module. The printer controller connects the printer directly to the 7700 CAT terminal.

The 5222DP produces data processing-quality output at 200 char./sec. and near-letter-quality at 50 char./sec. The 7700 CAT station has a 12-in. by 12-in. footprint, a 60-degree swivel and a 20-degree tilt. The package costs $3,425.

Data General introduces four-member modem family

Data General Corp. has announced the Model 5091 family of modems for use with any DG system.

The Model 5091 family consists of four modems, each available as a stand-alone unit or as rack-mounted card modules. All four are registered with the Federal Communications Commission for direct connection to the U.S. telephone network. Each modem supports full-duplex, half-duplex, synchronous or asynchronous transmission.

The first modem in the family transmits data at speeds from 300 to 1,200 bit/sec. It is said to offer compatibility with AT&T 212/103 modems.

A second modem supports 2,400 bit/sec. transmission with a fallback rate of 1,200 bit/sec. It supports AT&T 212 and CCITT V.22 standards.

Both of these modems are said to offer manual-dial, autodial and auto answer capabilities. The autodial allows users to store up to 20 telephone numbers.

The third modem supports 4.8K bit/sec. transmission with a fallback rate of 2,400 bit/sec. It offers compatability with CCITT V.27 standards.

The fourth modem transmits data at speeds of up to 9.6K bit/sec. with fallback rates of 7.2K bit/sec. and 4.8K bit/sec. It supports CCITT V.29 standards.

Prices for the modems range from $700 to $1,000 depending upon the model.

APL programs available for IBM AT/370, XT/370

IBM has announced that APL2 and VS APL are now available for the IBM Personal Computer AT/370 and the IBM Personal Computer XT/370.

These programs were designed to enhance the compatibility of the IBM Personal Computer/370 workstation environment with the host Virtual Machine/System Product (VM/SP) and VM/High Performance Option environments.

The Personal Computer AT/370 and the Personal Computer XT/370 can now execute the same APL programs as the 370 host. Data may be entered interactively, the program executed and the results reviewed on the desktop workstation. This enables users at remote locations to make use of the System/370 APL processing capability, as well as providing security and confidentiality of data for the programs executed on the Personal Computer workstations.

A host is not necessary for program execution although access to a VM System/370 host is required for downloading the programs. Only line-mode operation of VS APL and APL2 is supported on the Personal Computer workstation. The APL character set is not supported on the printer or the display.

The monthly charge for either APL2 or VS APL is $49. The one-time charge for either program is $735. The one-time charge includes any future enhancements or releases made available under the same program number.

NEW PRODUCTS

SOFTWARE & SERVICES

Systems software

Massoglia and Associates, Inc. has announced two software packages, **Menu/Security System** and **Queues Utility System**, for the IBM System/38.

The Menu/Security System was designed to allow user access to authorized programs while providing security for applications programs. Security is controlled by limiting user access to menu items. Levels of authorization are assigned to each user, and only menu items authorized to a specific user are displayed to that user.

The Queues Utility System allows access to job and output queues and lets users perform functions such as changing the attributes of a job, moving jobs from one queue to another and displaying any spool file from the output queue display screen.

The Menu/Security System costs $495. The Queues Utility System costs $295. Both require a 10% yearly maintenance fee beginning in the second year.

Massoglia and Associates, Suite 102, 4970 Northwind Drive, East Lansing, Mich. 48823.

Productivity aids

BMC Software, Inc. has announced the availability of Version 2 of its **Screen Plus**, the on-line screen generator for IMS users.

Screen Plus is said to allow users without message format service training to design IMS screens interactively through IBM 3270 terminals using IBM's TSO.

Screen Plus Version 2 is said to contain several enhancements. It now runs under BMC Software's installation and maintenance umbrella, Master Menu.

It supports all message format definitions, including multiple device pages and logical pages per format, generation of multiple message input descriptors and message output descriptors per format and all printer formats.

In Version 2, multiple data sets are used for message format service source and Copylib members, the vendor said.

The cost of a perpetual lease for Screen Plus Version 2 is $15,000. Other leasing arrangements are available.

BMC Software, P.O. Box 2002, Sugar Land, Texas 77478.

Application packages

Para Research, Inc. has announced **Manufacturing and Process Control System (MPCS)**, an interactive menu-driven manufacturing resource planning II package for the IBM System/34, 36 and 38.

MPCS consists of two modules: industrial management and customer order processing. Industrial management handles inventory and purchasing management, bills of material, resource planning, cost accounting and product costing. Customer order processing functions include order entry, invoicing, shipping and sales analysis.

With the inventory and purchasing management module, users can track such transactions as purchase orders, vendor receipts, production orders, stock transfers, issues, sales and returns. This module maintains up to six inventory balances for each inventory location — on hand, allocated, reserved for customers, held, in transit, and available to promise — at three levels: general, warehouse and user defined. Inventory can be evaluated as standard, average, last, first-in first-out and selling price.

The bill of material component is said to produce multilevel bills of material for operations as well as components. Bills of material are used for inventory and purchasing management, cost accounting and resource planning.

Resource planning includes demand forecasting, master production scheduling, manufacturing resource planning II and capacity planning. Forecasts reportedly can cover independent demands such as sales, warehouse replenishment or planned purchases. In addition, users can define time fences and horizons for forecasting plus subsequent processing and reporting, the vendor said.

Cost accounting is said to allocate indirect costs using five methods and to produce variance reports, cost center profit-and-loss statements and cost roll-up reports based on actual costs. Product costing combines direct cost information from inventory and purchasing management and bill of material with indirect cost information from cost accounting to generate product cost reports.

MPCS interfaces with the vendor's accounts payable, accounts receivable and general ledger packages. MPCS prices range from $3,000 to $10,000 per module.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01930.

Languages

The **R/1 Group** has unveiled **Unilisp**, a Common Lisp interpreter that allows artificial intelligence applications to be ported to AT&T Unix-based microcomputers.

The Unix-compatible Lisp requires 32K bytes of memory on most Unix machines and includes a full object list, called oblist. Mathematical, statistical and graphics add-on oblists for expert systems development are offered as options.

Mathlist is an oblist of trigonometric functions, power functions, logs and bessel functions. Graphlist contains point, line, arc, circle, spline, box, window and polygon graphics functions.

Other Unilisp features include support for Unix I/O and operating

Continued on page 99

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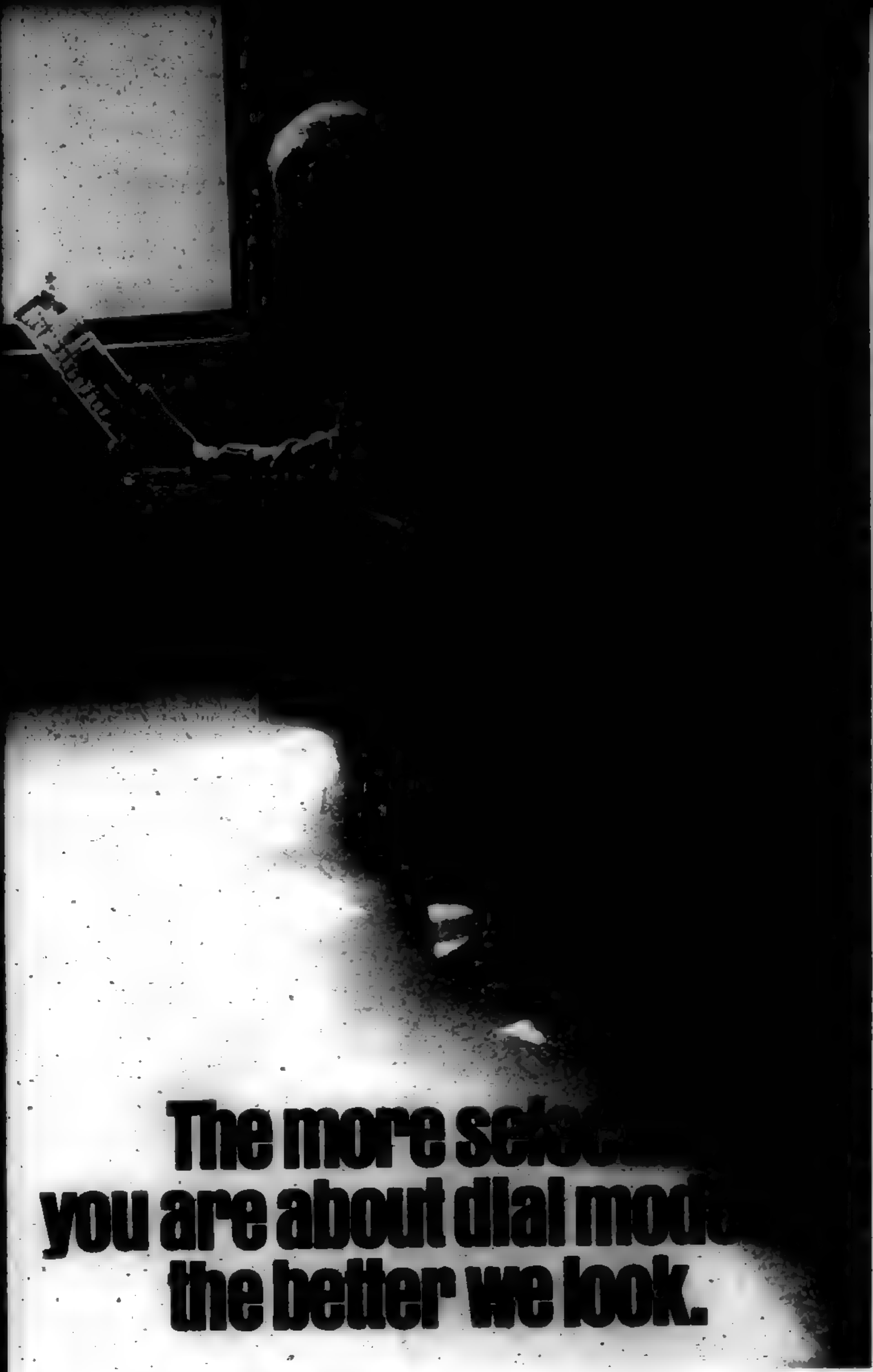

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NEW PRODUCTS

Continued from page 66

systems calls, physical memory access, arithmetic primitives, ability to link and unlink files or pipes and concurrent communications capability among multiple kernels.

Unilisp is available on Digital Equipment Corp. DEC Pro 300 series and Microvax, Intel Corp. 310, AT&T 3B2 and IBM Personal Computer AT microcomputers.

Prices range from $750 for use on desktop systems to $1,050 for multiuser workstations.

R/1 Group, 7623 Leviston St., El Cerrito, Calif. 94530.

Training

Innovative Software Solutions, Inc. has unwrapped **Teachme/3000**, a modular interactive package that runs on and trains users about Hewlett-Packard Co. 3000 systems.

Teachme/3000 consists of four modules. An Introduction to the HP-3000 acquaints users with the system in general. An Introduction to TDP/3000 trains new employees to use HP's text and document processor.

There are two more technically oriented modules designed for programmers and system developers. Image/3000: Principles and Utilities reportedly delves into HP's data base management system, while Cobol to Cobol II: Conversion and Features is said to discuss how to convert to and use Cobol II.

The four modules and a driver cost $3,200. The driver alone sells for $1,000; modules cost $750 each if purchased separately, according to the vendor.

Innovative Software Solutions, 10706 Colton St., Fairfax, Va. 22032.

MICROCOMPUTERS

Software

Pallas International Corp. has announced a capacity planning package called **Disk Model** designed to evaluate the performance of DASD on the IBM Personal Computer and other PC-DOS microcomputers.

Disk Model is said to be able to predict the performance of regular DASD and cache disk controllers. It is menu driven and offers built-in parameters for DASD and disk cache types, which can be overridden. It is dual ported and offers dynamic path selection.

Additionally, the product has a split-screen mode that can be used to compare results of two model runs, and results can be transferred to word processors and spreadsheets such as Lotus Development Corp.'s 1-2-3. Parametric model definition is possible using symbolic variables.

There are two versions of Disk Model available. Both the software floating-point version and the version requiring a floating-point coprocessor cost $750. They can be purchased together for $1,000.

Pallas International, 1763 Valhalla Court, San Jose, Calif. 95132.

●

Softdesign, Inc. has announced **Timebase 1.6**, an updated version of its office management system for Apple Computer, Inc.'s Macintosh.

Timebase 1.6 combines time management, data base management, deadline management and simple word processing on one disk.

Features of Version 1.6 include multiuser capabilities, viewing of unlimited multiple schedules in a single screen, schedule planning, customized time reporting, voice-synthesized reminders and alarms, mailing labels, tracking of expense accounts and credit cards and compatibility with Apple's Laserwriter laser jet printer.

The cost of Timebase 1.6 is $149.95. To upgrade from Version 1.01 to Version 1.6 costs $10, the vendor said.

Softdesign, 14145 S.W. 142 Ave., Miami, Fla. 33186.

Systems

Dicomed Corp. is offering **ProducerXP**, a graphics workstation.

ProducerXP is based on an 8-MHz Intel Corp. 8086 multibus CPU with an 8087 numeric coprocessor. It offers 46M-byte formatted hard-disk storage plus a 10M-byte removable cartridge.

The workstation is said to provide multiple slide operation sequences, word processor-style text editing and an image storage system with off-line communications. Each image can contain up to 124 colors from a palette of 16.7 million.

A local-area network option, XPlan, allows users to configure multiple workstations for task sharing and graphics merging.

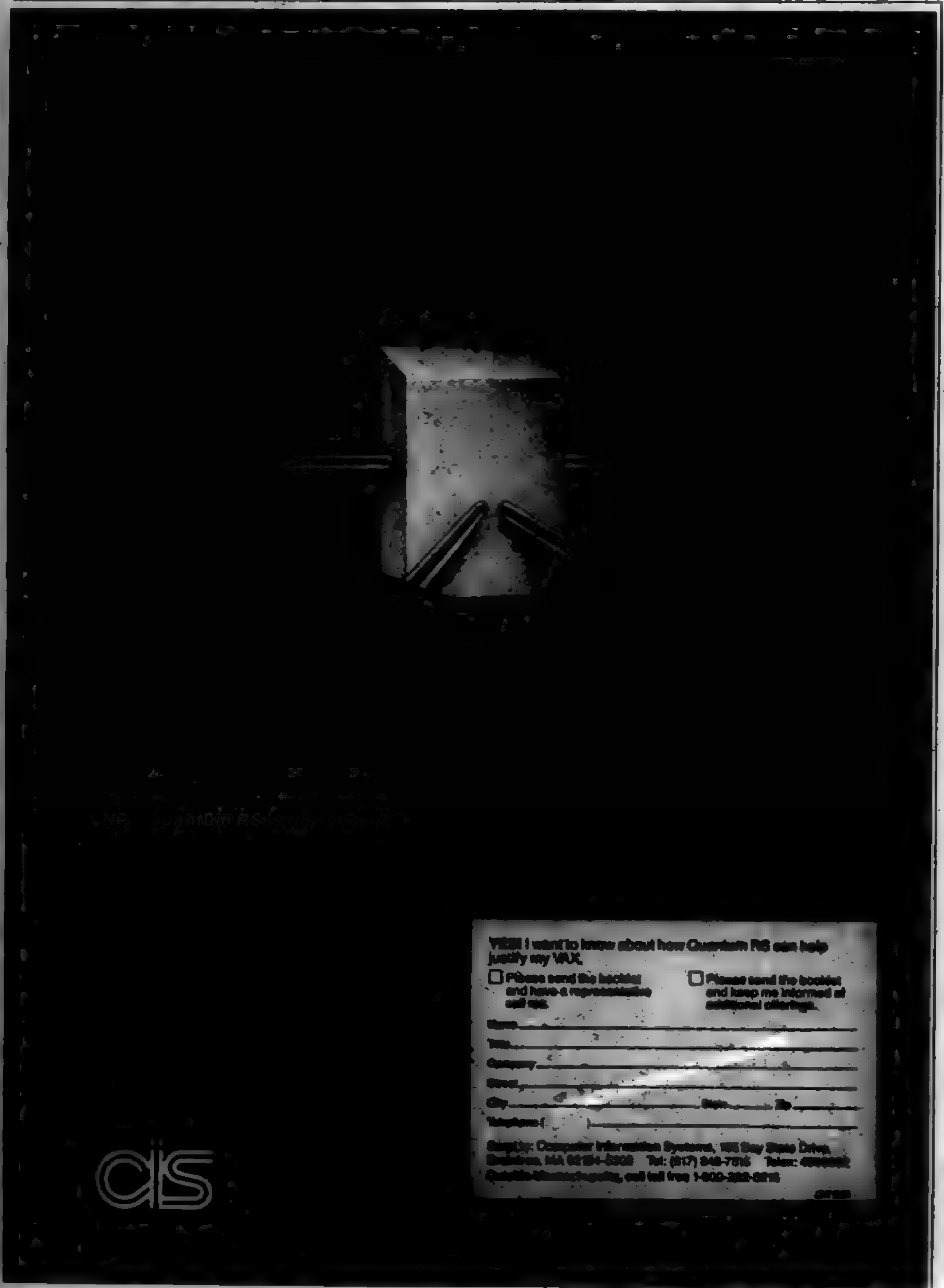
An optional application software package, XPmanager, tracks production and performs cost accounting by image, job or client, according to the vendor.

Other options include a 20-font graphics arts package, XPfonts, and XPchart, software that automatically creates charts and graphs. A spelling checker and dictionary are also available.

Priced at $79,900, the standard ProducerXP includes a 10M-byte removable hard disk drive, 55M-byte hard disk, 13-in. 640- by 480-pixel color display, 16-bit CPU with 1M-byte random-access memory, integrated digitizing tablet, keyboard, five-way adjustable chair, 1,600-image library, system software, two 10M-byte disk packs, 1,200 bit/sec. communications and a user manual, the vendor said.

ProducerXP options cost $5,000 for XPmanager and $55,000 for XPfonts. Other option prices are $5,000 for XPchart, $500 for XPspelling Checker and $500 for XPdictionary.

Dicomed, P.O. Box 246, 12000 Portland Ave. S., Minneapolis, Minn. 55440.



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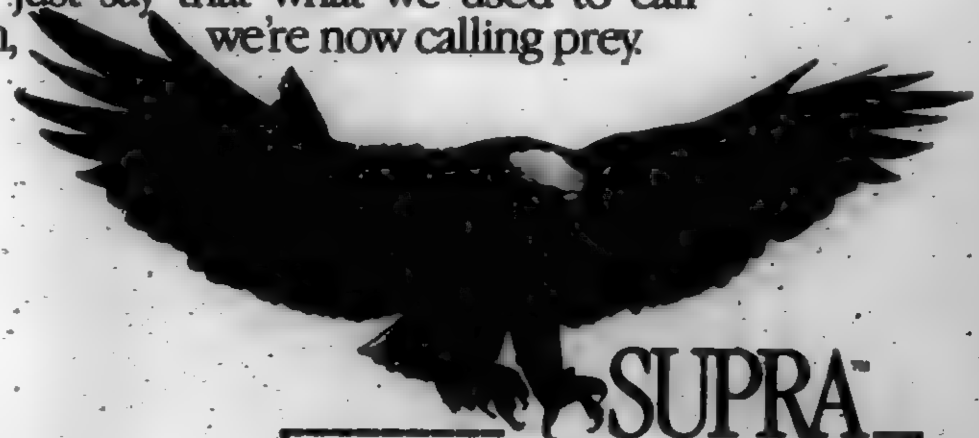

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NEW PRODUCTS

Communications

Decision Graphics, Inc. has developed the **PC File Transfer Program**, a menu-driven file transfer and dialogue handler package.

Using predefined dialogues, the product reportedly enables IBM Personal Computers and compatibles to communicate with remote computers to exchange data files or execute system commands and user programs.

It can control interactive programs, check for specific prompts and supply the correct response, according to the vendor. Other functions of the system include the ability to transfer ASCII files between the IBM micro and a Digital Equipment Corp. PDP-11 or VAX computer and specify user-defined dialogues for different computer systems.

The program operates with a user-defined or supplied dialogue file that includes user messages, prompts, object system commands and file transfer commands.

The package includes commands that clear the Personal Computer screen, write a message to a Personal Computer screen position, write a prompt to a position on the Personal Computer screen and read the user response, send a command to the object system and get a character from the object system.

Priced at $75, the product requires IBM PC-DOS 2 or higher, an asynchronous RS-232 communications port and an ASCII terminal port.

Decision Graphics, Suite 1622, 555 Sparkman Drive, Huntsville, Ala. 35816.

Gateway Communications, Inc. has announced **G/X25 Net**, a multiuser version of its G/X25 PC communications subsystem for the IBM Personal Computer, Personal Computer XT and AT.

The product reportedly allows micros attached to Gateway's G/Net local-area network to access public data networks such as McDonnell Douglas Network Systems, Inc.'s Tymnet and GTE Telenet Communications Corp.'s Telenet.

G/X25 Net hardware consists of Gateway's PC Wide-Area Network Interface Module expansion card, based on the Zilog, Inc. Z80B chip with 64K bytes of memory. Communications speeds of up to 19.2K bit/sec. are supported on up to two synchronous ports.

The software consists of modules handling X.25 data packetization and message accumulation, session support and flow control and an IBM PC-DOS-compatible communications application providing TTY, Digital Equipment Corp. VT100 and Televideo Systems, Inc. 950 terminal emulation.

G/X25 Net can be used as a network-to-network bridge over an X.25 link or as a network-to-mainframe link to an X.25 packet-switched host computer.

In each case, the gateway micro retains its full PC-DOS-based workstation capability, according to the vendor.

The multiuser hardware/software subsystem costs $2,495.

Gateway Communications, 16782 Red Hill Ave., Irvine, Calif. 92714.

Storage

Tallgrass Technologies Corp. has announced that its complete line of mass storage **Hardfile and cartridge tape backup subsystems** are now compatible with IBM PC Net, Novell, Inc.'s Netware series and 3COM Corp.'s Etherseries networks.

A Tallgrass mass storage system allows users to choose 25M, 35M, 50M, 80M or 160M bytes of hard-disk storage with 60M bytes of integral cartridge tape backup. It features Tallgrass' personal computer tape format.

Tallgrass Technologies, 11100 W. 82nd St., Overland Park, Kan. 66214.

COMMUNICATIONS

Controllers

International Data Sciences, Inc. has announced the **IDS Bullet Model 6400 Data Compressor**, a data compressor designed for use with asynchronous, full-duplex, two-wire dial-up lines.

The product is said to allow data throughputs up to 19.2K bit/sec. It incorporates a proprietary error-correction algorithm that reportedly guarantees 100% error-free data transmission.

The IDS Bullet has three modes of operation. The first, in which the Bullet is effectively transparent to the system, is used for data rate conversion only, not for data compression.

The second mode is identical to the first except that error correction is performed on incoming data.

The third mode adds the adaptive data compression feature, which increases data throughput four times more than the previous rate of data throughput.

All three modes are compatible with autodial, origination type and leased-line modems.

The IDS Bullet costs $995.

IDS, 7 Wellington Road, Lincoln, R.I. 02865.

Voice/data communications

Automatic route selection and simultaneous voice/data transmission capabilities have been added to **AT&T Information System's Merlin Communications System Feature Module 4.**

Automatic route selection places telephone calls over the least costly line. Users set up tables so the system automatically sends calls over foreign exchange, WATS or other lines.

Data terminals can be connected to the product through an outlet on the jack in a Merlin telephone set. Data can be transmitted over the same line as voice.

Another addition permits any station in a system to be programmed by an administrative terminal. A direct line pickup feature enables a user to answer any line that is ringing, parked or on hold in the system.

The product costs $1,450.

AT&T Information Systems, 100 Southgate Pkwy., Morristown, N.J. 07920.

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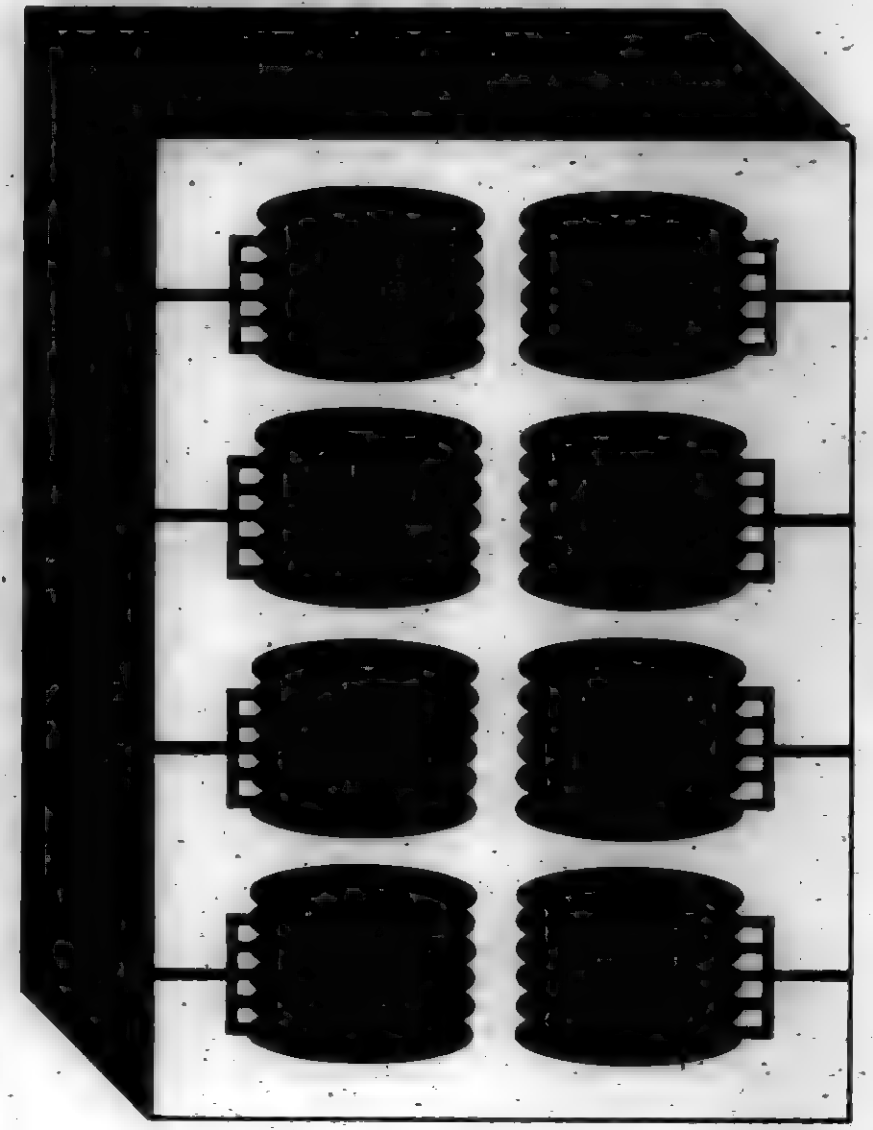
It's a waste of time and space—the time it takes to access data and the space required for the storage. It's a hardware problem and a software problem and Tandem has solved them both.

NEW NON-FAT HARDWARE.

Introducing a new disc drive product called the Tandem V8.

The data base that would normally be stored on one large, conventional disc has been split up over eight small, high-density discs.



NEW TANDEM V8.
8 disc drives, 8 actuators in one cabinet.

Instead of one actuator handling I/O requests sequentially, eight actuators can now work simultaneously. No disc space goes unused.

The Tandem V8 gives you high throughput, stores 1.3 gigabytes of data, yet remarkably takes up only six square feet of floor space.

Maintenance is easy, too. Each disc drive can be removed and replaced in a few minutes. And the Tandem V8 can stay on line even while it's being serviced.

NEW NON-FAT SOFTWARE.

We've developed new data base software that allows our relational data base to operate 50% to 100% faster on the same hardware. That means you can boost your throughput without buying new hardware. Massive amounts of data can be made easily and instantly available to hundreds of users, even if they're geographically distributed over a worldwide network.

Parallel paths to the disc speed up data access.

TANDEM'S GROWTH ARCHITECTURE.

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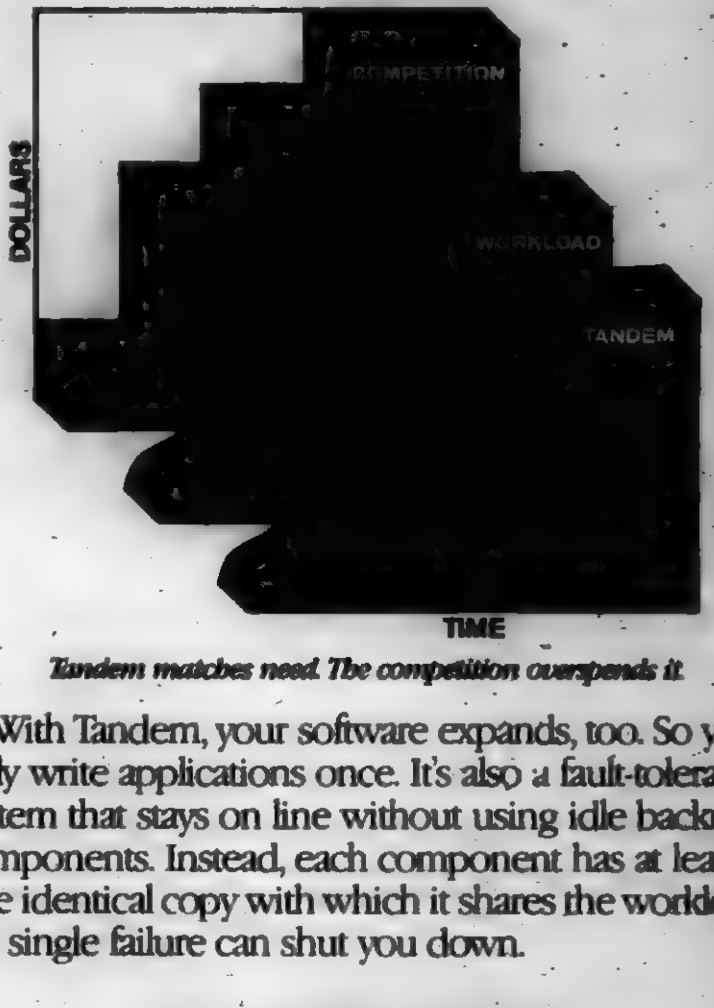

Tandem matches need. The competition overspends it.

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TANDEMCOMPUTERS

NEW PRODUCTS

Protocol converters

Dynatech Packet Technology, Inc. (Dynapac) has announced **Proto-PAD X.25**, a product that is an extension of its packet assembler/disassembler family for terminals, computers and hosts using synchronous protocols.

The product is a multiprocessor stand-alone or rack-mounted unit designed for use with IBM 3270 Binary Synchronous Communications (BSC)-compatible equipment. The unit allows up to eight cluster controllers of the 3270-type to connect to a host system with the IBM 3270 BSC protocol.

It has one packet-switched network trunk and one synchronous port that operates in the multidrop mode to support multiple cluster controllers. Call setup is via an autocall system or by entry at the user terminal.

The Proto-PAD X.25 costs $2,610.

Dynapac, 6464 General Green Way, Alexandria, Va. 22312.

Software

Autosoft, Inc. unwrapped **Modemmail**, a communications program for Digital Research, Inc. CP/M-based microcomputers that offers electronic bulletin board and mail modules.

The **Modemmail** electronic mail network ties together microcomputers to forward, reply to, copy or print mail messages automatically. The network chooses the lowest cost path.

Modemmail enables a computer to act as a gateway between a time-sharing service or a commercial electronic mail service and a Modemmail network or another time-sharing service.

Security options include the ability to encrypt mail messages and restrict user access to areas of the system where confidential information resides.

System requirements are CP/M 2.2, 64K bytes of memory, at least one disk drive, at least 180K bytes of disk space and the ability to access a modem.

Priced at $249, the package includes the Modemmail program; a set of Modemmail command files for operating and processing bulletin boards, exchanging electronic mail and accessing commercial time-sharing systems; a customization program; and the user manual, according to the vendor.

Autosoft, 166 Santa Clara Ave., Oakland, Calif. 94610.

Multiplexers/modems

Data Race, Inc. has announced the **Remote Access Computer Extension (RACE)**, an asynchronous dial-up modem that operates at speeds up to 19.2K bit/sec.

The modem provides automatic dialing, operates over two-wire leased lines as well as over ordinary phone lines and can handle either tone or rotary dialing. RACE data rates are selectable to match terminal or computer port rates from 1,200 bit/sec. to 19.2K bit/sec.

RACE contains a microprocessor that provides Cyclical Redundancy Check 16 automatic error correction. It also contains an AT&T Bell Laboratories 103-compatible modem that automatically changes terminal speed settings so users can access public data base services.

RACE employs data stream compression techniques so that it is possible to rewrite a 24-line, 80-column screen in less than 2 seconds.

RACE is available in two versions. RACE I, a single-channel, full-duplex modem, costs $1,995. RACE II includes a second independent printer channel allowing terminal output and printer output simultaneously over the same dial-up connection. RACE II costs $2495.

Data Race, 5839 Sebastian Place, San Antonio, Texas 78249.

SYSTEMS AND PERIPHERALS

Terminals

Two display stations, called the **8180** and **8178**, designed to emulate IBM 3270 and Digital Equipment Corp. VT220 environments, are available from **Datastream Communications, Inc.**

The display stations with 14-in. monitors are designed for protocol conversion and gateway applications that access 3270 applications through RS-232C connections.

The stations are IBM 3178- and 3180-compatible in keyboard layout and screen formatting and can operate in minicomputer applications as VT220-compatible terminals.

Full support is said to be provided for the 3270 status line that includes IBM-style ideograms plus a row and column indicator. The 8180 screen supports 3278 Models 2, 3, 4 and 5 screen sizes along with such VT220 functions as compose-character features, function keys and the capability to operate in VT100 and VT52 modes.

The 8178 also supports VT220 functions and the 3278 Model 2 screen, according to a company spokesman.

In 3270 mode, both stations' keyboards offer 24 unshifted programmer function keys and an 18-key pad. Keyboards can be dynamically reconfigured for VT220 emulation.

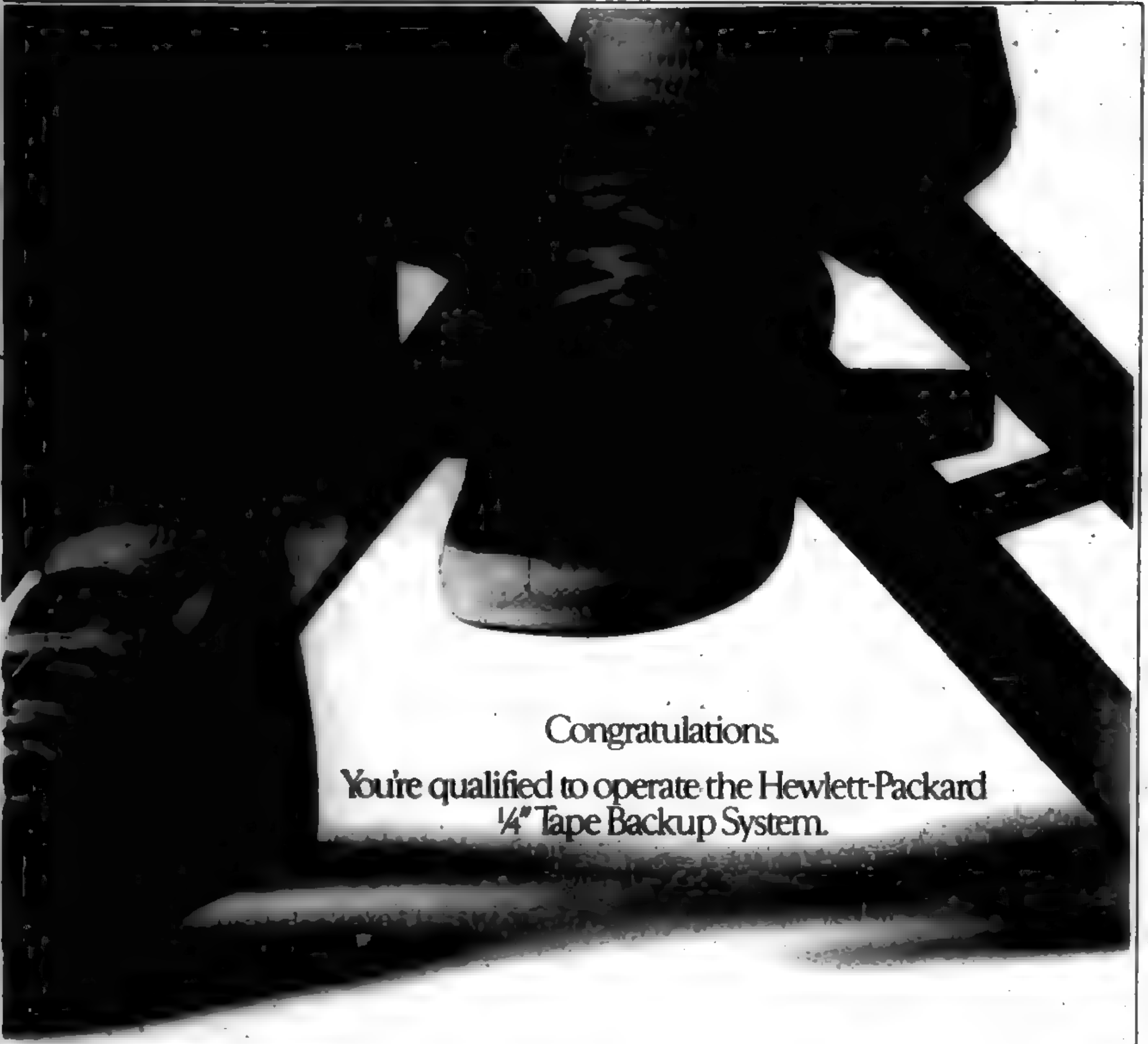
Prices are $995 for the 8178 and $1,850 for the 8180.

Datastream Communications, 2520 Mission College Blvd., Santa Clara, Calif. 95050.

Printers/Plotters

Tempest Technologies, Inc. has announced the **DWP5155Q** and **DWP5155SQ**, daisywheel printers that are accredited by the U.S. government's Tempest security program.

Continued on page 78



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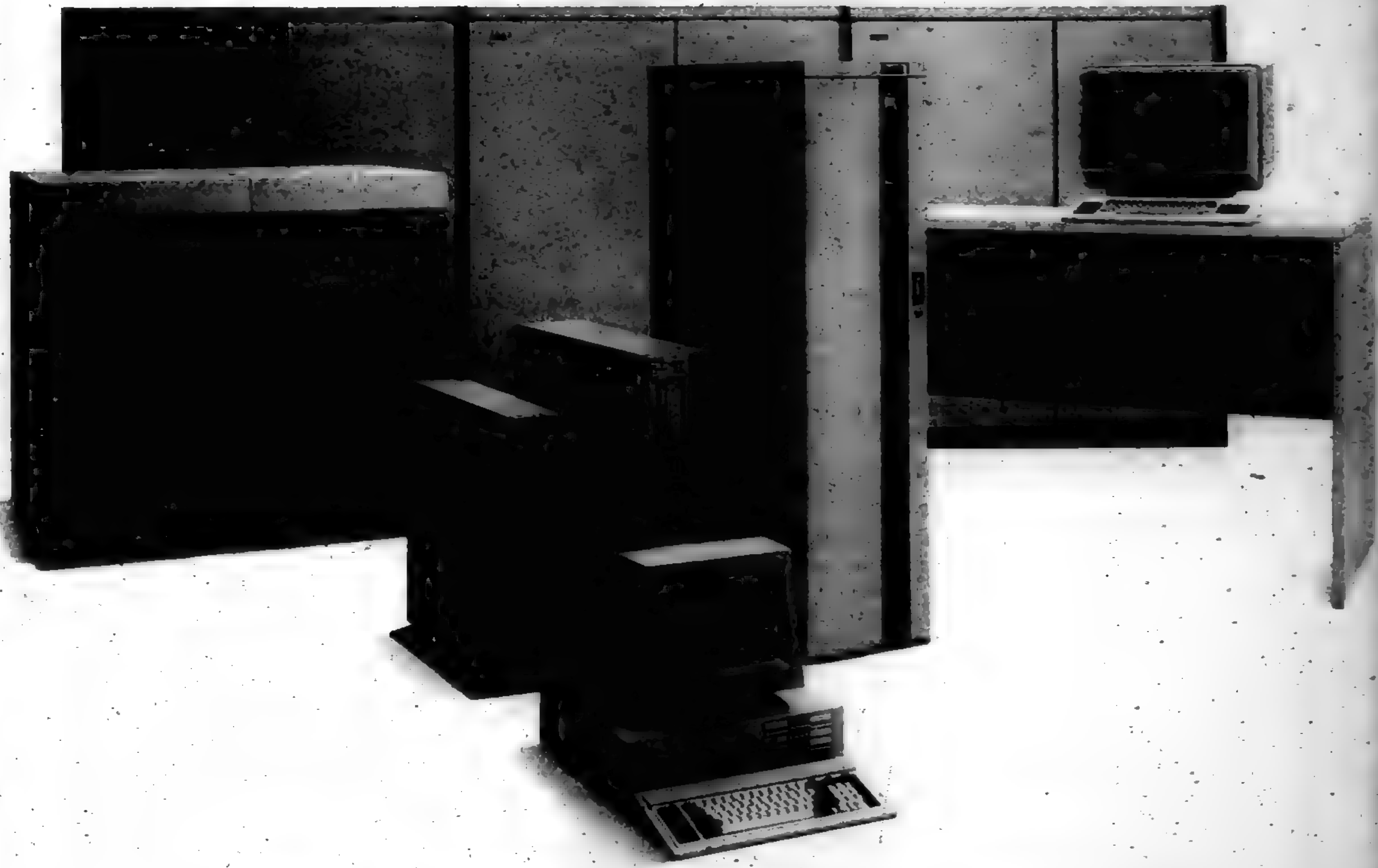

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Resellers: Call Sperry at 1-800-547-8362, ext. 125 to carry the only complete UNIX PC-to-mainframe line.

NEW PRODUCTS

Continued from page 76

Both printers are versions of the company's current DWP5155 printer that runs at speeds of 45 char./sec. in letter-quality mode. They are for use with micros and small minis, the vendor said.

The DWP5155Q supports single-bin, dual-bin and dual-bin with envelope sheet feeders and a bidirectional tractor feed.

The DWP5155SQ is a quieter version of the same printer, according to the vendor. It is said to operate at less than 55-db noise levels. It supports single- and dual-bin sheet feeders and bidirectional tractor feed.

The DWP5155Q costs $4,500, and the DWP5155SQ costs $4,900, Tempest said.

Tempest Technologies, 11411 Isaac Newton Sq. S., Reston, Va. 22090.

Soltec Corp. has unwrapped **Models 6213** and **6223** two-color **Thermal** or **Ink Writing Strip Chart Recorders**, which are one- and two-pen, 250mm chart-width instruments.

The recorders will write a red and black trace on thermal paper at up to 1,200mm/min. Ink pens can also be retrofitted for ink recording.

The 28-speed stepper motor chart drive is reversible and uses Z-fold chart paper. Eighteen input ranges are standard with a maximum sensitivity of 1 mV/250mm with automatic electronic over-range protection. There are also six standard remote control functions: pen lift, chart start/stop, chart speed, external chart drive, chart fast forward and chart reverse.

Prices start at $1,795.

Soltec, 11684 Pendleton St., Sun Valley, Calif. 91352.

Graphics systems

Spectragraphics Corp. has released its **Designnet** family of computer-aided design and manufacturing workstations.

The line consists of three models: the bottom-of-the line DS 1080 that emulates the IBM 5080 environment, the DS 1500 random-access memory-based system that supports four users and the DS 3000 top-of-the-line stand-alone graphics system.

The DS 1080 supports such applications packages as Cadam, Inc.'s Cadam, Dassault Systems' Catia, Structural Dynamics Research Corp.'s Caeds and Mathematical Applications Group, Inc.'s Synthavision. The DS 1080 starts at $16,400 with 512K bytes of display list memory and can be expanded to 2M bytes.

The DS 1500 is designed for interactive applications for up to four users. It offers IBM 5080 and IBM 3250 emulation. The DS 1500 is said to feature two- and three-dimensional transformations in hardware, real-time clipping and depth cuing; and backface testing. The four-user system costs $68,600.

The DS 3000 stand-alone system is said to consist of a general-purpose CPU and specialized graphics processors for real-time use. It uses Spectragraphics' DSX operating system and supports Spectragraphics' Prism operating system. The DS 3000 offers support for as many as four interactive users. A four-user system costs $96,200.

Spectragraphics, 10260 Sorrento Valley Road, San Diego, Calif. 92121.

■

Apollo Computer Inc. has introduced two workstations, **TDN560** and **TDN550**, designed to meet the U.S. government's Tempest specifications.

The TDN560 and TDN550 color workstations are functionally equivalent to Apollo's standard workstations. They come with either of the company's operating systems, Aegis or Apollo IX. The TDN560 is a color graphics workstation based on the Motorola, Inc. 68020 microprocessor and a Motorola 68881 floating-point coprocessor. The TDN550 color graphics workstation is based on the Motorola 68010 microprocessor and integral floating-point hardware.

Both workstations have an optical interface for constructing an Apollo Domain network.. The systems offer 1M byte of display memory, a 19-in. 1,024- by 800-pixel resolution display, a local-area network interface and an RS-232 serial port.

The TDN550 costs $41,500 for a system with 1M byte of main memory, $44,500 for 2M bytes and $47,500 for 3M bytes. The TDN560 costs $48,500 for a system with 2M bytes of main memory and $51,500 for 3M bytes of main memory.

Apollo Computer, 330 Billerica Road, Chelmsford, Mass. 01824.

■

Peritek Corp. has announced **graphics cards** that plug into Digital Equipment Corp. Microvax II computers.

The firm has released 10 DEC Q-bus color and monochrome cards to produce displays for tasks including engineering, scientific research and medical imaging. The cards are dual-height, and multiple cards can reside in one Microvax chassis to serve multiple displays. Some cards — for example, a color graphics card and an alphanumeric card — can be combined to put both displays on the screen simultaneously.

An alphanumeric card that puts monochrome characters on the screen costs $615. A $2,995 card offers 256 simultaneous colors from a pallet of 16 million colors with 512- by 512-pixel resolution. Color cards at lower prices offer 16 or eight colors from a pallet of 4,096. A monochrome card that costs $2,995 produces dot graphics plus an alphanumeric overlay with 1,024- by 1,024-pixel resolution. A $1,987 color card designed primarily for process control adds color and character graphics to the on-screen display.

Peritek, 5550 Redwood Road, Oakland, Calif. 94619.

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INDUSTRY INSIGHT
Peter Bartolik
CW News Director

IBM running on Wall Street

Probably not even General Motors Corp. could announce three consecutive quarters of lower than expected profits and still see its stock climb.

But IBM could and did.

After announcing a profit drop of 7% recently, IBM's stock climbed during the next two days of public trading on Wall Street.

There are two possible explanations:

■ Wall Street still does not have a firm grip on the computer industry and, therefore, relies for its expertise on IBM's vague comments that it still expects a strong fourth quarter to bring this fiscal year even with last year.

■ Wall Street has bought — hook, line and sinker — the expectations of a desperate industry that the announcement of IBM's token-ring local-area network, which came last week, will in itself convince equipment purchasers that the means to integration has arrived and they can now return to the helter-skelter spending of a year ago.

The betting in this corner is that IBM indeed can come out with a tremendously strong fourth quarter that will go a long way toward bringing this year's revenue even with last year's. The company has moved up delivery dates on tons of high-priced equipment and last week announced an average 10% price hike for much of its applications software.

But these are exceptional measures that apply only to IBM and will have little impact on other vendors, unless it

Continued on page 86

Eagle's eye on future; firm planning to soar

By Maura McEnaney

GARDEN GROVE, Calif. — On the day Eagle Computer, Inc. announced fourth-quarter losses of more than $4.4 million and annual losses of $10 million, President Gary Kappenman seemed more concerned about tomorrow's prospects than yesterday's losses.

"I expect Eagle to be a $100 million company within the next 24 to 36 months. If [it's] not, then I haven't done my job and should be replaced," he said.

Kappenman is that confident about his company's rebirth. For more than a year, Eagle has been fighting for its survival in the battle of the IBM Personal Computer-compatible machines.

Beginning with the sudden death of its president on the very day the company went public in 1983, Eagle has been troubled with its share of problems. A legal challenge from IBM questioned the copyright of Eagle's product line and forced the company to withdraw its product from the retail shelves and change its operating systems. An overly aggressive retail marketing scheme and an overcrowded marketplace also contributed to drastically reduced sales at the high-flying company, which saw $100 million in sales in 1983.

As a result, Eagle could not repay its long-term creditors, and by the end of 1984, the company teetered on the brink of insolvency. Between fiscal years 1984 and 1985, Eagle lost approximately $35 mil-

Continued on page 88

Finis Connor's reign a memory

Finis Connor's tour of duty as chairman and chief executive officer with Computer Memories, Inc. lasted less than one month. The former cofounder of Seagate Technology, Inc. recently resigned for personal reasons, according to the official word.

■

David A. Kay was named last week to succeed his father, Andrew Kay, as president of Kaypro. The elder Kay will stay on as chairman of the microcomputer manufacturer.

■

Continued on page 84

Osborne banks on ventures

By Maura McEnaney

FREEMONT, Calif. — Nine months after emerging from bankruptcy proceedings under Chapter 11 of the Federal Bankruptcy Act, Osborne Computer Corp. is continuing its pursuit of the portable computer market.

Driven from stardom to the depths of failure, the company with the controversial namesake is pursuing new business ventures that it hopes will keep it alive. Today, Osborne is operating with a skeleton staff of 35 workers in 20,000 sq ft of office space — a far cry from the days of $100 million sales, 1,000 workers and 120,000 sq ft of office space.

In recent months, Osborne announced joint marketing agreements with two small Silicon Valley firms, hoping to expand its

Continued on page 93

INSIDE

Trademark protection /81

Datapoint reported a hefty loss for the year just ended, but its spin-off service division, Intelogic Trace, reported a profit 89

Applied Data Research reported a small third-quarter profit /84

Business is very slow for software and services providers, but the slump in equipment sales may provide profit opportunities, according to a speaker at ADAPSO's recent management conference /87

INSTANT ANALYSIS

"There is, as yet, no evidence of a broad recovery in the U.S. market for computer systems."

— Charles E. Exley Jr.
NCR Corp. president

Trilogy, Elxsi merge; layoffs, losses reported

By Maura McEnaney

SAN JOSE, Calif. — The long-awaited merger between Trilogy Systems, Inc. and Elxsi, Inc. is complete, following the recent approval by shareholders at both companies and regulatory approval.

But news of the merger was overshadowed by Elxsi's simultaneous announcement of 50 layoffs at its manufacturing facilities in San Jose. At the same time, Trilogy announced a $3 million loss for the third quarter ended Sept. 29 and an additional $4 million charge against reserves, bringing year-to-date losses to $14 million.

Founded by mainframe entrepreneur Gene Amdahl in 1980, Trilogy has suffered since it dropped development plans for a fault-tolerant supercomputer last year and scrapped development of a wafer-scale integrated circuit that was planned to be the heart of the IBM plug-compatible system. The move left the company without a significant product line, while at the same time created large cash reserves.

The Elxsi merger, first announced last spring, makes the manufacturer of multiprocessor computer systems an independent subsidiary of parent company Trilogy Ltd. It also gives Elxsi, which recorded $11 million in losses for the first nine months of the year, much-needed access to Trilogy's $43 million cash reserve. As part of its preliminary merger agreement, Trilogy has already advanced $10 million to offset operating costs.

Elxsi shareholders will receive 38 million shares of Trilogy common stock at a value of $52 million. The stock traded for $1.37 per share at the time of the announcement.

AMD posts first net loss but reaffirms no-layoff policy

SUNNYVALE, Calif. — Advanced Micro Devices, Inc. (AMD) recently posted its first-ever net loss — laying part of the blame on "predatory pricing" by foreign competition, but the chip maker again said it is committed to a no-layoff policy.

The company, which earlier had announced a mandatory time-off policy [CW, Oct. 14], said it experienced a second-quarter net loss of $15.3 million, or 27 cents per share, compared with year-earlier profits of $42.1 million, or 72 cents per share.

The operating loss was much larger — $29.5 million — but the company was able to draw on tax credits to reduce the deficit. In the first quarter, the company had posted its first operating loss, but tax credits enabled it to post a small net profit.

Revenue for the second quarter was $128.1 million, only half the year-earlier level of $257 million.

AMD's results follow on the heels of a $3 million loss posted by industry leader Intel Corp. [CW, Oct. 14]. Intel announced it was discontinuing further operating efforts in the manufacture of dynamic random-access memory chips, which comprised only a small share of its total revenue.

AMD said more than half of its operating loss was attributable to operations in the sale of erasable programmable read-only memories, an area company President and Chairman W. J. Sanders said is experiencing "fierce competition combined with predatory pricing from foreign competitors."

Sanders said he believes the worst is over in the industry's recession but added that there is no hard evidence to support expectations of an upturn in the current quarter.

SPECIAL REPORT

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Issue Date: November 25 · Advertising Close: November 8

As corporations continue to expand their computer systems and data bases, the need to secure corporate information is becoming increasingly important. *Computerworld's* November 25 Special Report on Protecting the Corporate Information Resource will address the many complexities surrounding the corporate security issue.

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Our many features and tutorials will explore the importance of audit software, the differences between "hot" and "cold" sites, and methods for securing local area networks — plus creation of a disaster recovery plan and new technologies for determining user authentication. We'll also examine security legislation being studied in Washington and look at the vital roles played by the data processing manager and chief security officer.

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Trademark law protects product names and logos

EIGHTH IN A SERIES

By Jerome J. Roberts
and Michael P. Brownell
Special to CW

A substantial portion of a vendor's software investment is attributable to marketing expenses intended to inform the market of its software, to differentiate such software from the competition and to establish the reputation of the vendor. Accomplishing these objectives normally requires the establishment of a widely recognized product name and/or logo, usually at considerable expense.

If a vendor follows certain rules regarding the selection and promotion of its product name and/or logo, it will be able to prevent others from using such a name and mark and leveraging off its investment and marketing goodwill. Such protection is the province of trademark law.

Laws exist at both the state and federal levels to protect trademarks, service marks and trade names. This article explains the fundamental aspects of the trademark protection under the federal Lanham Act.

ELIGIBILITY

The mark itself may consist of any visual representation — for example, letters, words, symbols, artistry — subject to several prohibitions. First, a trademark may not consist of other governmental insignia, personal names, portraits or signatures used without a person's consent; any immoral, deceptive or scandalous matter; or any mark that might discourage or falsely suggest a connection with a person or entity.

Second, the mark must not be "generic" or "descriptive," as such terms are defined under trademark law.

Apple Computer, Inc.'s "Apple®" is an excellent mark because its inherent primary meaning, that is, a type of fruit, bears no logical relationship to microcomputers. On the other hand, the hypothetical mark "Spreadsheet" used in connection with licensing a spreadsheet software package probably would be deemed generic and descriptive. However, an otherwise generic or descriptive mark still may receive the act's protection if it acquires "secondary meaning," as defined under trademark law, or if the mark is modified so as to make it distinctive.

The act's third requirement concerning eligibility denies protection to any mark that so resembles a mark that is already being used in the U.S. in connection with similar goods or services that the use of the new mark would confuse or deceive the public.

A thorough investigation can be achieved by performing a trademark search.

In addition to satisfying the act, performing a trademark search prior to using a desired mark can alert a vendor to potential liability for infringing a similar mark already in use.

REGISTRATION AND NOTICE

A mark meeting the foregoing requirements may be registered under the act so long as the relevant software has been marketed in interstate commerce under such mark. Trademark registration is more difficult and time consuming than copyright registration, and very often requires the services of an attorney knowledgeable in trademark law.

Once a registration certificate has been issued, the registered mark may be displayed with the registered trademark symbol "®," the words "Registered in U.S. Patent and Trademark Office" or the abbreviation "Reg. U.S. Pat & Tm. Off." Failure to so provide notice of registration may cause loss of certain remedies under the act. Such notices may be used only in connection with a mark for which a trademark registration certificate has been issued. Prior to such time, a vendor may use only the symbol "™" to provide notice that a mark is being claimed as a trademark.

INFRINGEMENT

Infringement commonly is described as the attempt of a competitor to use a confusingly similar trademark to palm off his goods as those of the vendor that owns the original mark.

The remedies available under the act to address infringement include the right to obtain an injunction to prevent or restrain the infringement, the right to recover damages and/or the infringer's profits resulting from the infringement and the right to have infringing articles impounded and/or destroyed.

A certificate of registration is valid for 20 years, provided that after five years the registrant notify the Patent and Trademark Office, in the manner prescribed by the act, that the mark has not been abandoned. Upon the expiration of the 20-year protection period, the owner's registration may be renewed continuously by filing a renewal registration application as required by the act.

Roberts and Brownell are attorneys with the law firm of Bermand, Roberts and Kelly in Chicago. The firm's practice deals with legal issues related to procurement, distribution, management and protection of computer resources.

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Report claims European software market booming

U.S. vendors supply top-selling packages

By Edward Warner

(CWN) — By the year's end, total personal computer software sales in Europe will be double what they were in 1984, according to a recent report from the French market research firm Intelligent Electronics Europe.

The 1.6 million packages that the report predicted will be sold this year in Europe will come mostly from the U.S., the report continued. All of the 10 top-selling packages in Europe, as of July, were published by U.S. vendors, the report said. Heading that list were, in order, such familiar names as Lotus Development Corp.'s 1-2-3, Microsoft Corp.'s Multiplan and Micropro International Corp.'s Wordstar.

Capturing a slice of the lucrative European software pie is not an easy task for U.S vendors, however.

'Rejection of nontranslated packages'

According to the report, "even in countries where English is widely used and understood in business circles, there is now a very definite rejection of nontranslated packages."

Lotus, for example, once marketed 1-2-3 untranslated but has since established a European headquarters in the UK where about 30 employees work on adaptations of its products for specific languages and currencies.

In recognition of the difficulty that newcomer U.S. vendors experience when trying to penetrate Europe, Microrim, Inc. late last month announced that it would enter the European market under the wing of Microsoft, a Bellevue, Wash., neighbor.

Microsoft to market R:Base 5000

Microsoft will market Microrim's R:Base 5000 data base management package under a licensing agreement as Microsoft R:Base.

Microrim President Kent Johnson said his firm turned to Microsoft because he was impressed with Microsoft's experienced, 100-member European marketing group. Microsoft, he said, is the "largest independent U.S. software vendor in Europe."

Microsoft will translate R:Base 5000 into French, German, Spanish, Swedish and Italian versions, to become available next year, and a British-English version, to be available late this year. Pricing was not announced.

Other attractions draw firms overseas

There are other attractions, besides the booming market, that draw U.S. personal computer software companies to Europe. According to the Intelligent Electronics report, "only in the UK and France is there an active horizontal [market] publishing activity" among native developers.

Putting it more bluntly, Lotus international business development manager Stephen Kahn said, "I don't think there's any area [in Europe] that's doing as much software development as [the] whole Boston area."

Microrim's Johnson said he expects Microsoft R:Base to encounter its greatest competition from U.S. products: Ashton-Tate's Dbase II and III lines, a finding borne out by the report.

The Intelligent Electronics Europe report said that the Dbase products were the top-selling personal computer data base management systems in Europe and that, overall, the market for DBMS and spreadsheets showed the greatest growth in Europe in the last year.

The report is based on interviews with more than 200 companies involved in the European software market, including publishers, importers and distributers, and is available from Intelligent Electronics Europe, which is located at 15, Rue Buffon, 75005 Paris, France.

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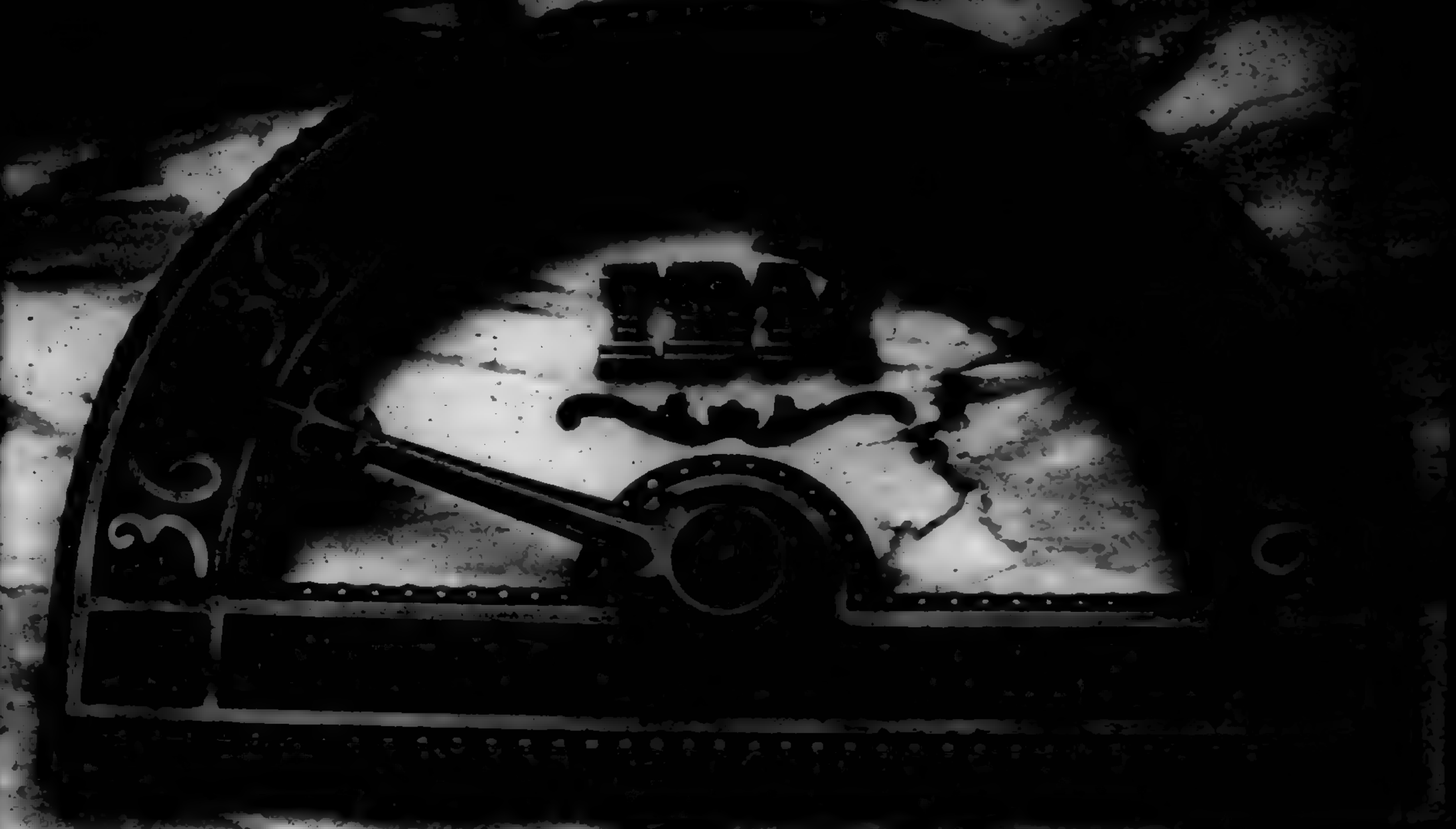

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ADR reports third-quarter profit

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) last week reported a third-quarter profit of $228,000, or 3 cents per share, and said the return to profitability indicates improvement in demand for its products.

For the nine months ended Sept. 30, ADR reported a loss of $2.3 million, or 37 cents per share, compared with year-earlier profits of $4.5 million, or 80 cents per share.

The third-quarter profit was down substantially from the year-earlier profit of $2.5 million, or 45 cents per share.

John R. Bennett, chairman and chief executive officer of ADR, said an anticipated strong fourth quarter indicates the company will show a profit for the year.

However, the company declined to make any specific projection due to the current economic climate and uncertainty within the computer industry.

ADR said it will continue to control expenses so as to position itself for the possibility of further economic uncertainty.

From page 79

Finis Connor's reign a memory

Sperry recently agreed to sell its New Holland farm equipment business to Ford Motor for $440 million. With the anemic division no longer blurring Sperry's vision of the information processing industry, all eyes will be watching to see if the venerable Univac computer line will get yet another master, or if Sperry is indeed intent on spurning all acquisition offers.

■

Harris Corp. and 3M Corp. recently announced they will form a joint company to market copiers and facsimile machines.

■

Measurex Corp. recently signed with Ford to develop jointly a highly flexible computer-integrated manufacturing system for Ford's body and assembly operations. The $14.4 million program will be aimed primarily at software development.

■

The American Electronics Association recently came down hard on the current reform package proposed by the U.S. House of Representatives' Ways and Means Committee recently. The association said the package would impose a major penalty tax on research and development activities of high-tech firms.

■

Ungermann-Bass recently signed a five-year OEM agreement to supply its Personal Network Interface Unit boards to Intel, which will be incorporating them into a product enabling IBM Personal Computer AT and XT models, as well as their compatibles, to communicate with Intel's Opennet local-area network.

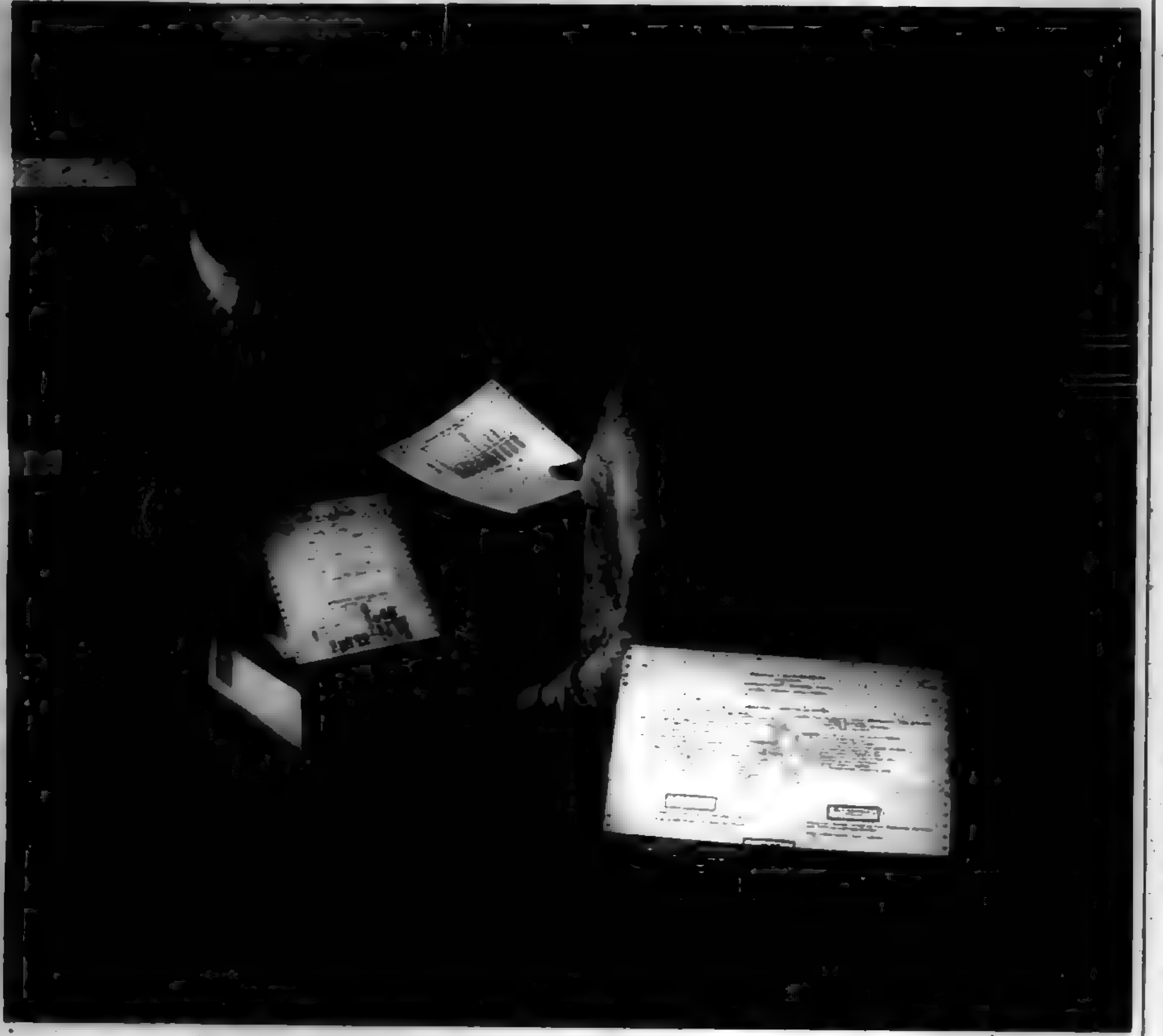
■

The computer services industry is continuing to grow with new entrants and with the pace of mergers picking up, according to statistics compiled by the Association of Data Processing Service Organizations/Broadview Associates index. For the first six months of 1985, a total of $846 million in mergers have taken place, which is a 50% increase over the similar period in 1984.

■

Broadview Associates, a market analysis firm, estimates that the total number of mergers within the computer services industry will approach 1,500 through the 1980s, and that the total value of the mergers will reach $20 billion. From 1980 through 1984, the value of mergers totaled $6.5 billion, according to Broadview.

Broadview said the average dollar value of mergers is $3 million and that the largest takeover to date is the acquisition of EDS Corp. by GM in 1984 for $1.1 billion.



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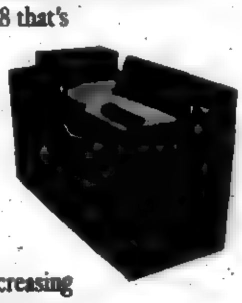

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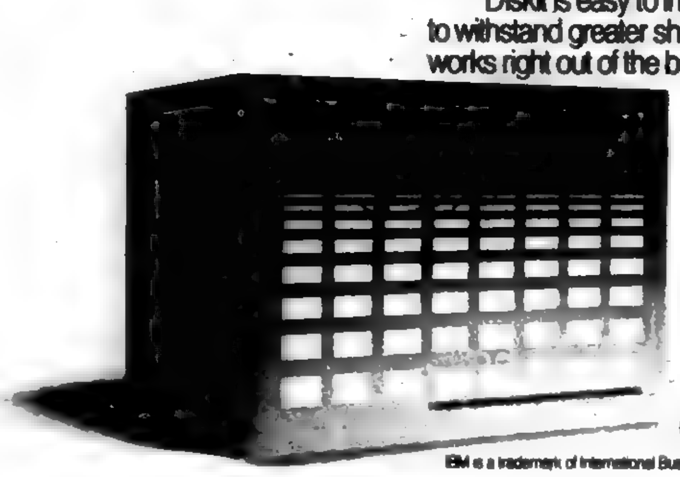

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COMPUTER INDUSTRY

Software firms find new market

By Bryan Wilkins

WASHINGTON, D.C. — Independent software companies, feeling the pinch of a slowdown in hardware sales, can find new opportunities by meeting user demands for systems integration that equipment manufacturers are unable or unwilling to fill.

That was the view offered by Jim Blake, vice-president of business development for Cullinet Software, Inc., at the Association of Data Processing Service Organizations, Inc.'s 64th management conference held recently.

"Things are very tight, very tight," Blake conceded during a meeting on systems integration. But, he said, independent software vendors are looking at new market opportunities represented by the retrenchment of hardware vendors that have cut back their sales forces and are now approaching software companies for assistance.

Blake said customers are adopting a very cautious stance on buying software packages. Potential users subject products to extensive analyses to determine their possible shortcomings and their ability to change with the needs of the business.

"It seems like [users] are demanding the ability to put all their systems together into one information center-type approach and at the same time are demanding an ability to perform distributed processing from their micros, minis and mainframes," he added.

Software vendors are facing customer dissatisfaction with existing micro-mainframe packages that are now in wide use in businesses. This dissatisfaction is due to limitations on uploading data to the mainframe, Blake said.

But software applications that distribute data from mainframes among micro users and within local-area networks are not as advanced, and the problems appear harder to solve, according to Blake. This is because the problems stem from issues such as incompatibility of hardware, software and communications protocol links, which then affect backup and recovery planning if an applications package is tailored for a specific solution.

"No one has solved these problems yet, though everyone is trying hard," Blake said. In this way the popularity of relational technology and referential integrity — the ability to update data with direct reference to establishing that the initial data was in the correct format — can be explained. Relational data base packages and SQL-type packages are helpful, but they are hampered by lack of support from hardware manufacturers, Blake said.

IBM, according to Blake, has expressed an unwillingness to produce a referential integrity type of package in the next two to four years. This, coupled with the lack of a communications protocol in the IBM Systems Network Architecture LU6.2 product, Blake asserted, creates "a severe problem."

The current equipment sales slowdown and users clamoring for a transparent applications package that allows them to communicate and manipulate mainframe data from their micros present an opportunity for independent software firms to fill the demand, Blake said.

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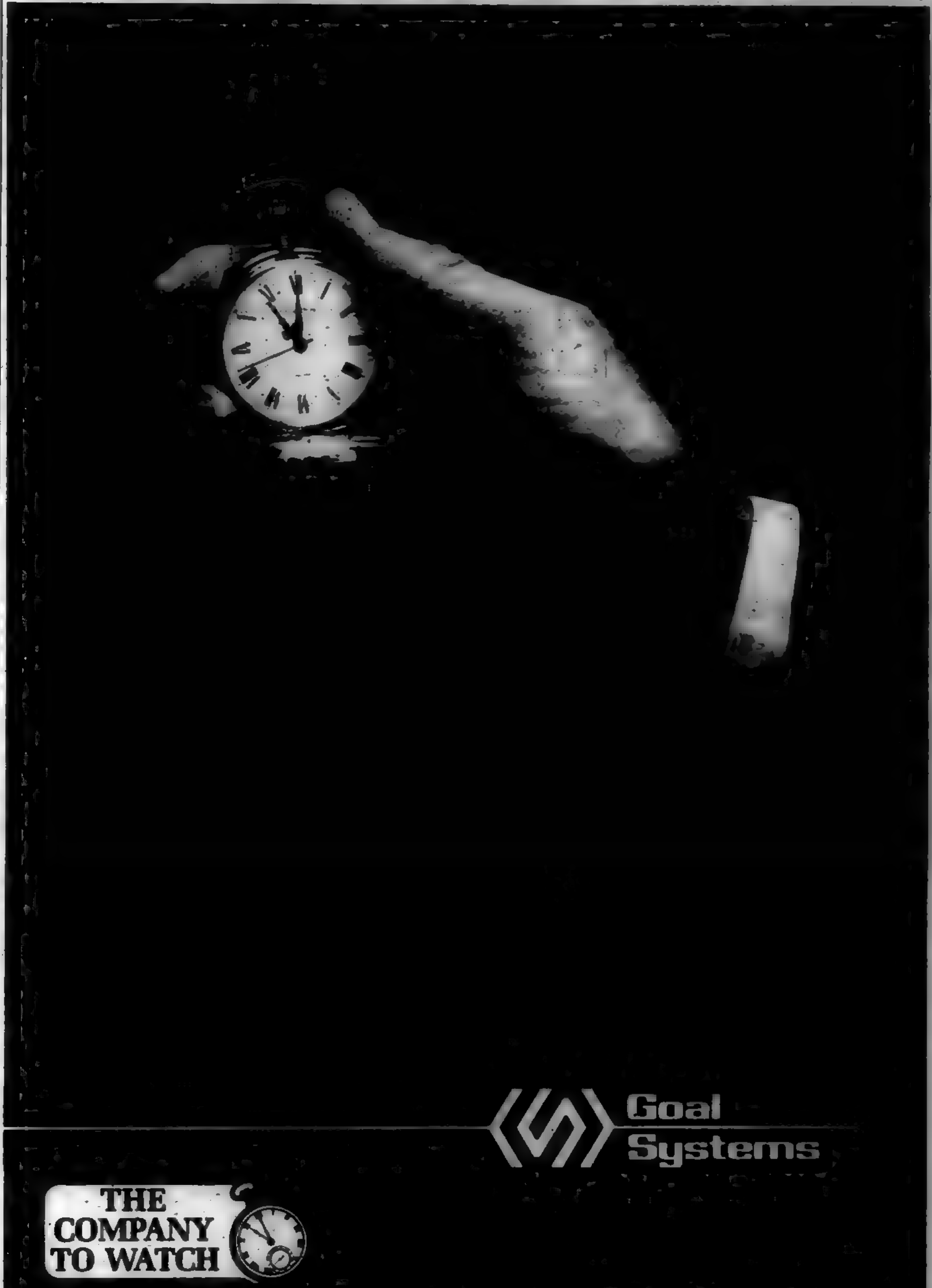
Each directory of computer installations lists 10,000-16,000 computer users covering the NY Metro Area (NY, NJ & CT), the Mid-Atlantic States (PA, VA, MD, DC, WV & DE), and the New England area (MA, ME, NH, RI & VT) Each site includes a profile of the hardware installed, software installed, (languages, databases, etc.), consultants used, future plans, applications and DP executives' names, titles, and phone numbers. An index provides quick access to 133 cross-references by hardware, software and industry. Price: NY-$370, MA-$370, and NE-$300. Call (212) 683-0606. Computer Management Research, Inc. 20 Waterside Plaza, NY, NY 10010.



From page 79

Eagle's eye on future; firm planning to soar

tion. Layoffs trimmed the Eagle staff down to 65 from 330, and all operations were consolidated to the Garden Grove offices.

Kappenman, however, said he believes Eagle has learned from all its troubles and is about to leave its problems behind.

While it registered its $10 million loss, Eagle laid the groundwork for what it said it hopes will be its resurgence in the computer market.

Without seeking the protection of the courts, Eagle reorganized and, by August, established a repayment plan for its long-term debtors [CW, Sept. 30]. It initiated manufacturing operations in Seoul, South Korea; added 10 million shares of stock to its holdings; recruited a new chief operating officer; increased its field sales force; refocused its market; and readied itself for a new line of products.

Critical to Eagle's attempted flight from the ashes is the success of the SST, a multiuser supermicro scheduled to debut at November's Comdex.

Some analysts say the SST is just what Eagle needs to make it airborne. "Multiuser systems could be a smart move for [Eagle]," said Maureen Fleming, president of Digital Information Group in Stamford, Conn.

IBM's System/36 PC is far too expensive, has limited dealer channels and is not considered to be a mainstream product, Fleming said.

To be successful, Eagle must put some money behind its marketing efforts — hence the need for more stockholdings, Eagle officials noted — and the SST must work with the top word processing and spreadsheet packages, she noted. Eagle has not released any SST specifications.

With Eagle's new product will come a new marketing emphasis, Kappenman said. The company will try desperately to avoid repeating one critical mistake of years ago. "In the clamor to get onto the retail shelves, we lost some of our identity," Kappenman said. Eagle will now focus on selling new customers solutions to both new customers and its established base of more than 45,000.

"Our marketplace is the small marketplace — it always was," Kappenman said.

With the SST will come a slower, more sophisticated approach to its market. "If we try to get billions of dollars of business, we are going to fail," Kappenman said.

Analysts like Fleming have said they have difficulty believing that Eagle does not want the big market right away. "Comdex is an expensive show, and it's for retailers, so I'm sure they are going for the glamour market," she said. It is possible Eagle could pit itself against firms producing Microsoft Corp. MS-DOS-based machines that can be networked together. "You don't usually have a Comdex launching if you are going to try and limit yourself to the small business market," she said.

Big market or small market, Kappenman and Eagle's management still are playing for some heavy stakes. And they are convinced theirs will be one of the few companies that can be down but can come up swinging. In fact, the tough guy image is one preferred by Kappenman and his management team. "People like a tough company and a management team that doesn't give up," he said.

Whether or not Eagle will reinstate faith in the storybook ending remains to be seen. But don't try to convince Kappenman that it cannot be done. "We were once considered a Cinderella story. Now we're more like Rocky, coming back to fight the challenge," he said.

There are several ways to simplify VM for your users...

and they're all called MULTIPAK/VM™

MULTIPAK/VM is a productivity aid designed by SKK, Inc. to enable your VM users to more easily perform daily tasks. MULTIPAK/VM is actually a collection of four separate but related VM utilities that improve upon some existing facilities, while adding some powerful new capabilities for VM users under CMS.

MULTIPAK/VM was written to assist users at all levels of experience. The package offers a trove of features that will benefit the most experienced VM/CMS programmer as well as the non-technical, inexperienced VM user. In fact, we developed MULTIPAK/VM for our own use based upon our years of IBM and VM experience from our ACF2 product line. SKK is a leader in IBM mainframe software products, with over 1,600 user sites worldwide.

Here are just a few of the many ways that MULTIPAK/VM can help you:

1. SPOOL VIEWER

Spool Viewer gives users the ability to now display all spool files. This includes print and punch files, which were previously inaccessible. With Spool Viewer users are no longer limited by file size, because the entire spool file may be viewed regardless of size.

Spool Viewer offers user-tailorable screens, which may also be used to change the displayed data. The Display/Change feature enables users to change file attributes by simply keying-over the displayed data without using complex CMS commands.

2. SHORT CUT

Short Cut is a command shell which simplifies CMS by guiding users through a multilevel system of command panels. Short Cut is designed to reduce the CMS learning curve and to increase efficiency of experienced users by offering simpler, faster alternatives to existing facilities.

Managers may use Short Cut to restrict CMS command usage by specific groups of users or by individuals.

3. SCREEN PAINTER

Screen Painter enables users to construct full-screen application panels by laying out screens exactly as they are to appear. Screen Painter offers new levels of performance, while automatically validating all screens and allowing users to print screen hardcopies. These screens may be called from an assembler program, and EXEC, or a high-level language.

4. STRETCH EDIT

Stretch edit offers VM users new and enhanced XEDIT capabilities. MVS or VS1 datasets, or parts thereof, may be copied directly into CMS files without losing the current line displayed. Stretch Edit allows users to swap screens, rename files in one step, and enhance normal program function key usage.

5. FREE TRIAL

SKK can also give you a productive way to evaluate MULTIPAK/VM; a 30-day free trial. Simply mail in the completed coupon or call a MULTIPAK marketing representative at 312/635-1040.

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From page 79

IBM running on Wall Street

depresses the demand for Sierra-like products announced by the plug compatibles.

But let's look down the road: If IBM sells a bunch of Sierras this year, the machines can only be coming from next year's projected sales. Even if the backlog stretched into 1987, the demand for IBM's biggest machine is still limited by the relatively limited market for them. Only a certain percentage of IBM 3080-class users can afford or use the power of the IBM 3090 models; this market is not, after all, dealing in personal computers that cost only $3,000 or so.

At some point, IBM's decision to move up its projected revenue stream has to be felt when demand stabilizes.

So why would Big Blue optimize short-term results at the expense of long-term health?

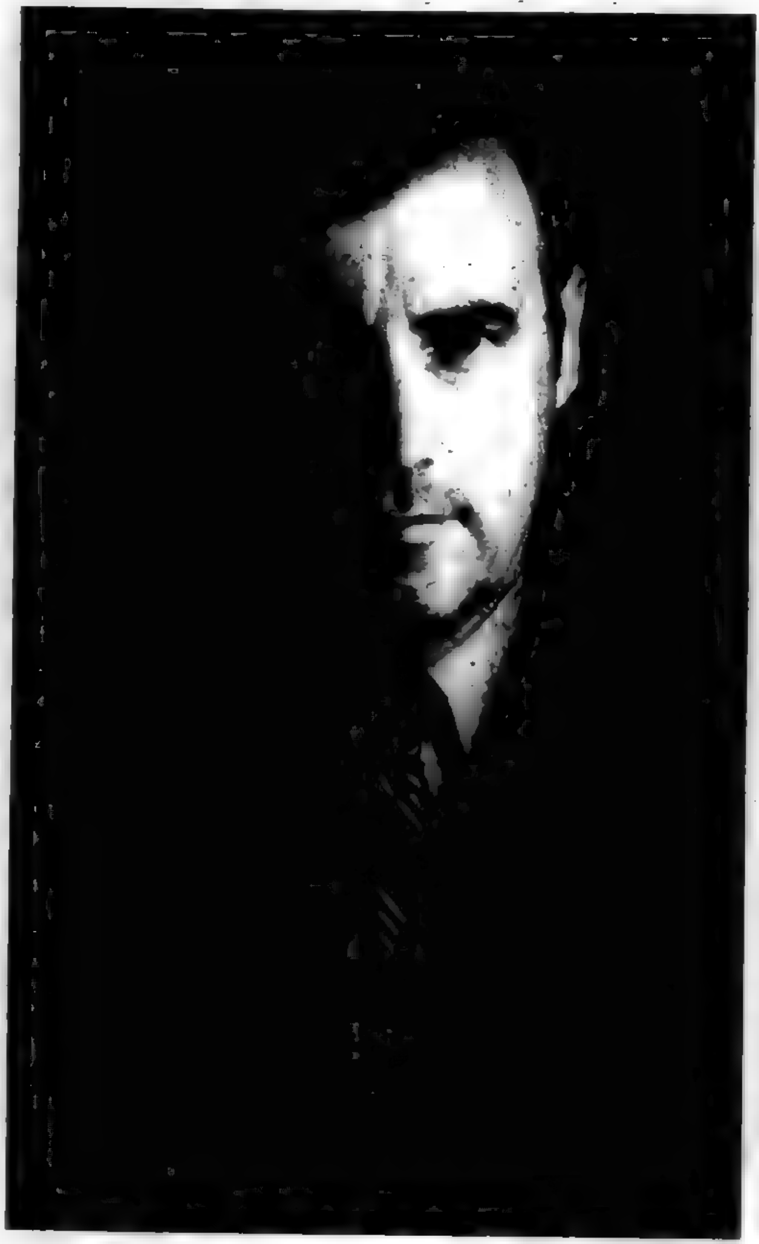
It just may be that IBM's large staff of economists has come to the conclusion that the U.S. economy at this point in time cannot deal with adverse news from the largest vendor in the fastest growing industry.

If IBM were to concede temporary defeat this year, its stock would take a hit. IBM could deal with that, but the action would surely pull down the rest of the high-tech stocks. And there is some reason to believe that high-tech industries are leading indicators of the economy these days, so the further impact could be to pull down the stock markets broadly. That would severely undermine confidence in the U.S. business climate and possibly could tip a feeble economy over the edge into a quicker than expected recession, setting off an even more severe cycle.

It just may be that IBM has become so huge that it no longer can make decisions based solely on its own goals, but it must also shoulder responsibility for propping up the U.S. economy. If so, one can expect that IBM President John Akers will age as quickly in his job as Jimmy Carter did in his post.

The time has come for straight talk about database management systems.

"The only reason to buy a database management system is to build better applications."



Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEO's of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

JJ Cullinane

John J. Cullinane
Chairman of the Board

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The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of on-line and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/1, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS

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With a workstation on every desk from the CEO's on down, decision-makers will have the information they need right at their fingertips. Managers will be able to keep a close eye on plant productivity and quality control. And by using AT&T computers to automate order-entry and access up-to-the-minute data, the sales department will have an edge in the highly competitive battle for shelf space.

Many vendors were considered, but only AT&T had the technology and service Heath needed today, as well as the flexibility to grow and evolve to meet the needs of tomorrow. With AT&T, Heath's future looks sweeter than ever.

To find out why AT&T is the right choice for your business, call your Information Systems Account Executive or 1 800 247-1212, Ext. 539.

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COMPUTER INDUSTRY

Datapoint reports loss while spin-off Intelogic posts profits

SAN ANTONIO — Datapoint Corp. recently reported a net loss of $48.2 million, or $2.61 per share, for the year just ended, but the service unit that spun off it as an independent company, Intelogic Trace, Inc., reported profits of $20.2 million, or $1.09 per share.

Revenue for the year was $520 million, compared with $600 million a year earlier. Profits in the previous year were $28.1 million, or $1.29 per share.

Excluding the contribution of the service unit, revenue for Datapoint was $380.3 million.

In the fourth quarter, Datapoint posted a loss of $5.8 million, or 32 cents per share, including the effects of a one-time charge of $6.5 million resulting from the settlement of litigation.

According to the company, a year earlier it reported fourth-quarter profits of $5.6 million, or 27 cents per share.

Intelogic Trace said its profits for the previous year, based on adjustments and assumptions related to its former status within Datapoint, would have been $14.7 million, or 79 cents per share. Revenue for the year just ended was $158.5 million, compared with last year's $144.3 million.

From page 79

Osborne banks on ventures

product line and give it more exposure in the retail market. The company put out a $3 million stock offer this summer, reduced its debt from $15 million to $6 million and is seeking additional financing of $4 million to $6 million for 1986 operations.

In August, Osborne signed an agreement with Sona Computers, Inc. of San Jose. The research and development company is designing a 16- to 18-lb machine that will be compatible with the IBM Personal Computer.

Dubbed the Osborne Voyager, the 16-bit machine is expected to be introduced early next year and will cost less than $1,500, according to Osborne President Ronald Brown, former vice-president of the firm's international division, who took over after Osborne filed for bankruptcy two years ago. The company expects to ship between 10,000 and 12,000 Voyager units next year, he said.

To enhance its presence in the retail market, Osborne announced last month an agreement with San Diego-based Tigermark Corp., the manufacturer of a security board for the IBM Personal Computer. The product is now available for Osborne's Vixen portable, introduced last year.

Tigermark also manufactures peripherals for Apple Computer, Inc. products and is said to have a strong presence within domestic computer retail markets. The agreement makes Tigermark a U.S. distributor for Osborne, which will then sell Tigermark products through its established international distribution channels, Brown said.

These two deals are just the beginning of what could be several relationships for Osborne, according to Brown, who would not rule out the possibility of a merger with these or other companies. "We could put together three or four of these kinds of deals," in an effort to beef up its product line, he said. Future products could include an IBM Personal Computer XT- or AT-type system, an AT&T Unix-based system or even Apple-compatible products, Brown noted.

Even with the new product line, Osborne remains committed to the CP/M operating system, installed in early Osborne I and Executive portables. "There is an installed base of one million computers out there," Brown said. "That market isn't growing, but it's not going away."

Uptime

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Announces

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SAS Institute launched an effort to develop a subset of the SAS® Software System for the IBM Personal Computer. After careful study, we agreed that C was the programming language of choice. And that the Lattice® C compiler offered the quality, speed, and efficiency we needed.

One year ago...
Development had progressed so well that we expanded our efforts to include the entire SAS System on a PC, written in C. And to insure that the language, syntax, and commands would be identical across all operating systems, we decided that all future versions of the SAS System—regardless of hardware—would be derived from the same source code written in C. That meant that we needed a C compiler for IBM 370 mainframes. And it had to be good, since all our software products would depend on it.

So we approached Lattice, Inc. and asked if we could implement a version of the Lattice C compiler for IBM mainframes. With Lattice, Inc.'s agreement, development began and progressed rapidly.

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Our efforts are complete—we have a first-rate IBM 370 C compiler. And we are pleased to offer this development tool to you. Now you can write in a single language that is source code compatible with your IBM mainframe and your IBM PC. We have faithfully implemented not only the language, but also the supporting library and environment.

Features of the Lattice C compiler for the 370 include:

- Generation of reentrant object code. Reentrancy allows many users to share the same code. Reentrancy is not an easy feature to achieve on the 370, especially if you use non-constant external variables, but we did it.
- Optimization of the generated code. We know the 370 instruction set and the various 370 operating environments. We have over 100 staff years of assembler language systems experience on our development team.
- Generated code executable in both 24-bit and 31-bit addressing modes. You can run compiled programs above the 16 megabyte line in MVS/XA.
- Generated code identical for OS and CMS operating systems. You can move modules between MVS and CMS without even recompiling.
- Complete libraries. We have implemented all the library routines described by Kernighan and Ritchie (the informal C standard), and all the library routines supported by Lattice (except operating system dependent routines), plus extensions for dealing with 370 operating environments directly. Especially significant is our byte-addressable Unix®-style I/O access method.
- Built-in functions. Many of the traditional string handling functions are available as built-in functions, generating in-line machine code rather than function calls. Your call to move a string can result in just one MVC instruction rather than a function call and a loop.

In addition to mainframe software development, you can also use our new cross-compiler to develop PC software on your IBM mainframe. With our cross-compiler, you can compile Lattice C programs on your mainframe and generate object code ready to download to your PC.

With the cross-compiler, we also offer PLINK86™ and PLIB86™ by Phoenix Software Associates Ltd. The Phoenix link editor and library management facility can bind several compiled programs on the mainframe and download immediately executable modules to your PC.

Tomorrow...
We believe that the C language offers the SAS System the path to true portability and maintainability. And we believe that other companies will make similar strategic decisions about C. Already, C is taught in most college computer science curriculums, and is replacing older languages in many. And almost every computer introduced to the market now has a C compiler.

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C supports structured programming with superior control features for conditionals, iteration, and case selection. C is good for data structures, with its elegant implementation of structures and pointers. C is conducive to portable coding. It is simple to adjust for the size differences of data elements on different machines.

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POSITION ANNOUNCEMENTS

The Hubble Space Telescope is an orbiting astronomical observatory to be launched by Space Shuttle in 1986. Space Telescope Science Institute will conduct the scientific operations of the telescope, which has a planned 15 year scientific mission.

At launch the Institute's computing systems will amount to a half-million lines of code written in C, FORTRAN, VAX/11 Macro, OPS5, LISP, and Scan, as well as three critical databases and a data archive. The system is distributed over a dozen CPUs at two sites and is networked to other mission operations systems located at Goddard Space Flight Center.

Space Telescope Science Institute, an astronomical research center operated by AURA for NASA, is assembling a team of S/W experts – dedicated, motivated individuals who will take responsibility for the future growth of a major computing facility. This team will be responsible for systems now under development and will work with operators and astronomers to define and implement the next generation.

We have immediate openings in the following areas:

- OPTICAL DISK ARCHIVE
  STScI is building an optical disk based data management facility to provide an on-line archive of astronomical data. Current optical disk jukebox technology will be employed in conjunction with a relational database machine to provide both archive and catalogue services to scientists analyzing data. The system will serve a variety of networked processors, both local and remote.
- NETWORK/UNIX SPECIALIST
  STScI is developing an extensive network of VAXes, SUNs, and image processing workstations to support data analysis and scientific computing. We are looking for a key individual with several years experience in this area to spearhead this effort. We are currently using TCP/IP and DECnet on Ethernet; plans call for higher bandwidth installation of fiber optic media and exploration of wide-area network options.
- SCIENCE MISSION PLANNING
  The science planning system is responsible for planning and scheduling all Space Telescope science operations, including the generation of optimal spacecraft activity timelines and command sequences to execute them. This system involves a wide variety of computing subfields and languages.
- REAL-TIME SUPPORT
  This real-time system manages minute-by-minute spacecraft operations, including target acquisition, real-time decision making, and the first look at the data. This system monitors critical instrument status data and must be online around the clock.
- PIPELINE DATA PROCESSING
  This system operates the Space Telescope data pipeline, in which a huge volume of data must be reliably calibrated, archived, and made available to the international astronomical community on a variety of distribution media.
- GUIDE STAR SELECTION SYSTEM
  In order to position the telescope for each observation, a pair of appropriate reference stars must be extracted from an all-sky catalog of 40 million stellar objects. This system will generate and maintain the catalog and will process requests for guide star pairs.
- SYSTEM ENGINEERING AND SUPPORT SOFTWARE
  These staff members will be responsible for system support and cross-system integration, involving the ground support subsystems, the data archive, the operational databases, local and remote networks, and other Institute facilities.
- SCIENTIFIC DATA ANALYSIS
  STScI is developing a large body of astronomical data analysis software to reduce Space Telescope data. This software will support the astronomical components of the operational systems, as well as the interactive data analysis and image processing systems utilized by the astronomers.
- REVISION CONTROL
  These staff members will be in charge of development of build procedures, build generation, and installation validation for operational system upgrades. Extensive use will be made of automated tools for build generation, version tracking, and regression testing.

All positions require experience in large scale software engineering, and will put you right where the action is. Previous spacecraft experience is not necessary, but experience in several of the following areas is desirable:

- Knowledge-based planning & scheduling
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- Systems programming,
  Networking,
  Multiprocessor distributed systems,
  Command languages;
- Real-time systems;
- Scientific computing,
  Image processing & computer graphics,
  Computational geometry,
  Numerical analysis,
  Algorithm development;
- Relational and hierarchical databases,
  Hardware database mgmt. systems.

Languages and operating systems used include:

C, FORTRAN, LISP, OPS5, Scan, VAX/11 Macro;
UNIX and VMS.

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All applications/resumes should reference position [illegible] and must be received by November 8, 1985. Reply to:

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EOE/M-F

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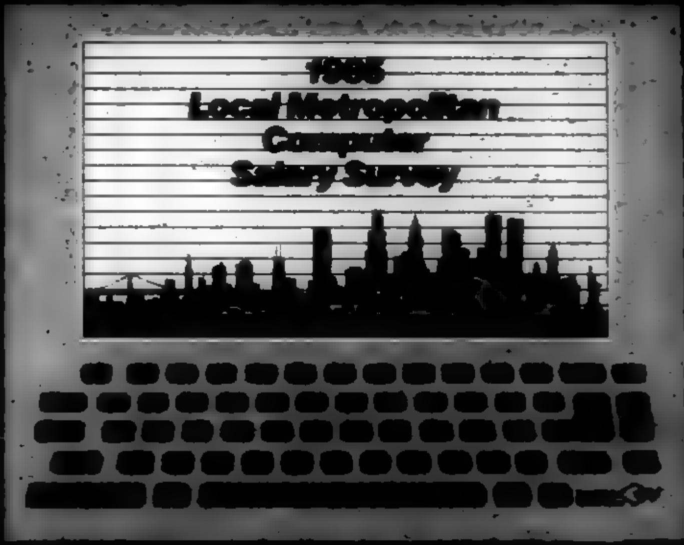

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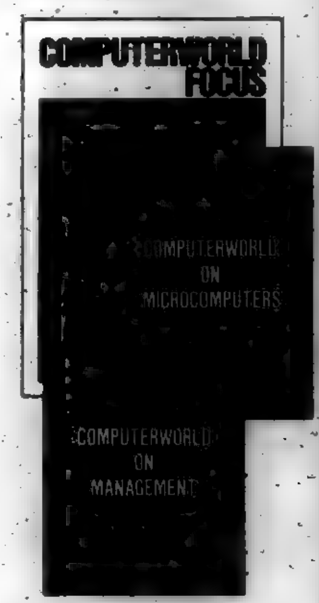

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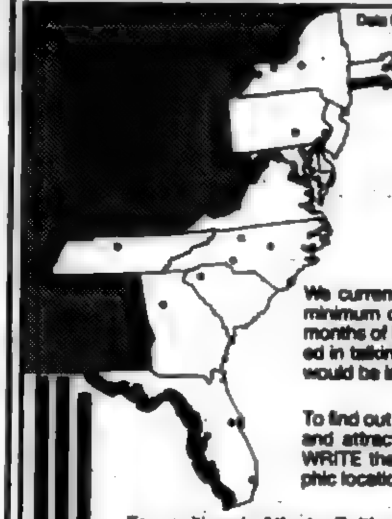

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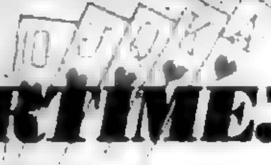

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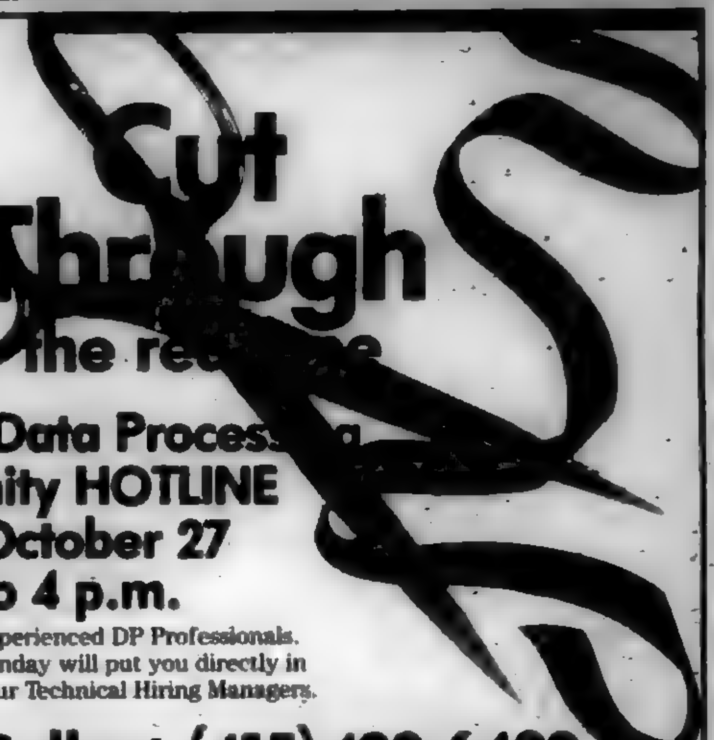
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40 hours per week, 8 a.m. to 5 p.m., $19,624 per year. Design and implement computer assisted instruction (CAI) software; Write CAI technical reports; Maintain CAI library and courseware modules. Provide administrative and technical support. All above duties using VAX 11/780 (VAX/VMS), TOWER (UNIX), IBM PC (PC-DOS), and NCR DM-V (MS-DOS). Master of Science in Management Information Systems or equivalent. Assurance of completion of degree sufficient. Experience with CAI and software development; knowledge of PASCAL, C, COBOL, BASIC PILOT, TenCORE, systems knowledge of VAX 11/780 (VAX/VMS), TOWER (UNIX), NCR DM-V and PC-IV (MS-DOS) and IBM PC (PC-DOS); one year experience in academic research. Qualified applicants send resume or application letter to: AZ DES Job Service, Attn: 732-A Re: 0801839, P.O. Box 6123, Phoenix, Arizona 85005 (Job Location: Tucson. Employer paid ad. Proof of authorization to work in U.S. required; list in resume or application letter).

Program Director - Responsibilities include planning, directing & coordinating activities of projects geared to develop advanced computer applications & promote business internationally. Review project proposals to determine methods & procedures for accomplishment of project. Develop staffing plan & establish work plan & schedules for each phase of project in accordance w/time limitations & budget. Prepare project status reports for mgmt & confer w/project personnel to provide technical support & assist in problem-solving. Supervise 8 employees. Applicant must have a Masters degree in any scientific discipline. Masters degree course work must have included use of computers. Must have 8 yrs managerial level exp in development of advanced computer applications including int'l business promotion or 8 yrs in the job being offered. 9AM-5PM. $110,000/yr. Mail resumes to: NYS Job Service, JO# NY8006821, 97-45 Queens Blvd., Rego Pk, NY 11374.

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Eastern New Mexico University, Portales, New Mexico, is seeking applications for a Programmer Analyst. Qualifications: Bachelor's degree or the equivalent experience, knowledge of COBOL. Salary: $17,101. To apply send letter of interest/resume/3 names of references to:

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Systems Programmer needed for technical support group in a gulf coastal bank. Four years experience with DOS/VSE, VTAM, CICS, VSAM, NCP, for a 43XX shop. Should have COBOL and Assembler experience. Must have good oral and written communication experience. Please send resume, reference and salary requirements to: **CW-B4709, Computerworld, Box 880, Framingham, MA 01701**

Network Systems Analyst: design, develop, implement. Data communication networks, utilizing SNA and local area networks, including ENVOY X.25, PATHWAY, EXPAND and CML. Participate in written high level detailed design review, development of strategic business plans and provide technical support to customers. $38,600 per annum. 35 hours per week. B.Sc. in Communication Science plus 2 years experience required or 2 years in systems analysis. Mail resumes to NYS Job Service, JO #NY8006649, 97-45 Queens Blvd., Rego Park, NY 11374.

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Develop Software for Management Information Systems. Maintain and support software, hardware, micro and mini computers. Specify computer and design custom interfaces. Work with MOTROLA M600, ZILOG Z80, ZILOG Z800, IBM 3033 (370) series, Prime 555 series, CP/M and MIS based systems. Work with computer graphics and CAD. Requires B.S. in Computers and Systems Engineering, 2 yrs. exp. in job or as Programmer. $650/wk for 40 hr.wk. DOT 012.167.066. Mail resume to: NYS Job Service, JO# NY8006787, 97-45 Queens Blvd., Rego Park, NY 11374

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Job candidates should meet the following position requirements: BS/BBA degree or equivalent; 4+ years Burroughs mainframe experience (preferably medium systems) with DMS II, COBOL 74, GEMCOS and NDL knowledge; 4+ years management experience, excellent communication skills and prior data communications network experience.

Interested candidates should submit a resume with salary requirements in confidence to:

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COMPUTER APPLICATIONS ANALYSTS

Mobil Exploration and Producing Services Inc. (MEPSI) provides programming and data processing support to Mobil Oil Corporation's exploration and producing activities worldwide. Several openings are immediately available for experienced, preferably technically oriented, computer applications analysts/programmers. As a member of the Technical Applications Support Group, you will be involved in challenging assignments in support of our engineering and other technical departments.

Preferred candidates should possess:

- Minimum 2-5 years of technical programming experience or equivalent credentials. Oil & Gas industry experience desirable.
- High proficiency in use of IBM OS and/or VM computer systems (MVS, CMS, TSO, FORTRAN, PL/1, JCL, Utilities, PANVALET, FOCUS).
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Responsibilities include:

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The preferred candidate should possess at least 4 years of experience in MVS, CICS, VTAM, RMF and CMF. Familiarity with installation, training and maintaining is helpful.

COMPUTER PROGRAMMER

The preferred candidate should have a minimum of 3 years manufacturing application as well as proficiency in FORTRAN and use of IBM computers; knowledge of IDMS a plus.

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The preferred candidate should be proficient in the following engineering packages: CADAM, CATIA, NASTRAN and APT. In addition, knowledge and ability to install and maintain programs and functioning closely with engineering groups is essential. Knowledge of Graphic hardware, IBM 3250 and 5080 equipment helpful.

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- MS/DOS personal computers experience
- LAN-based office systems experience
- Good oral and written communications skills
- Project management skills

If you have the right combination, please submit your resume and salary history to: **N. Fitzpatrick, Dept. CW-10/21, GTE Data Services, P.O.Box 1548, D.C.136, Tampa, Florida 33601.** An equal opportunity employer.

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PROGRAM ANALYST: Research design and development of software with working knowledge of system programming for clients of software consulting company. Must have knowledge of ASSEMBLER, COBOL, FORTRAN, BASIC, PASCAL, PL/1, VOS. Hardware used is Stratus. BA degree plus 1 year experience required. 35 hours per week, $27,500 per annum. D.O.T. Code: 012.167.066. Mail resume to: NYS Job Service, JO #NY8024554, 97-45 Queens Blvd., Rego Park, New York 11374.

Engineer—Software Design. Design, construct and test software control of state-of-the-art inertial navigation systems. Apply control theory to guidance and control systems. Use IBM VAX hardware to develop software in assembly language and structured languages such as JOVIAL and ADA. Requires B.S. math, comp. sci., or statistics, 5 yrs. exp. Must have exp. in applying control theory to software design for leveling, calibration navigation and temp. control, producing software for control & guidance of inertial navigation systems, using inertial guidance hardware and software design standards and methods for military standard quality control. Pay is $40,040 /yr. Job located in Woodland Hills, CA. Send this ad and resume to job #2686, P.O. Box 1580, Sacramento, CA 95823-0580, not later than Nov. 4th, 1985. If offered employment, must show you have legal right to work.

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QUALIFICATIONS: Graduation from an accredited four year college or university with a degree in business, mathematics, accounting, computer science, engineering or equivalent. Practical experience may substitute for education. Certified training in management practices, skills and concepts, management techniques, resource management, budgeting and planning is desirable.

A complete job description is available upon request. Apply or send resume to the Hernando County Personnel Office, 10 North Brooksville Avenue, Brooksville, Florida 33512 or call (904) 796-5770. Salary is negotiable. Closing date October 31, 1985.

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Personnel Department
P.O. Box 20020
Oklahoma City, OK 73156
EOE M/F/V/H

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Database Administrator: design, develop, code, test and implement computer systems relating to networking of TANDEM systems with other hosts (eg. IBM) utilizing ENCOMPASS, DATABASE, PATHWAY and TRANSFER networking software. Responsible over all planning of hardware and software components and integrate TANDEM products customer specifications. $39,800 per annum. 35 hours per week. Master's degree Management plus 2 years experience required or 2 years systems analysis. Mail resume to NYS Job Service, JO# NY8008879, 97-45 Queens Blvd., Rego Park, NY 11374.

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Requirements include a minimum of two years' experience in the development of systems in a Wang VS environment as a programmer or systems analyst. Experience in managing project development through contract support highly desirable. B.S. in Computer Science preferred.

Qualified candidates are invited to forward resume with salary requirements to: **Manager, Employment & Staff Development, Dept. CW/32, Gas Research Institute, 8600 West Bryn Mawr Avenue, Chicago, IL 60631.** An equal opportunity employer M/F/V/H.

Gas Research Institute

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[illegible]

ENGINEER
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MS IEOR, knowledge of systems analysis, knowledge of advanced manufacturing systems a must. Good background in mechanical/production engineering capabilities a must. Good understanding of programming language (COBOL, FORTRAN) and working knowledge of statistics. Background in Data Base management a plus. [illegible] per year. Send resume to:

Arkansas Employment Security Division
P.O. Box A-1
Mountain Home, Arkansas [illegible]
J.O. #[illegible] Phone (501) [illegible]
Ad paid by an Equal Opportunity Employer

DATA BASE ADMINISTRATOR

The Central Management Consulting Group of Arthur Young & Company is expanding to meet client needs. To meet this need we are seeking a person to lead and build our data base administration function.

The ideal candidate will have a degree and a minimum of 10 years data processing experience - most of which has been spent in the data base area. Expertise in IMS and/or IDMS is needed. Other data base knowledge would be a plus. The ability to communicate and interface with other professionals is also an important qualification.

If you would like to be considered for this highly visible, challenging position, please send your resume in confidence to: **Diane Mackey, Manager/Professional Staffing, Arthur Young & Company, 100 East Broad Street, Columbus, Ohio 43215.**

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SYSTEM 38

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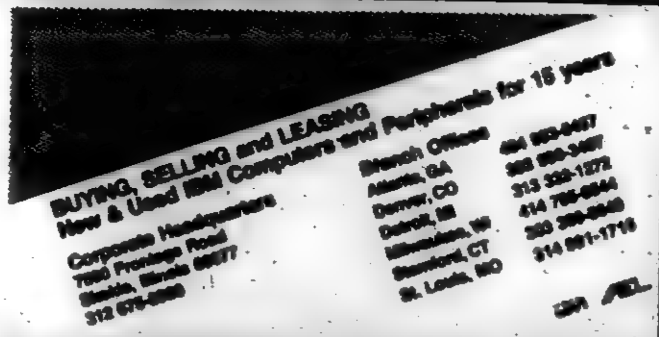

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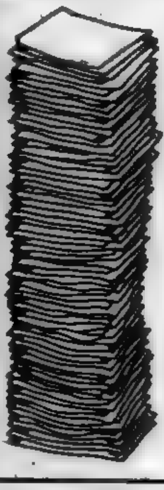

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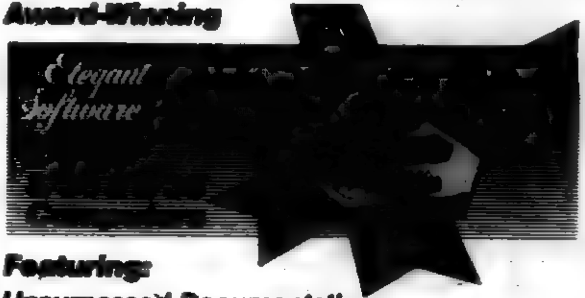

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VOL 19

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IBM weighs laptop need

Entry Systems chief cites corporate micro strategy

By Eric Bender

BOSTON — IBM Entry Systems Division President William Lowe hinted at plans for a laptop computer and restated IBM's commitment to open architecture and to Microsoft Corp.'s MS-DOS operating system during a rare public appearance last week.

"There are a number of applications out there which can only be solved with laptop devices," the head of IBM's Personal Computer group told several hundred MIS professionals at the Hammer Forum. "It's an important opportunity for [microcomputers]."

Reaffirming the role of micros in IBM's strategy, Lowe said, "The [Personal Com-

Continued on page 4

Sperry axes 1100 micro

By James A. Martin

BLUE BELL, Pa. — Sperry Corp. said last week it has abandoned efforts to bring its 1100 series mainframe architecture down to the desktop level and will concentrate marketing efforts instead on its Series 5000 AT&T Unix-based supermicrocomputers.

The company also confirmed that it has laid off a total of 225 employees, mostly in the product development and production departments, but said the two moves were unrelated.

"The strength of [such products as the Series 5000 and the PC/IT-based network], coupled with Sperry's commitment to both long- and short-term enhancement and expansion of these product lines, eliminates the need to produce a micro 1100 product as a desktop 1100 or as an 1100 work group concentrator," according to Michael Maynard, the manager of Sperry

Continued on page 15

Amdahl out with Sierra competitors

By Jeffry Beeler

SUNNYVALE, Calif. — Amdahl Corp. last week countered IBM's February high-end systems announcement with the introduction of three 5890 series mainframes. Amdahl said the systems offer increased internal logic over existing systems with either price or performance benefits over the IBM 3090 family counterparts.

While claiming 15% to 35% better price/performance than the 3090 family competition, Amdahl also reported that the first dual processor in its 5890 series will not be delivered until the second quarter of 1986 and that its four-way processor will not be available until the third quarter of 1987.

IBM delivered its first dual-processor 3090 in August and expects to deliver a four-processor version in late 1986. Analysts speculated — and company officials would not deny — that the lengthy lag time may be modified (see story page 8).

Along with enhancements to and price cuts for its seven earlier 580 series mainframes, Amdahl introduced the 5890 series mainframes, which include Models 200, 300 and 600. Although both the 200 and 300 are dual-processor configurations with the same 15-nsec machine cycle time, they differ sharply in price and performance.

The Model 200 roughly equals the internal throughput of an IBM 3090 Model 200 and sells for 18% less, according to Amdahl, while the 5890 Model 300 is said to outperform the Big Blue processor by 32% and costs about the same.

The 5890 Model 600, by contrast, provides 30% to 35% more computing power than the IBM 3090 Model 400 for a nearly

Continued on page 8

TOP OF THE NEWS

Hewlett-Packard has internally set Feb. 28 as the tentative date for unveiling the newest of its HP 3000 line of transaction-oriented systems, code-named Spectrum, and is keeping developers busy nearly around the clock. The new model, expected to replace the current HP 3000 systems eventually, is a 32-bit reduced instruction set computer architecture system.

■

Among a host of introductions this week at Localnet '85 in New York, Novell, Inc. said it will take another step in fault-tolerant local-area networks. At a gala event featuring Ray Charles, Novell will announce mirrored disk-drive capabilities and related network products. Meanwhile, Sytek, Inc. said it will launch the second product in its System 6000 family, a high-capacity dedicated file/print server. Compatible with the IBM PC Network, the 6610 server will provide 75M bytes of disk storage and a 60M-byte streaming tape drive.

■

A source close to Software AG said that the DBMS and fourth-generation language vendor plans to introduce two new products early next month. The source said the Reston, Va.-based compa-

Continued on page 4

FYI

Fiber optics: Light at end of the network tunnel

By John Dix

If you removed the individual glass strands from all the fiber-optic cables that communications carriers plan to install in the next three years and attached them end-to-end, you could wrap the resultant wire around the world approximately 52 times.

Fiber-optic use in telecommunications networks is poised to explode. Between now and the end of the decade, carriers plan to install roughly 100,000 miles of fiber-optic cable — each with multiple fibers. That is 10 times the amount used today, according to Bob Holtzman, a market analyst with Kessler Marketing Intelligence, a Newport, R.I., firm that specializes in fiber market research.

Carriers originally installed fiber optics in high-density traffic routes — such as between Washington, D.C., and Boston — but now are expanding to take advantage of the high-capacity, reliable media and its associated cost benefits.

Last week, MCI Communications Corp. announced completion of a 968-mile Illinois-to-Maryland link that connects its Chicago-hub Midwest network to its New York-to-Washington, D.C., mid-Atlantic network. The company said the linked high-capacity system represents the nation's longest system to date and is capable of carrying 480,000 simultaneous conversations.

Most carriers will lease or sell fiber capacity to large users that need very high-speed digital communications links. The capacity of fiber optics is probably its greatest advantage over alternative transmission facilities. AT&T, for example, claimed that by 1988 its fiber network will operate at 1.7G bit/sec., enabling a single pair of glass fibers to support 169,344 simultaneous conversations. At that speed, the same fiber pairs could transmit the contents of the *Encyclopaedia Britannica* in less than two seconds.

New types of services will stem from fiber use. The great capacity will enable carriers to offer high-speed private-line options previously not available, such as 45M bit/sec. channels.

Today few user applications require such bandwidth, but it could make new applications feasible. Host processors could support remote CPUs, high-speed printers or other remote devices as if they were channel-attached locally and

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NEWSPAPER

GSA moves to upgrade hardware

By Mitch Betts

WASHINGTON, D.C. — The General Services Administration (GSA) has stepped up its campaign to rid U.S. government agencies of obsolete computer hardware, agency officials and analysts said last week.

The GSA is developing a new regulation that will encourage agencies to review and replace the older, critical systems, according to Roger Walker, chief of the policy branch at GSA's Office of Information Resources Management. "We recognize that obsolescence is a precursor to inefficiency," he said.

A proposed regulation that GSA issued in July would have allowed U.S. agencies to use expedited procurement techniques to replace hardware that is 6 or more years old. That proposal is being modified and will be released as a final ruling in the next two to three months, Walker said.

Robert C. Dornan, government market analyst at International Data Corp.'s (IDC) Washington, D.C., division, said GSA has been trying to show improvement on this score ever since Congress' General Accounting Office (GAO) issued a critical report in 1980.

"In fact, GSA attributes the widespread belief that the government has a serious problem with obsolete computers either to this GAO report ... or to personal knowledge of an old CPU laboring in the bowels of some agency," an IDC report said.

Earlier this year, GSA reviewed 100 federal data processing systems and their major supporting CPUs and found that only 5% are totally supported by pre-1976 machines, IDC said. The systems GSA reviewed are general-purpose computers that operate major applications systems important to the nation, such as the IBM 3081 that handles agricultural loans and the two Amdahl Corp. 470/V8 units at the Federal Reserve Board.

Furthermore, GSA is sending letters to agencies recommending that specific older systems be considered for replacement, according to Dornan.

DEC profit gain defies predictions

Prime keeps growing, but Apollo, Harris suffer profit losses

By Clinton Wilder

MAYNARD, Mass. — Although its profit level still was below that of one year ago, Digital Equipment Corp. outperformed Wall Street analysts' expectations for the second consecutive reporting period with its first-quarter results posted last week.

Another major minicomputer vendor, Prime Computer, Inc., posted a 7% profit increase on a 19% revenue gain in the third quarter ended Sept. 29. The Natick, Mass.-based company earned $15.2 million, or 32 cents per share, compared with 30 cents per share from continuing operations a year ago. Revenue increased from $165 million to $196.7 million.

In another development last week, former high-flying engineering systems vendor Apollo Computer, Inc. reported an after-tax operating loss of $4 million, as the company previously had indicated, and a whopping $14.4 million inventory write-down. The combined factors resulted in a net loss of $18.4 million.

Harris Corp. reported that profits fell approximately 50% to $12.9 million, or 32 cents per share, compared with $25.3 million, or 63 cents per share, a year ago. The drop in net income from operations was even greater, as the recently ended quarter included a $3.9 million, 10-cent-per-share gain from the sale of Harris' power supply division in Miami Lakes, Fla. First-quarter revenue increased slightly from $511.7 million to $559.9 millon.

DEC earned $72.3 million, or $1.20 per share, from operations, compared with adjusted profits of $80.9 million, or $1.38 per share, in the first quarter of fiscal 1985. The actual year-earlier earnings of $144.2 million included a one-time credit of $63.2 million from changes in federal tax laws,

Revenue grew just 7.2% to $1.62 billion from $1.51 billion a year ago, but analysts said improved profit margins owing to cost controls gave DEC a better than expected bottom line. Most analysts predicted DEC's earnings per share would fall in the 80- to 85-cent range.

"Gross margins were the story," said Carol Muratore of Prudential-Bache Securities. "Revenues were in line with our projections, but [DEC] kept costs, inventories and receivables under control. I think costs will stay under control and revenue will continue to grow, spurred by [its] new products."

Marc Schulman of Salomon Brothers, Inc. shared the same sentiment. "[DEC's] earnings were substantially better than I thought they would be," he said. "I was surprised by the higher margins, lower research and development cost and lower selling expenses."

> *"We're focusing on the set systems that are available now, instead of many with bells and whistles."*
>
> — **Mark Steinkrauss**
> **Digital Equipment Corp.**

DEC's revenue for the period represented a 12% drop from fourth quarter of fiscal 1985 levels of $1.85 billion, a traditional sequential decline for the company. DEC Vice-President and Chief Financial Officer James M. Osterhoff said the company's U.S. sales "continued to reflect the cautious spending of some of our major customers during the quarter." International sales remained strong, particularly in Europe, he said.

Mark Steinkrauss, DEC's director of investor relations, said several factors contributed to cost containment, including a manufacturing work force reduction of 900 employees during the quarter. He noted that DEC's newer products, such as the Microvax II, VAX 8600 and Vaxstation, have generally higher margins than older systems.

"We're also stressing modularity and a set systems approach," he said. "We're using existing backplanes, terminals and other components with many different products, and that has far-reaching positive implications for both margins and inventories. We're focusing on the set systems that are available now, instead of many with different bells and whistles. We're also getting more out of our existing plants."

Analyst Frederic Withington of Arthur D. Little, Inc. said the higher margins represent the culmination of DEC's return to its core VAX business after less successful ventures in personal computers, retail channels and independent sales forces.

"Everything DEC's announced since the VAX-11/780 has been pointing back to the core," Withington said.

"[It's] delivering minis in the way the market wants — network oriented instead of stand-alone. [It's] concentrating on large accounts for sales of entire networks, which mean sales of software, terminals and other add-ons — just like IBM. There is less risk, but perhaps less potential for large return."

Prime turned in its second straight quarter of growth compared with year-earlier quarters, a rare accomplishment in the mini sector this year.

"I think Prime's doing some right things in positioning the company," said Sandra Gant of Cupertino, Calif.-based Infocorp. "[Prime's] now pushing [computer-aided design and computer-integrated manufacturing (CAD/CIM)], and I think [the company] is gaining share."

In a prepared statement, Prime President and Chief Executive Officer Joe M. Henson said the firm has increased R&D spending 29%, beefed up its direct sales force and increased its resources devoted to CAD/CAM applications.

Apollo's $18.4 million loss, equal to 54 cents per share, was in sharp contrast to year-earlier profits of $6.3 million, or 20 cents per share. Revenue declined to $55.2 million in the quarter, from $57.3 million a year earlier. The net loss wiped out year-to-date profits, leaving the company with a nine-month loss of $2.2 million, or 7 cents per share, on a revenue increase of 61% over the year-earlier period.

Thomas A. Vanderslice, president and chief executive officer of Apollo, said the revenue decline was primarily caused by slumping domestic demand that has spread throughout the industry and that cost-cutting measures previously announced will lead to improved operating results.

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CORRECTIONS

The article "Prime adds power with replacements of 2550, 9650" [CW, Oct. 21] contained incorrect information about the Prime 2655 and 9655. The 2655 is said to offer a 50% better CPU performance than its predecessor and the 9655 a 10% better CPU performance. An upgrade from a 2550 to a 2655 is said to provide a 40% system performance gain. The 9655 is housed in a 53- by 26- by 35-in. box. The new systems have a maximum memory of 8M bytes. The 2550 supports four computer-aided design and manufacturing users, while the 2655 supports six. The 9655 supports 128 general-purpose computer users. The company claimed that the processors exceed the speed of the Digital Equipment Corp. VAX-11/780. There is no board-swap upgrade available from the 9650 to the 9655.

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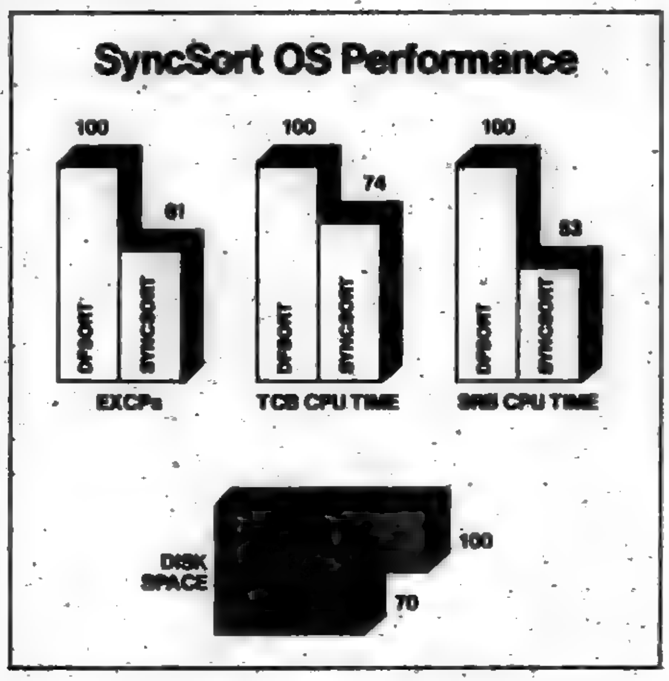

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TOP OF THE NEWS

Continued from page 1

ny will introduce office system software and a data dictionary product.

■

The bitter battle for control over the Computerland micro distribution chain mellowed a little last week with a compromise between the two sides that "lifts a dark cloud" that was hanging over the operation.

The principals of Micro/Vest, which earlier this year won a multimillion-dollar judgment against Computerland and its subsidiaries, agreed not to require the chain to post a $25 million bond in order to continue an appeal of the earlier judgment.

However, the compromise does not alter the requirement that Computerland founder William Millard and his IMS Associates, Inc. holding company post a $25 million bond in order to continue the case.

■

In the strange-but-true department, a current MBA candidate at MIT's Sloane School of Management is none other than Lotus Chairman Mitch Kapor.

"I started working on the degree several years ago but dropped out in 1979 to pursue the personal computer business full-time," Kapor told a Boston forum last week.

"I'm still a few courses short." Kapor's masters thesis advisor is MIT's artificial intelligence maven, Randall Davis.

■

Hackers may face arrest

FBI investigating 23 teens in bank case

By Peggy Watt

SAN DIEGO — The arrests of youthful computer trespassers may be pending as Federal Bureau of Investigation agents look into allegations that 23 teenagers, ages 13 to 17, broke into on-line computers handling financial records for Chase Manhattan Corp.

The FBI seized 25 computer systems at 23 San Diego-area homes last week, after the youthful computer users apparently tapped files at Interactive Data Corp. of Waltham, Mass., a Chase Manhattan subsidiary that maintains the financial institution's records.

An FBI spokesman said apparently no money was taken or transferred from accounts, but the intruders changed several passwords, preventing legitimate access to accounts. At least one fictitious account was created, and some files "were destroyed or modified," according to John J. Covert, assistant special agent. The intruders also threatened to destroy records unless they were given free access to the system.

Chase Manhattan first contacted the FBI with concerns of computer trespassing in June, when Interactive Data uncovered several unsuccessful attempts to enter Chase Manhattan records through a toll-free number that was supposed to be available only to qualified users.

After tracing the unauthorized calls to the 23 San Diego homes, with the help of telephone companies on both coasts, and after surveillance of the sites and background investigations of residents, agents sought search warrants on Oct. 15 and served them at the homes, Covert said.

He said there was no evidence of a conspiracy among the youngsters, but that some are acquainted with each other.

However, all could be charged under the Computer Fraud and Abuse Act of 1984, which includes penalties for even attempting to enter computer systems illegally as well as for succeeding at a break-in. Maximum sentences range to a fine of up to $250,000 or twice the value of property lost or damaged and 10 years in prison for a first offense. Because a financial institution was involved, the offenders also could be charged under laws restricting access to financial records. The FBI became involved in the case because it affects interstate commerce. However, Covert noted that juveniles usually serve a sentence only until they turn 21 years old.

The teens "and some shocked parents" have been interviewed, and the FBI does not expect to seek more warrants now, Covert said.

Once the investigation is completed, any prosecution recommendations will be turned over to Robert D. Rose, assistant U.S. attorney in San Diego, for consideration by a federal grand jury, Rose said. The confiscated computers will be kept as part of the investigation, he added.

From page 1

IBM Entry Systems exec weighs laptop need

puter] is in the center of the large-account strategy at IBM."

However, existing laptops have suffered from several liabilities, he remarked. "The screens we've seen up to now don't provide the legibility that's required." High prices and the lack of IBM compatibility were other drawbacks, Lowe said. Unsurprisingly, he did not discuss any specific product plans.

IBM underlined its open architecture strategy with this month's token-ring local-area network introduction, maintaining "an open interface for [Personal Computers] on networks," Lowe said.

Sticking with Microsoft's MS-DOS, IBM also is "committed to providing enhanced operating system support in a compatible way," Lowe said. "It's a very high priority for us to break through the 640K-byte [direct-address] barrier and to provide multiuser and multitasking support."

Asked whether IBM will support the Lotus Development Corp./Intel Corp./Microsoft Expanded Memory Specification, which offers ways around the 640K-byte barrier, Lowe said that the approach suffers from limited flexibility and that IBM would rather provide full operating system support for additional memory. He suggested, however, that IBM may endorse some interim scheme.

Lowe declined to make direct comparisons between IBM's Topview operating environment and Microsoft's Windows offering. He emphasized IBM's joint development work with Microsoft and added, "You can expect to see improved graphics interfaces as well as improved user text interfaces."

Other operating systems plans include taking full advantage of the Intel 80286 chip and moving toward "cooperative processing," with tasks shared between micros and hosts. "We're talking about a set of interfaces that will allow [micros] to off-load complex calculations to the mainframe or allow the mainframe to off-load the user interface to the [micro]" transparently to users, he explained.

He refused to respond to repeated questions about the respective roles of IBM local-area networks and the System/36 in handling work-group or departmental computing. "I don't see either of them predominating," he said.

Lowe recommended that customers contact their IBM sales representatives for further enlightenment on this point. However, one MIS manager later commented that his sales rep had suggested attending the Lowe session to get an explanation of IBM's strategy for the two schemes.

Among future IBM plans, Lowe mentioned "a composite editor for voice and data, which we hope will surface soon."

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Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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NEWS

Analysts downplay divisive effect of IBM Token-Ring

Viable networking alternatives for those who cannot wait

By John Dix

The battle lines have been drawn in local networking, but the war may never rage.

While viewed as extremely significant, analysts said, IBM's introduction of the Token-Ring network two weeks ago will balkanize the network market.

Signaling techniques, media type and access methods aside, "all of the networks do pretty much the same thing," according to William F. Zachmann, vice-president of corporate research with International Data Corp. (IDC), a market research company in Framingham, Mass.

"There are some insignificant differences," Zachmann added, "but actual network performance characteristics aren't so radically different."

As initially announced, the IBM Token-Ring does not support the wide range of devices that, for example, can be accommodated by the Ethernet standard. But, analysts predicted, that deficiency will be short lived for two reasons: IBM has singled out the Token-Ring as its general-purpose office network; and the network's open architecture will cause a frenzy among third-party developers, much as IBM's Personal Computer did.

Users who cannot wait for the Token-Ring to grow up have many viable alternatives, noted Howard Frank, a network consultant in Washington, D.C. "The network field has matured," Frank said. "There are lots of networks that can handle today's needs relatively easily."

Frank said he believes, however, that two standard technologies will emerge: Ethernet type, which a broad cross section of the industry uses, and token-ring networks. "Ethernet is too well established now not to survive," Frank said.

> ”
>
> *The IBM Token-Ring will cause a frenzy among third-party developers, much as IBM's Personal Computer did.*

Local networks use different methods to provide the same basic transport service between machines. With Ethernet, for example, each network-attached device chops its data up into packets to be shuttled in both directions across a common cable. Stations upstream and downstream from the transmitting device listen for their addresses. With token-ring networks, stations that have something to transmit capture an electronic message or token as it circulates around a ring, append data to the token and send it back. The token passes each network station in sequence, and the intended recipient captures the data as it passes.

For all of that, these "technical network differences are unimportant," Frank said. "They are second-order considerations." More important, the consultant indicated, is network software and the ability to provide device compatibility through higher level protocols.

Even network performance — measured in terms of throughput, the actual rate at which data can be passed through a net — is dictated by software, according to Kim Myhre, director of communications research at IDC. "Most performance limitations are related to software and not necessarily based on the network technology used," Myhre said.

Gauging network performance is a hairy profession that is probably less exacting than processor benchmarks. Every vendor claims his network technology is adequate or better and decries the claims of others.

Laura Stuart, director of distributed systems for the Yankee Group, a Boston-based research company, summed it up this way: "If you want a practical network today that offers relatively high performance, Ethernet has clearly demonstrated that capability." If, on the other hand, "you are a large IBM user and know that eventually you want to support a wide [Distributed Office Support System] network or something like that, then the Token-Ring will ultimately make sense," she said.

One concept that has gained additional credence with IBM's announcement of the 4M bit/sec. baseband Token-Ring is the idea of work-group networks. Under this scenario, departmental network clusters will be installed first and then interconnected by a higher speed, higher capacity backbone network. That backbone network will probably be a broadband coaxial cable system like that provided by Sytek, Inc. Eventually, Frank said, fiber optics will supplant coaxial systems.

"If you want to wire a building or campus, broadband is the way to go," Zachmann said. "For the group or local area, take your pick."

From page 1

Fiber optics: Light at end of net tunnel

still have enough capacity to meet other intracompany data and voice needs. The possibilities will develop as the capability becomes reality.

Some users, however, can justify such capacity today. IBM, for example, leases a 45M bit/sec. link from Lightnet to string together 30 of its office and manufacturing sites in Florida. Lightnet is a joint venture owned by Southern New England Telephone in Connecticut and CSX Corp., a railroad company headquartered in Richmond, Va.

Lightnet has 455 miles of fiber in use in Florida, and in September began construction of 2,000 additional network miles. Scheduled for completion in the fourth quarter of 1986, the total system will include 5,000 fiber miles east of the Mississippi serving 24 states.

Outside of the IBM deal, Lightnet is predominantly known as a carrier's carrier, leasing or selling fiber capacity for use in other carriers' networks. The firm has five carrier customers today, including Satellite Business Systems (now owned by MCI), and U.S. Telecom, a subsidiary of United Telecommunications Co.

Lightnet is unique, however, because it offers carriers and large users alike the opportunity to buy or lease fiber capacity. Customers can lease 45M bit/sec. channels on the network for five or 10 years or buy that capacity condominium style.

AT&T Communications, long the leader in fiber use, said it will have 21,000 miles of fiber in use by the turn of the decade. The company already has three major lightwave systems: one linking Boston, New York, Washington, D.C., and Richmond; another between San Francisco, Sacramento, Calif., and Los Angeles; and a third between Dallas and Houston. These individual systems will be interconnected over time to provide a national fiber net.

At the recent Telecommunications Association conference in San Diego, AT&T Communications' Chairman Randall L. Tobias said the company would lease capacity on existing and planned fiber routes to large users. The smallest link increment will be 45M bit/sec.

In competition with AT&T is National Telecommunications Network (NTN). NTN is a joint venture owned equally by seven partners that was conceived to provide the administrative, marketing and technical coordination necessary to create a national network by interconnecting its owners' regional nets, according to Martin McDermott, vice-president and general manager.

Six of the seven NTN partners — which include Consolidated Network, Inc.; LDX Net, Inc.; Litel Corp.; Microtel, Inc.; Souternnet, Inc.; Southland Fibernet, Inc.; and Williams Telecommunications Co. — have resale arms and subscriber bases. Resellers traditionally have leased network capacity from carriers like AT&T — which bases the price of its facilities on average use — and eked out a living by cramming more users onto the private lines.

NTN originally was created to provide resellers with their own facilities, reducing their dependence on AT&T. Today NTN has completed construction on more than 2,000 miles — 23% of the planned network. By the end of the year, it expects to have 6,000 network miles in operation. The current $500 million invested in NTN will finance planned expansion to more than 9,000 miles. Ultimately, McDermott anticipates the network will include 16,000 network miles.

Another carrier with roots in the resale market is U.S. Telecom. This United Telecommunications subsidiary intends to put a 23,000-mile fiber net into service by year-end 1988. It will be used to serve three U.S. Telecom arms: Communications Services Co., the reseller that was formerly U.S. Telephone; Corporate Network Services Co., a private network company that was formerly called Isacomm; and Data Communications Co., a packet-switch carrier formerly known as Uninet.

U.S. Telecom will build or buy the fiber capacity that it needs to meet its ambitious plans. Besides capacity purchased from Lightnet, the company has already installed 1,700 miles of fiber cable. U.S. Telecom intends to lease smaller capacity increments than do other carriers, starting at the T1 rate of 1.54M bit/sec.

MCI is not contemplating directly leasing or selling capacity on its planned 7,300-mile fiber network. A company spokesman said the capacity would be too great for most companies. It will use the fiber net to augment present services and to provide integrated services.

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Dayton	Oct 9
Denver	Oct 29, Nov 20
Detroit	Oct 22, Nov 12
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Kansas City	Nov 6
Los Angeles	Oct 22, Nov 19
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Newport Beach	Oct 17
Oklahoma City	Nov 7
Omaha	Oct 24
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From page 1

Amdahl out with Sierra competitors

identical price, according to David Anderson, director of Amdahl's program products.

The debut of Amdahl's 5890 series of IBM-compatible processors coincided with an 8% to 16% price cut for the firm's seven existing mainframe models and a 32M- to 128M-byte increase in their main memory capacities. Four of the older machines have been expanded from a maximum of 64M to 128M bytes, two from 128M to 256M bytes and one from 96M to 128M bytes.

Consisting of four CPUs, the 5890 Model 600 reportedly executes instructions 70% to 90% faster than the 300 and holds a 10-fold edge in performance over Amdahl's entry-level 5840 uniprocessor. The Model 300, meanwhile, boasts 25% greater processing speed than the Model 200 and 70% to 90% more than the vendor's existing 5870 dual processor.

High-end systems

	IBM 3090	NAS[1] AS/XL	Amdahl Corp. 5890
Relative Performance[2]	[illegible]	[illegible]	[illegible]
Mips[3]	29.3 to 52.7	28 to 50	27 to 75
Purchase Price (Memory Size)	$4.6 million[4] (64M bytes) to $9.3 million (128M bytes)	$4.84 million[5] (64M bytes) to $8.47 million[5] (64M bytes)	$4.25 million[5] (64M bytes) to $9.33 million (128M bytes)
Memory Size in Bytes	64M to 128M	32M to 256M	64M to 512M
Machine Cycle Time (nsec)	18.5	Not available	15
Channels	32 to 90	32 to 64	64 to 128
Cache (Buffer) Size	128K to 256K	256K to 512K[6]	128K to 256K
Price per 1M Byte of Additional Memory	$12,500	$11,800[7]	$12,500[7]

1. National Advanced Systems Corp.
2. CW estimates based on vendor-supplied information. [illegible]
3. Million instructions per second; CW estimates.
4. Per processor only.
5. For processors, consoles, power supply and [illegible].
6. Cache memory per processor.
7. Minimum additional memory is 8M bytes.

CW Chart

The first dual processor in Amdahl's 5890 series will not be delivered until the second quarter of 1986 and the four-way processor not until late 1987.

MIPS ratings

Amdahl Chief Operating Officer E. Joseph Zemke said the company does not rely heavily on million instructions per second (MIPS) ratings to measure CPU performance but did claim that in tests on the assembly line 5890 Model 200 matched the IBM 3090 Model 200 at 27 to 29 MIPS. He said the 5890 Model 300 tested at 36 to 38 MIPS. The 5890 Model 600 tested at 56 to 66 MIPS in single-image mode and 75 MIPS when partitioned.

Amdahl attributes the 5890 family's superior performance over its other seven 580 models partly to a 15% increase in the latest machines' internal logic. "By adding more logic to our existing design, we have cut our cycle times from 23.25 nsec [for the existing 580 processors] to 15 nsec [for the 5890s]," Anderson said. The reduced machine cycle times account for about half of the three latest CPUs' increased throughput.

The rest of the 5890 line's advantage in execution speed stems primarily from a restructuring of the mainframes' pipelines — a change that has trimmed the number of machine cycles needed to run a given instruction, Anderson said.

Both of the two smaller members of Amdahl's top-of-the-line processor trio reportedly can be upgraded in the field to the next largest model in the family. But users of the company's existing mainframes — the 5840, 5850, 5860, 5867, 5868, 5870 and 5880 — will have to swap machines if they want to move up to the 5890.

One reason for the absence of a field-upgrade path is that the 5890 incorporates some enhanced technology, including 1,000-gate emitter-coupled logic (ECL) chips and 4,000-bit random-access memory (RAM) packages with 3.5-nsec access times. Existing 580 series CPUs, by contrast, use 400-gate ECL components and slower RAM chips, Anderson said.

Otherwise, all 10 members of Amdahl's mainframe line reportedly use basically the same packaging and chip technology.

In addition to lacking a field-upgrade capability from the original seven 580 series mainframes, the largest of the three 5890s — the Model 600 — will be unavailable for shipment for another two years.

The 5890 Model 200 and Model 300 hold 32 to 64 channels and 64M to 256M bytes of main memory, compared with the Model 600, which expands from 64 to 128 channels and 128M to 512M bytes of internal storage.

In a basic configuration, the processors cost $4.25 million, $5 million and $9.33 million, respectively. Although the 600 will remain unavailable until the fourth quarter of 1987, the 300 will begin shipping during the second quarter of next year and the 200 three quarters later.

■

Amdahl also used its Oct. 22 announcement to strengthen its mainframe line with several additional product enhancements and introductions, including the following:

■ An enhancement that expands from two to four the number of like or unlike operating systems that Amdahl's existing Multiple Domain Feature can support concurrently on the same processor complex.

■ An Expanded Storage Feature that permits users to add paging store to configurations that are unable to expand beyond 64M bytes of main memory because of operating system constraints.

■ A consolidation of several previously separate VM/Performance Assist Features and a 10% increase in the constituent products' efficiency.

■ Expanded support for Amdahl's High-Speed Floating Point feature, which now, for the first time, is available across the company's entire processor family, not just to its three uniprocessor models.

■ A Multiprocessor Coupling feature that allows the firm's three existing uniprocessors to be combined to form CPU complexes.

■

Delivery delays may lessen impact of 5890

The performance numbers were impressive, but delivery delays of up to two years will not help as Amdahl Corp. tries to drive further into the high-end IBM market with the announcement of its 5890 series of processors, developed under the code name Apache.

That was the immediate reaction from analysts after Amdahl introduced its new product line, which includes what it claimed will be the most powerful IBM 370 architecture processor ever, the four-processor 5890 Model 600, when it is delivered in late 1987.

However, there also was speculation that Amdahl's delivery schedule, with the first dual-processor 5890 Model 300 set for the second quarter of 1986, was scheduled with delivery problems in mind and with the notion that Amdahl could advance those delivery dates if production moved smoothly. Amdahl President John C. Lewis, noting that there might be "a little bit" of complaining from users, left open the possibility of earlier deliveries.

Senior Analyst Jeff Canin of Hambrecht & Quist, Inc. said the 5890 Model 600 offers somewhat greater performance than analysts initially expected, performance that he said could be "offset at least a little bit by its delivery lead time." He added: "I believe we'll see an improvement in the Model 600's delivery schedule. But Amdahl, made wary by its previous delays in shipping the 580 machines, probably just wants to play it safe for a while."

A consultant for Framingham, Mass.-based International Data Corp., Steve Josselyn, noted that IBM is likely to react to the Amdahl announcement.

"Obviously, Amdahl had to do something to compete with [IBM's Sierra 3090 series] at the high end. But I suspect it might be a little late. There are not going to be a lot of people who will wait for an Amdahl like they would wait for an IBM. Also, I

Continued on page 9

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From page 8

Delivery delays may lessen impact of 5890

think IBM is not going to be that much behind in getting something out the door. It certainly can tune up that [3090 Model 400] to get the performance that the 5890 offers," Josselyn said.

Aspect of announcement defended

Amdahl officials defended one aspect of their announcement — the notation that existing 580 systems cannot be upgraded to 5890s even though there is a migration path within the 5890 series — by saying that such a performance jump required a new approach in designing the systems. "That kind of magnitude of performance requires a move to a new base. Sometimes technology just forces you to a new base," Amdahl Chief Operating Officer E. Joseph Zemke said.

Canin, noting that the lack of an upgrade capability was reminiscent of IBM's bar on migrations from the 3080 series to the 3090, said Amdahl has been good about retrofitting its existing systems with the hardware features and software enhancements that accompanied the 5890 announcement.

Josselyn, however, added that there is a gamble involved for users shifting from IBM to any plug-compatible manufacturer such as Amdahl.

He warned that users hoping to get full performance out of IBM MVS/XA on Amdahl machines are going to lag behind IBM users. "IBM is going to continue to announce enhancements to XA, and those are tough for the [plug-compatible manufacturers] to match."

— James Connolly
and Jeffry Beeler

■

Amdahl profits dive despite revenue gain

SUNNYVALE, Calif. — Amdahl Corp. reported Wednesday that third-quarter profits declined by more than half from the year-earlier period, despite a 22% increase in revenue.

The firm said profits were higher in the third quarter of 1984 because of a lower effective tax rate and a one-time tax credit related to legislative changes concerning domestic international sales corporations.

For the quarter ended Sept. 27, Amdahl posted revenue of $221 million, compared with $180.6 million a year earlier. Profits for the period just ended were $5.7 million, or 12 cents per share, compared with the year earlier figures of $11.2 million, or 25 cents per share.

Pretax income jumped to $8.4 million for this year's quarter, compared with $2.1 million a year earlier.

Amdahl President John C. Lewis said the company expects shipment volumes to improve during the fourth quarter and anticipates revenue and profits to be higher than the three preceding quarters.

For the nine-month period ended in September, Amdahl's profits stand at just less than $15 million, compared with $20.3 million at this point last year.

IBM slashes storage costs

By Glenn Rifkin

RYE BROOK, N.Y. — IBM last week reduced the purchase prices for selected models of its 3380 disk drives and 3880 cache storage controllers by an average of 10%. Prices for the 3380 Model E were reduced 10%, and the cost of upgrading a 3380 Model D to a Model E was cut 5%.

"They are trying to make the product more price attractive in the market," said Tom Henkel, an analyst with the Yankee Group, a Boston-based market research firm. "It's interesting because [IBM has] virtually no competition right now from the PCMs [plug-compatible manufacturers] for those devices."

An IBM spokesman indicated that the price cuts, which are targeted for current products, are part of the company's "normal business practice to pass along improvements in price/performance to our customers."

According to the announcement, the price of a typical configuration, or string, of four 3380 Model E controllers was lowered from $465,940 to $416,900. This string consists of one Model AE4 and three Model BE4s.

Prices were also reduced by 10% for 3880 Models 21 and 23 storage controllers, and a 12% to 17% reduction was announced for upgrading Models 1 and 3 to selected models of the 21 and 23. In addition, prices were reduced 11% to 13.5% for upgrading Models 11 and 13 to selected models of the 21 and 23.

For example, the purchase price of a 3880 Model G23 32M-byte cache control unit was lowered from $263,750 to $237,400. The price to upgrade a 3880 Model 3 to a Model E23 was decreased from $123,480 to $105,130.

"It's possible that the devices weren't selling quite as well as IBM wanted, but there are no statistics to back that up," Henkel said. "[NAS Corp., Storage Technology Corp. and Amdahl Corp.] all announced their intent to provide dual-capacity disk drives, but none of them are shipping yet. IBM, in terms of direct access storage devices, has left the PCMs in the dust. They probably just want to make the units more attractive."

Teach yourself VSE JCL

Suppose you want to teach yourself the basics of VSE JCL.

To start, you have to study the IBM manual called *VSE/Advanced Functions System Control Statements*. It gives the formats of all VSE control statements... both statements for job streams and commands the system operator uses. Of course, it's up to you to figure out which commands will help you and which won't.

Since that manual doesn't show you how to use the statements in production jobs, you'll probably have to turn to the *VSE/Advanced Functions System Management Guide* for more help. Unfortunately, this guide isn't organized for easy reference. And again, you'll have to sift through a lot of facts that don't apply to you.

Now, a JCL text designed for do-it-yourself training

You have another option, though. You can read pages 72-106 of a book called *DOS/VSE JCL*. That section covers the basic JCL statements you'll use for almost every job you run.

It also gives you 2 complete production examples that show you how the statements work together: (1) an edit-update job with 4 programs and 6 files and (2) a report-preparation job that executes 4 application programs, the system sort program, and a user-written utility.

Now, suppose you're an experienced COBOL programmer, but VSE is new to you. You want to enter a simple COBOL program using the VSE text editor, then compile and test it in batch.

You first need to study the *VSE/Interactive Computing and Control Facility Terminal User's Guide*—a 450-page manual—to learn how to use the text editor, ICCF.

Or, you can read pages 61-68 in *DOS/VSE JCL*.

Next, you have to learn the JCL to compile your program. That's in the *IBM DOS/VS COBOL Compiler and Library Programmer's Guide*.

Or, you can find what you need on pages 289-304 of *DOS/VSE JCL*.

You also need to know about the spooling system, VSE/POWER, to understand how the system will handle your compile. That's in the *VSE/POWER General Information Manual*. To control how POWER schedules your job or what it does with the job's output, you need to learn to code POWER JECL (job entry control language). That's in the *VSE/POWER Installation and Operations Guide*. Finally, you need to know how to transfer your job stream to POWER from ICCF and how to get its output at your terminal. That sends you back to the ICCF manual.

Or, you can read the section on POWER in pages 158-208 of *DOS/VSE JCL*.

In fact, in just 421 pages, *DOS/VSE JCL* covers all the JCL and VSE features you're likely to use in your shop.

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- how to manage job scheduling and output processing with POWER
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Probes turn federal spotlight on software piracy issue

By James A. Martin

SAN FRANCISCO — The first federal criminal charges in a software piracy case, according to investigators and legal experts, may reflect a new weapon for vendors who until now have had to rely on civil litigation to resolve what the industry says is a costly and growing practice.

A five-count indictment, including charges of misdemeanor copyright infringement and unauthorized distribution, was filed recently against a defendant who allegedly pirated two copies of a court-reporting software system more than two years ago.

The charges come in the second recent case of alleged piracy to draw attention from federal investigators. *Computerworld* reported recently [CW, Oct. 14] that the Federal Bureau of Investigation is probing a piracy case in Philadelphia and New York.

The federal charges are a welcome change in terms of effectively combating software piracy, according to David B. Sturtevant, senior director of public communications for the Association of Data Processing Service Organizations (ADAPSO).

"In terms of showing that this is a serious problem and not to be treated like jaywalking by the federal government, this can only serve to strengthen the industry in this area," Sturtevant said.

Reflects growing government trend

Sturtevant said the case reflects a growing trend in which the federal government, realizing the potential revenue loss to the industry, has decided to take a strong stance. "A lot of people, ADAPSO included, have done everything in their power to bring it to the [government's] attention. They now recognize this as a pervasive problem in our society, an economic problem that has the potential to eat at the roots of a very important sector of our economy."

It will be crucial for vendors to proceed with legal action in addition to whatever the FBI or the U.S. attorney's office might be doing, Sturtevant said, to send as strong a message as possible to potential pirates.

Federal criminal charges were filed in late September in U.S. District Court against Thomas Taylor, who reportedly reproduced and distributed at least two copies of Cimarron 4.0.3 software, authored by Stenograph Corp. of Skokie, Ill. Taylor apparently acted alone and was not identified with any company in the suit. No further information on the defendant was available.

The five counts against Thomas include one for allegedly reproducing copyrighted software for "commercial advantage and private financial gain," one count of infringing the copyright of the user's manual by reproducing and distributing the manual, two counts of distributing a diskette containing the reproduced software to two named individuals believed to be court reporters and one count of illegally removing the copyright notice that appears on the software. The suit alleges that these activities occurred between Oct. 1, 1982 and Aug. 29, 1983.

Thomas pleaded not guilty, according to Eb F. Luckel, assistant U.S. attorney in San Francisco. A trial is scheduled for the U.S. Magistrate's Court here Dec. 9. The maximum penalty for each count is one year in prison and/or a $1,000 fine, Luckel said.

"There have been numerous civil lawsuit copyright cases, but I am not aware of any criminal charges having been filed under the copyright act of federal law against software pirates," said Thomas J. Smedinghoff, Chicago-based attorney for Stenograph.

Lee C. Evans, special agent for the FBI in San Francisco assigned to the case, said it was the first such case he was aware of as well.

No civil lawsuits have been filed by Stenograph. The company is awaiting the outcome of criminal charges, according to Edward H. Kight, Stenograph president.

Stenograph heard from one of its sales representatives in 1983 that an unauthorized copy of Cimarron had been circulated in the San Francisco area, according to Kight. Rather than taking legal action, Stenograph contacted the FBI. Some 18 months lapsed between the time of the initial investigation and the date the charges were filed by the U.S. attorney's office.

"We didn't have any idea how long it would take," Kight told *Computerworld*. "Our primary concern was for the world to know you can't steal software like that. We felt strategically that a criminal action would be a stronger statement than civil action."

The FBI would not comment on the case while "waiting for legal proceedings to transpire," according to Evans.

Cimarron is marketed by Stenograph as an assembly language court reporting system with Digital Equipment Corp.'s Professional 350 and Professional 380 series of workstations and costs between $28,000 and $30,000, according to Kight.

The DEC Professional 350 and 380/Cimarron package includes a built-in protection board, manufactured by Stenograph, which enables the software to be read by the processor, Kight said.

The Cipher

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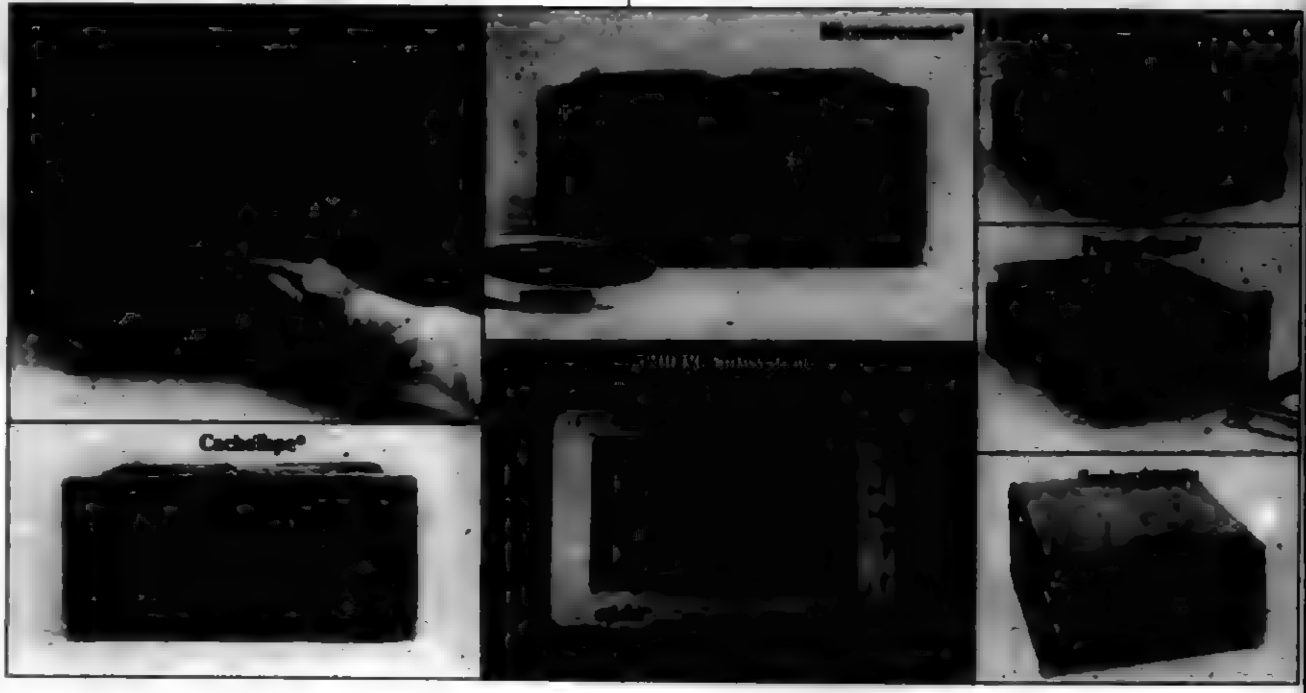

For a copy of Cipher's annual report, call 1-800-4-CIPHER, ext. 9.

Court dismisses Vault's software licensing suit

Judge cites lack of jurisdiction

By Peggy Watt

NEW ORLEANS — Officials of Vault Corp. in Westlake, Calif., have appealed the recent district court dismissal of their software licensing dispute, which was thrown out of court for lack of jurisdiction.

Federal District Judge Frederick Heede Sr., of Louisiana's Eastern District, indicated that he dismissed the case because neither company involved is headquartered in Louisiana, although Vault filed there partly to take advantage of a so-called shrink-wrap licensing law that it helped pass. The law states that the provisions in a software package's license is binding if the buyer opens the package.

Vault, which designs copy protection for software, claimed Quaid Software Ltd. of Toronto violated license provisions against decompiling program code when Quaid designed its copy-protection-breaking program, Copywrite. Vault said the only way Copywrite could work against Vault's Prolok copy protection was by reverse-engineering Prolok code. Copywrite allows users to make unlimited backup copies of a program without buying or registering them with the program's developer.

Vault sought an injunction prohibiting further versions of Copywrite that break the latest versions of Prolok protection and up to $100 million in damages for what it called "bootleg" copies made by Copywrite.

"I don't understand the court's decision, frankly," Vault attorney Jerrell Godfrey said. He said he plans to point out that Quaid sold 510 copies of Copywrite in Louisiana last year and advertised in seven national publications with distributions of 5,000 copies each month in the state to satisfy the court's concern that there was not "sufficient minimum contact" to warrant pursuing the case there. However, he added, Vault may also consider pressing the matter in another state, notably Illinois, which recently passed a similar shrink-wrap law.

'Jurisdictional issue'

Quaid attorneys called the case "strictly a jurisdictional issue" and said they had not heard about Vault's plans to appeal.

In initial hearings, Quaid countered that its Louisiana business constituted only three-tenths of 1% of its sales.

Godfrey also said the case, while it cites Louisiana's new shrink-wrap law, is "primarily a copyright case." He will next pursue it in the 6th Circuit Court of Appeals and indicated the company was willing to take the issue to the U.S. Supreme Court if necessary.

He said taking the issue to Canadian courts could be complicated because of differences in copyright laws in the two countries.

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WORLD DIGEST

CW International News Network

TOKYO — Ignoring the adversity of the recession-hit semiconductor market, Toshiba Corp. announced plans to move ahead with production of the next generation in 1M-bit dynamic random-access memory (RAM) chips.

Toshiba, which claims to be the world's first integrated-circuit vendor, will begin volume production of 1M-bit CMOS dynamic RAM chips at its plant in southwestern Japan next April.

The plant has a monthly capacity of 1 million units, according to Toshiba.

BRUSSELS — The future success of Esprit, the European information technology research program, hinges on increasing its current funding, according to an independent review board that presented its findings here Oct. 18.

The review board, appointed by the Commission of the European Community to assess the mid-term progress of Esprit, also leveled criticism at the European Economic Community's handling of Esprit, a five-year program of information technology research and development involving almost 450 companies, universities and research institutes.

LONDON — The number of companies supplying microcomputers here has jumped a whopping 68% this quarter, and the number of software suppliers increased by 19%.

However, most of the new firms on the scene are merely agents for imported packages and systems, according to a recent survey from the National Computing Centre, a privately funded consulting company in London.

The quarterly survey also revealed that less than one-third of all hardware products available in the UK are actually made by British firms. U.S. products account for 42% of all hardware on sale.

Users find IBM's software price increase unjustified

Costs raised too high without adding value

By John Gallant

Facing price increases on more than 1,100 IBM software products, users last week spoke out strongly against IBM's software pricing strategy.

"The price hike is not justified," said Donald Sitter, director of information services for Lyons Transport Lines, Inc. in Erie, Pa. "What is the reason for such a healthy increase? IBM has not improved the quality of that software. There certainly has been no value added to those products. Other than the fact that IBM wants to improve its bottom line, I cannot understand these price increases."

Sitter's response was typical of the reactions of IBM software users interviewed by *Computerworld* in the wake of IBM's recent announcement of an average 10% price increase on 1,115 applications and utility packages for its medium- and large-scale processors [CW, Oct. 21]. In general, users said IBM's software prices are too high and are subject to increases too often.

Donald Pressley, director of information systems for Oshkosh Truck Corp. in Oshkosh, Wis., said, "IBM is clearly not adding value to its software products at the same rate it is increasing prices. I have some software in use that is no longer even supported, and IBM has increased the price. It is ridiculous. IBM's prices are too high, and they are raised too often."

Users attributed the software price hikes — in February, IBM also increased prices by an average of 7% on a wide range of packages — to Big Blue's attempt to make up for slipping hardware revenue.

"IBM is forced to meet its projected earnings figures one way or another," said Glenn Lukowicz, director of computer services at St. Luke's Hospital in New Bedford, Mass. "Equipment revenue is not going to do it for IBM, so the company shifts gears and gets the revenue where it can. Where it can is in software. There is no doubt in my mind that IBM too often raises its software prices. And those increases are not consistent with the overhead involved in supporting and developing those products.

"Users are living with the equipment that is in place, and they see no need to move to the so-called newer technology, which really is not any different from what they already have. Thus, IBM has had to shift the emphasis to software."

Lukowicz, whose shop was a beta test site for IBM's VSE/SP 2.1 operating system, said software price hikes have a direct impact on his organization's equipment purchases. "Those increases do not force us to forego using software. They force us to pull back on needed equipment, such as printers and terminals, to support our expanding on-line environment. We are forced to second guess as to whether we can afford those things because our software costs are spiralling. We are not getting any more software for the cost, just getting less equipment."

Users said the average 10% price hike would have a real impact when multiplied by the number of affected products in use at their shops. According to Robert Heist, manager of technical services for Carpenter Technology Corp. in Reading, Pa., "Some of IBM's packages are definitely overpriced. If those already overpriced products that I rely on are affected, I am not going to be very happy. That may represent a substantial monthly cost increase."

The price increases have also made users more willing to seek alternative suppliers of software. Overall, users said, independent vendors offer higher quality products at more affordable prices.

"Years ago I just went to IBM and bought software," Sitter said. "But other vendors have made available software that simply works better and costs less."

Pressley echoed those comments. "I use a lot of third-party software. I think I get more value for my dollar. IBM's higher prices and lower functionality are the reasons I have tried other vendors. As a DP executive, you just cannot afford to be a true-Blue shop these days. You have to look around for other sources of software."

> ”
>
> *'IBM's higher prices and lower functionality are the reasons I have tried other vendors. As a DP executive, you just cannot afford to be a true-Blue shop these days.'*
>
> — **Donald Pressley**
> **Oshkosh Truck Corp.**

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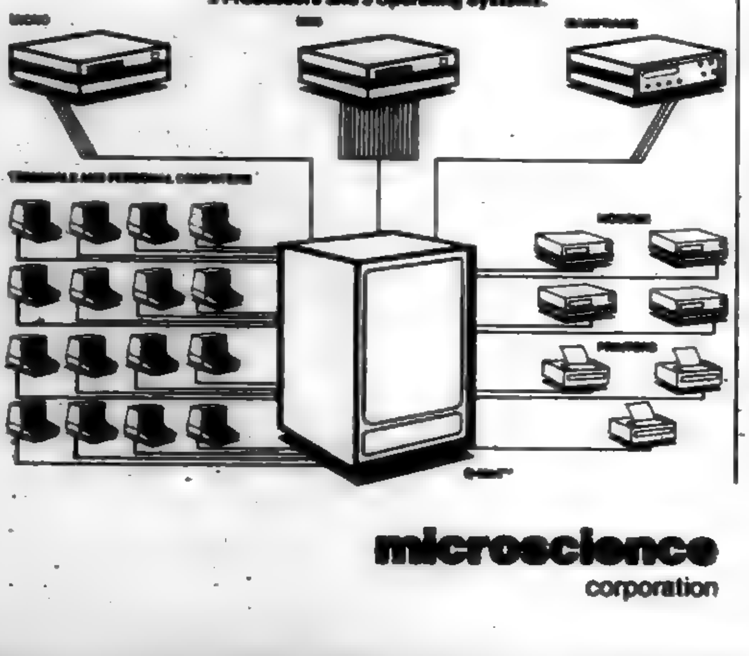

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IBM announces wares for fault-tolerant System/88

By Donna Raimondi

RYE BROOK, N.Y.— Support for IBM's fault-tolerant System/88 arrived last week in the form of a barrage of programming, communications and device-attachment capabilities.

IBM also said that the System/88, announced in March and previously sold on a limited basis, will be widely available by February of 1986 and will be sold through the company's sales offices.

The System/88, which is a Stratus Computer, Inc. fault-tolerant machine, is said to provide uninterrupted service to on-line terminal users in industries that include banking, retailing and manufacturing. The System/88 announcements represent a phased entry into the fault-tolerant market, a spokesman said, noting that IBM has not announced an intention to develop its own fault-tolerant machine at this time.

New programs for the system include Oracle Corp.'s Oracle relational data base management system, which costs $27,000. IBM is releasing a choice of two operating systems, the System/88 Operating System Release 1 and Release 1.1.

Creating a mystery

Release 1.1 is Stratus' VOS 4 operating system, released since the original agreement with Stratus. VOS 4 supports both Oracle and the AT&T Unix operating system, according to Omri Serlin of the Itom International Co. research and consulting firm based in Los Altos, Calif. But IBM did not announce any Unix capabilities with its release, creating something of a mystery, Serlin said.

Packages that will enable the System/88 to communicate with multiple System/88s or with other IBM systems include the following:

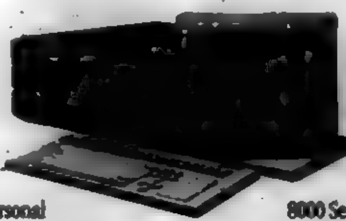
- System/88 Network Release 1 — software that connects the System/88 to multiple System/88s — priced at $7,550.
- RJE, which provides binary synchronous data transfer between the System/88 and a variety of other processors. It costs $3,540.
- Release 1 of 3270 Terminal Support, which allows the System/88 to support 3270 devices as if they were ASCII ones. It costs $4,370.
- Release 1 of 3270 Emulator Support, which enables System/88 application programs to communicate with other IBM Synchronous Data Link Control (SDLC) protocols as a 3270 device. It costs $5,900.
- Systems Network Architecture (SNA) Cluster Controller Release 1, which allows the System/88 to appear to IBM SNA hosts as an IBM cluster controller. It is priced at $8,100.
- SDLC Protocol Support, which allows the transmission and reception of data over SNA networks. It costs $3,300.

Operating system subprograms

Also announced were a variety of operating system subprograms that include modules for transaction processing services ($6,140); a forms management system ($4,370); X.25 and X.29 networking facilities ($5,430 and $1,770, respectively); compilers for Fortran, Cobol, Basic, PL/I and Pascal ($5,900 each); a text editor ($2,360); and a symbolic debugging aid ($1,660).

IBM Personal Computer terminal support is being offered for $100, as is an SNA 3270 terminal emulation package for Personal Computers that are attached to a System/88. The emulation package costs $2,200, and it allows the Personal Computer to appear to the SNA host as an IBM 3278 display station.

The announcements represent standard, run-of-the-mill SNA compatibility, analyst Serlin said. "IBM will definitely make improvements as time goes by to integrate the system more deeply into SNA," he said. The announcement is not good news for Tandem Computer, Inc., however, which up to now has been the heavy competition in the fault-tolerant arena, he added.



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Focusing on end-user issues can boost DP manager's role

By Peggy Watt

BOSTON — Focus on the end user's needs, and the role of DP manager may shift from overseeing information processing to planning information strategy, IBM strategic planning director Robert Berland promised managers at the Hammer Forum last week.

Users are "the ones with the money and the business problems," Berland said.

He dismissed price and functionality as be-all and end-all factors for users. "It doesn't matter if it's free if it doesn't help the user solve a business problem," he said.

Berland listed a handful of users' red-letter concerns:

■ **Ease of use.** "The one interesting thing about ease of use is that you know when you ain't got it," Berland claimed.

Berland cited IBM's "usability lab," which tests documentation clarity and once identified the need for 300 corrections in a single program.

He told the story of one lab participant who, confronted with an unfamiliar keyboard, was reluctant to press the Execute key " 'until I know who's getting executed.' "

■ **Consistency.** It is not always possible, with different programs having different functions, but it is desirable.

■ **Transparency of the MIS department.** Management must support users, but should not be heavy handed, he said. "Security doesn't mean you take control."

■ **Interaction between industry and user.** It is encouraged at IBM through a citizens' advisory board that reminds the industry that it does not work in a vacuum, according to Berland. "It's a disservice to come up with an office system drastically different from the [mainframe] data base," especially when the office system accesses the mainframe.

■ **Security.** It is "often an afterthought — but it had better not be," Berland warned. He called information "the second most valuable resource in your company," with people being No. 1.

■ **Standards.** "The lack of meaningful standards is one of the biggest problems in the industry," Berland noted. The issue is not operating systems but the accessibility afforded by local-area networks and interchange with outside systems. He described networks as the wave of the office computing future: "Even the guy that's stand-alone wants to get to the data base."

Berland warned against letting users expect the impossible. "People are looking for a panacea," he said. "The kind of application that needs to be done now is not the generic thing out there that is the answer to everybody's problem."

No single solution

Not everyone needs a spreadsheet. The solution may be a very vertical application, or one that is flexible enough to bend to very vertical needs, he said.

The situation is like that of the oil companies who declare, " 'all the easy oil has been found,' " Berland said. "All the easy applications have been done. We've got to start working with those end users to find out what application problems are necessary for their business."

As office computing evolves, so can the MIS manager — to marketing and strategic planning responsibilities — Berland predicted.

'Not enough blue suiters'

"There aren't enough blue suiters in the world to go out and market to all your end users," he said. "You are your marketing agent to your own end users."

With approximately 2,000 IBM office computing products available, the MIS manager has a heavy responsibility to keep up on what is new.

For its part, IBM is trying to establish product families to make lines easier for customers to understand and easier for marketers to remember, he added.

HOW TO
MAKE A
GREAT
IMPRESSION
AT THE
OFFICE

From page 1

Sperry axes 1100 micro

press relations.

The canceled effort, known as the Orion Project, was apparently Sperry's attempt to develop a top-to-bottom equipment lineup based on the 1100 architecture. The Orion Project was similar in goal to Digital Equipment Corp.'s successful strategy to migrate downward its VAX architecture to its Microvax products.

"Sperry's Information Systems Group remains committed to the 1100-chip-set-based technology, in particular, and the 1100 product family in general. . . . The 1100-system family remains the primary Sperry EDP mainframe product line both now and in the future," Maynard said.

Sperry has been experimenting with a number of new product areas, mostly on an OEM basis, during the past six to nine months with the realization that not all of them would come to fruition, observed Gwen Peterson, director of business computer systems for Dataquest, Inc. San Jose, Calif. Recently it dropped plans to remarket superminicomputers being manufactured by start-up Encore Computer Corp.

"They are trying to get into areas relatively new for them, and my sense is that they are going after a lot and then sort of taking the approach of let the best project win," Peterson said. "My impression is that Sperry is pursuing many different avenues at one time, and it seems unrealistic that all would carry through."

In what the company said is an unrelated matter, a total of 255 employees have been laid off as a result of Sperry's need to "realign the company's organization, modify product strategies and reallocate personnel resources," Maynard said.

Owing to the "challenging conditions of changing technologies and market conditions," Sperry found it necessary to obtain "cost efficiency [in order to] remain competitive," Maynard added.

Of the 255, 130 were product development employees, 70 of whom were based in Roseville, Minn., and 60 in Blue Bell, Pa., Maynard said. These layoffs occurred earlier this month. Subsequently, 125 production or manufacturing workers in Minneapolis were let go.

Maynard said the eliminated positions "cannot be tied to any specific projects" and said it had not been decided if the layoffs would be temporary. "They've been feeling the same pressures as any other computer company as far as having profits where they would like them to be," Dataquest's Peterson said.

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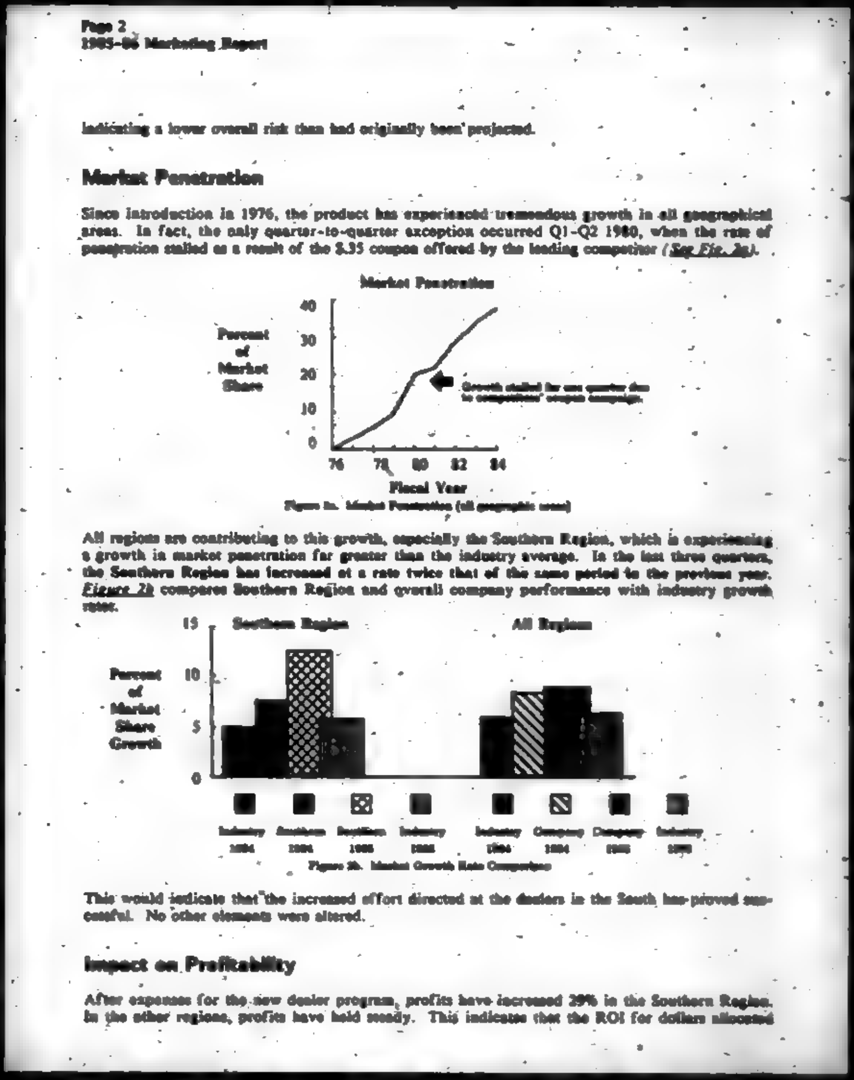

Page 2
1985-86 Marketing Report

indicating a lower overall risk than had originally been projected.

Market Penetration

Since introduction in 1976, the product has experienced tremendous growth in all geographical areas. In fact, the only quarter-to-quarter exception occurred Q1-Q2 1980, when the rate of penetration stalled as a result of the $.35 coupon offered by the leading competitor (See Fig. 2a).

Figure 2a. Market Penetration (all geographic areas)

All regions are contributing to this growth, especially the Southern Region, which is experiencing a growth in market penetration far greater than the industry average. In the last three quarters, the Southern Region has increased at a rate twice that of the same period in the previous year. Figure 2b compares Southern Region and overall company performance with industry growth rates.

Figure 2b. Market Growth Rate Comparison

This would indicate that the increased effort directed at the dealers in the South has proved successful. No other elements were altered.

Impact on Profitability

After expenses for the new dealer program, profits have increased 29% in the Southern Region. In the other regions, profits have held steady. This indicates that the ROI for dollars allocated

HEWLETT PACKARD

AT&T layoff spurs union strike vote

ANAHEIM, Calif. — The Communications Workers of America last week authorized a strike vote by employees of AT&T Information Systems in response to the company's layoff of 24,000 employees. The union charged that AT&T Information Systems was contracting out work in violation of its contract with the union.

"Layoffs in the face of . . . profits and an extraordinary level of both overtime and contracting out is unconscionable. Clearly the work is there," union President Morton Bahr said.

Bahr asked Communications Workers of America members employed by AT&T Information Systems not to work voluntary overtime and cited a letter of agreement from AT&T to the union that states that "traditional telephone work will not be contracted out if it will currently and directly cause layoffs or part-timing of employees."

AT&T Information Systems denied that a breach of its contract with the union had occurred. "We strongly disagree with the position taken. We have fully honored our obligation to the union and are willing to have that position tested in accordance with our contractual arrangements with the [union]," the company said in a statement.

The company said it has devoted considerable resources to relocate employees and find new employment for those whose jobs have been terminated.

— Bryan Wilkins

VIEWPOINT

EDITORIAL

Profits without honor

Critics have recently had a high good time taking U.S. business to task for its shortcomings, particularly as compared with its Japanese counterparts. One point that is often and effectively made addresses U.S. business's preoccupation with short-term financial gain. Too many companies worry too much about the current quarter's stock prices and too little about long-term corporate health.

Viewed in this context, IBM's announcement last week of software price increases and new policies on software licensing [CW, Oct. 21] is particularly troubling. Called by some the most Japanese of U.S. corporations, IBM has long stood for a brand of corporate management that stresses stability and enduring commitment to product lines that serve a marketplace and its customers.

Now, IBM seems to be caving in to pressures from Wall Street to improve its bottom line, whatever the cost. And this from a company acknowledged to be among our best in terms of management and overall financial performance. Third-quarter profits were down 7% from last year; fourth-quarter profits must be boosted by raising prices, the reasoning seems to go.

Perhaps even more significant is IBM's decision to make 262 programs formerly supplied through monthly licenses available for a one-time charge. By allowing users to obtain software for a flat fee, IBM is giving up a much higher total lifetime income to inflate a single year's revenue.

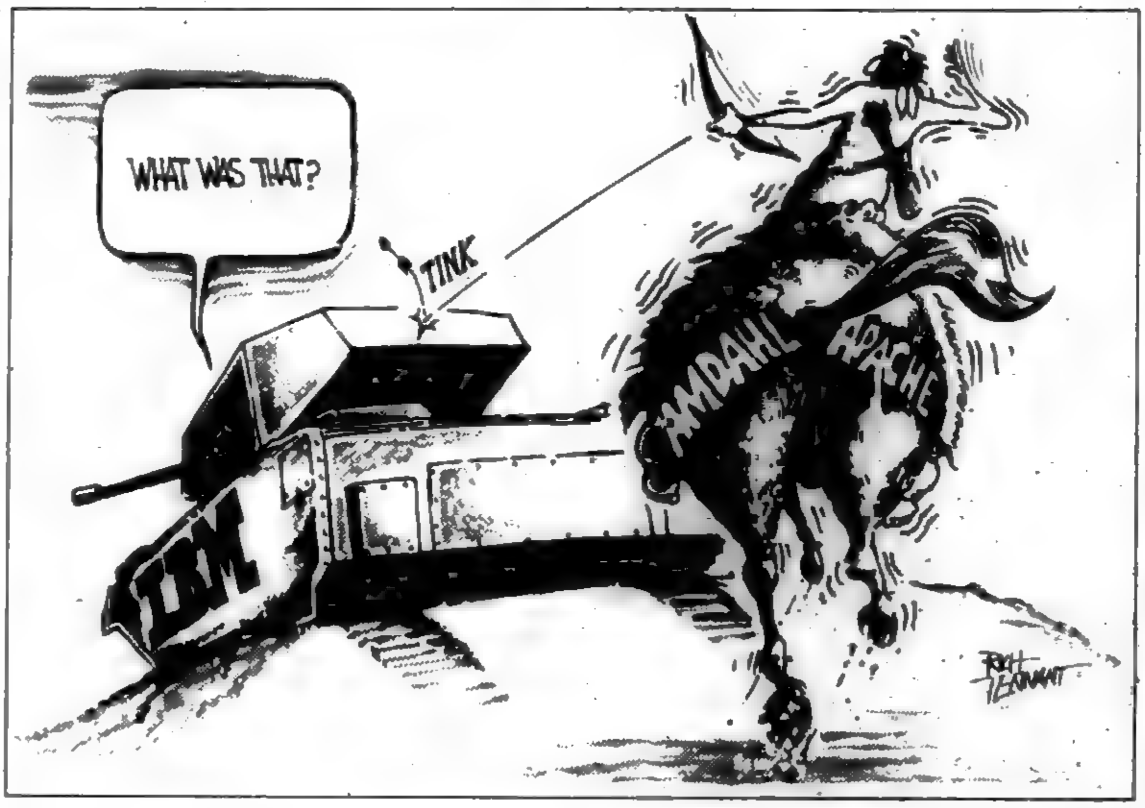
The significance of this shell game for users centers on the question of how IBM intends to balance the pressure to maintain high profits against the equally strong pressure to maintain the integrity of its new products. Can it ensure that products are not rushed through the development cycle — with resulting glitches and bugs — just to begin generating new revenue? Perhaps IBM, that most Japanese of U.S. companies, will manage successfully to do just that. But perhaps too, IBM, that most American of U.S. companies, will fudge quality to boost profits. Caveat, as they say, emptor.

New in CW

On page 107 of this issue of *Computerworld*, you'll find a section headed "New Products" which debuted last week. Although CW has covered new products since its inception 17 years ago, this new format represents an effort to bring together in one place the majority of products that we cover and whose sheer volume — coupled with editorial time restraints — precludes our staff from reporting on them in depth.

In the New Products section, we will provide the essential details of these products along with the address of the vendor to facilitate contact by interested readers. This information has been provided by the vendor and has not been independently verified by CW. Product information that appears elsewhere in CW, including the news pages and technical sections, is the result of reporting by our staff and focuses on the week's most significant product releases.

This reformation of our new product coverage underscores CW's commitment to provide its readers with the best, most thorough and most accessible computer news.



LETTERS TO THE EDITOR

Rules for choosing relational DBMS fail to come up with valid conclusion

E. F. Codd's article "Does your DBMS run by the rules" [CW, Oct. 21] featuring his rules that a data base management system must meet to qualify as "fully" relational is about the silliest article on data base technology I have ever read.

If you follow all of Codd's rules and develop a fully relational DBMS, you are casually informed by Codd at the end of the article that this fully relational DBMS won't be able to handle applications with "severe performance requirements."

I find this a remarkable admission on the part of Codd because most companies' applications are exactly the kind that Codd's relational technology cannot handle. Thus, following Codd's rules would be analogous to building an airplane according to an aeronautical engineer's design specifications only to find in the last chapter that the plane, once completed, will not fly.

It has been Cullinet Software, Inc.'s position for years that what was needed was one DBMS that could efficiently process complex applications with "severe performance requirements," yet still could accommodate end-user applications development easily.

In other words, there are some nice features to relational technology, and for this we are grateful to Codd. However, Codd's articles are really a thinly veiled, self-serving justification for a dual data base strategy, a strategy that has been thoroughly vetoed by the user community as unnecessary. A strategy, I might add, which is the only justification for DB2, the product that evolved from his work while at IBM.

John J. Cullinane
Westwood, Mass.

Constraints suggested for Soviet students allowed to access U.S. computer systems

In Charles P. Lecht's column "On students, computers and the Soviets" [CW, Sept. 9], a number of facts seem to have escaped Lecht's attention.

There is no quid pro quo from the Soviet government for all the education in the U.S. provided for the Soviets' future leaders. The Soviets do nothing in return for us. Yet, this education we provide, especially in computer systems and languages, only serves to make it more and more likely that they will be able to destroy our country.

Admittedly, the Soviet Union has made great technological strides without the use of any of our supercomputers. Does it make any sense to help them go futher along the road to world war?

The sworn aim of the Communist Party is complete domination of the entire world. There is no equivocating this aim; it has guided its every move in every part of the world for the past 70 years. The U.S. should take the following actions:

■ Restrict visas to a specific and very small number of Soviet visitors each year and ensure that each one who is admitted has a permanent Federal Bureau of Investigation/Central Intelligence Agency coterie hanging onto their coattails.

■ In general, give no more to the Communists than they give to us. And make their diplomats conform to U.S. laws as the U.S. diplomatic corps in Moscow are required to do.

And, as far as providing any assistance in further upgrading their technology, the same quid pro quo should apply to our business executives as they apply to their business executives: Trafficking with the enemy is treason.

Walter E. Murdock
Honolulu

AN/FS Q-7 memory cycle time, dates specified inaccurately in article

Regarding the In Depth article "A walk through The Computer Museum with Gordon Bell" [CW, Oct. 14], the memory cycle time of the AN/FS Q-7 was written as 6 msec. I'm not one to quibble about a few milliseconds, but you were off by a lot.

The Q-7 cycle time was 6 microsec., and if the logic were there, the data could have been accessed in 3 microsec. Because my memory is not always infallible, I checked my Q-7 programming manual, dated Nov. 15, 1956, just to be sure.

This date brings up another point about the Q-7. I programmed my first one in early 1957. So I'm pretty sure that there was one as early as 1956.

One last point about transistors: I went to work for Burroughs Corp. in Paoli, Pa., on the first day of 1959 and worked on a computer built with transistorized circuitry. So, they existed as early as 1958 in a computer as opposed to a laboratory.

Edwin B. Heinlein
San Rafael, Calif.

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JULY 1, 1985

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AT&T reaches out

Tools permit limited file exchange between 3B line and IBM mainframes

LINCROFT, N.J. — AT&T last week announced its first set of tools that enables an AT&T 3B computer to communicate with an IBM mainframe.

Included in a deluge of AT&T product announcements were two models of the 3B, four communications products for the 3B line and a version of AT&T's Unix System V Release 2 that runs

Crystal ball

Profile

IBM gives up SBS for 16% of MCI

WASHINGTON, D.C. — IBM last week initiated a major push into telecommunications by selling its 60% ownership interest in Satellite Business Systems to MCI Communications Corp. in return for an immediate 16% stake in MCI, the second largest long-distance carrier. The agreement permits IBM to acquire up to 30% of MCI during the next three years, and IBM indicated it will in-

standards/83

Following the murder of two Wang employees in El Salvador, some companies are redesigning aspects of international business travel. Page 4.

SUNNYVALE, Calif. — Amdahl Corp. last week extended its supercomputer line both upward and downward by announcing two additional vector processors, one with performance exceeding one billion floating-point operations per second.

With the introduction of Models 1400

and roughly 40% the performance of Cray Research, Inc.'s X-MP-1.

The top-of-the-line 1400, meanwhile, reportedly executes 1.14 Gflops, compared with 533 Mflops for the 2-processor X-MP/2 by approximately 400%.

Each of the four Amdahl machines runs the same software and can be upgraded in the field to its next larger system, according to the company.

Although the four machines have nearly identical machine cycle times, the 1400 produces eight

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VIEWPOINT

Performance reviews benefit firm, worker

Frequent, truthful feedback required in appraisal

By John P. Murray
Special to CW

What is the policy of your organization concerning performance appraisals? Are they conducted on an annual basis? Are they administered in a consistent manner? Does your supervisor or manager demonstrate a strong interest in the process? Is the completed appraisal, including the comments of the person being appraised, reviewed by someone at a level above that of the supervisor or manager conducting the review?

THE DATA CENTER

Performance appraisals are an important aspect of the process of employee development; therefore, their use should be encouraged and supported by the organization. Properly done, the review can provide significant benefits to both the employee and the manager.

The person who has responsibility for conducting the appraisal should be willing to devote sufficient time and attention to the effort so that the session is not only meaningful but provides a realistic assessment of both the strengths and weaknesses of the individual being appraised. The purpose of the appraisal session should be to offer guidance, encouragement and suggestions for improvement.

> ”
>
> *The purpose of the appraisal session should be to offer guidance, encouragement and, when appropriate, suggestions for improvement.*

Given the correct atmosphere, the formal process associated with the performance appraised should not produce any major surprises for the employee.

Feedback should be provided as instances of good or bad work occur. Employees deserve to know where they stand at any given time, not just at appraisal time.

This sets a more constructive framework for the formal session. Rather than engage in lengthy discussions about the negative items mentioned in the review, the participants can focus on constructive approaches for the future.

This is the ideal situation. In too many instances, any type of continuing feedback is viewed as being something onerous by the person responsible for the appraisal.

This sets the stage for undue concern for both the manager and the employee as the appraisau nears. There is often so much apprehension on both sides that by the time the session begins, considerable tension is evident. What should be a constructive and positive meeting, unless performance has been poor, is often viewed as a difficult process by both parties.

For some reason, this situation seems to be worst in information processing departments. There is simply too much other work to be done. As a consequence, appraisals tend to be put off.

The real answer is probably found in the aversion many information processing managers have in dealing with the people issues associated with performance appraisals. There is also a reluctance on the part of many employees to seek regular feedback on their work. Perhaps managers and employees alike tend to focus too much on technical issues and too little on people issues.

The performance appraisal must be as honest as possible if it is to be effective. If the employee has done well, it should be acknowledged. If the work has been less than satisfactory, that must also be recognized.

There is sometimes a tendency on the part of the manager to avoid or soften criticism and to mention only positive aspects of the individual's work. Although that stance may make both the manager and the employee feel better, it does not address the issue and is unfair to the employee. Again, if the informal appraisal process has been correctly handled, negative comments will not be a total surprise.

When the appraisal session is finished, the employee and the manager should feel that they have engaged in a fair and candid review of the employee's performance. If the appraisal has been correctly carried out, the employee may not be entirely pleased but should not be surprised.

The review of the employee's performance during the prior period is only one aspect of the review. The session also should be used to develop a set of constructive plans for strengthening identified weak areas and for developing the employee.

The planning for future development should combine the needs of the organization and the employee.

People cannot be expected to improve if they are unaware of their shortcomings. Performance appraisalsshould be seen as a necessary and constructive tool that can be used to strengthen employees.

Murray is director of management and information services for American Breeders Service, a DeForest, Wis., division of W. R. Grace & Co., and is the author of Management Information Systems as a Corporate Resource.

Computer literacy: rehabilitation or risk?

Government officials in Oregon recently launched a vocational training effort that highlights both the virtues and potential hazards of promoting computer literacy among teenagers.

By Jeffry Beeler

The program uses 14 personal computers, all donated by a philanthropist, to teach basic programming know-how to some 200 convicted juvenile delinquents in five Oregon work-study camps and two training schools.

The main aim behind the state-run project is undoubtedly admirable: To turn the youthful offenders into responsible, productive members of society by teaching them job skills and work habits that will someday increase their chances of landing desirable employment.

INSIDE LINES

But for all its noble intent, the program still gives pause for thought. Here, after all, is a rehabilitation effort that places personal computers, with their vast capacity for privacy abuses, in the hands of kids who have already shown a marked propensity for breaking the law. A corporate MIS director or systems security officer could probably be excused for wondering whether such a program's potential risks surpass its claimed benefits.

> ”
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> *Youths who would never dream of trespassing on private property feel no compunction about intruding into someone else's electronically stored information.*

The chief danger in Oregon's programming instruction effort is not that a participating youth might misuse the system while under state care. Close supervision of trainee activities and tight controls on systems access can effectively eliminate most opportunities for unauthorized personal computer use.

The main threat, rather, is that one or more participants in the Oregon vocational training program might succumb to the temptation to misapply their new-found computing expertise after they leave state custody.

Precedents for such high-tech juvenile delinquency abound. Trade and general-interest publications alike carry accounts regularly of the misdeeds of teen-age computing enthusiasts who have made a popular game of thwarting information security safeguards and penetrating corporate or government data bases. The term "hacker," virtually unknown outside computing circles only a few years ago, has recently become a mainstay in the lay vocabulary.

Epidemic of systems break-ins

What is perhaps most perplexing about the recent epidemic of systems break-ins is that most of the crimes are committed by otherwise law-abiding individuals. Youths who would never dream of trespassing on private property or resorting to vandalism in its conventional form apparently feel no compunction whatsoever about intruding into someone else's electronically stored information.

Implicit in much of their misconduct is a modified brand of hacker socialism that instinctively dismisses all claims to the private ownership of data.

If a system's security is vulnerable to even the most principled and comparatively benign hackers, imagine the damage that could be inflicted on a data base by computer knowledgeable youngsters with malice in their hearts and felonies in their backgrounds.

An Oregon educator, asked whether he had any misgivings about exposing known juvenile delinquents to easily abused technology, characterized the potential security threat as minimal.

Many of the project's participants suffer from serious learning disabilities and thus "will never reach a skill level that would make them a threat" to a user's information privacy, according to James Richard, a director in Oregon's state Education Department.

Simple motivational tool

Moreover, he continued, the project's computer training courses are intended to serve more as a simple motivational tool than as a means for producing professional computer programmers.

Maybe Richard is right. Maybe none of the program's participants will ever advance beyond a rudimentary level of computing competence, and maybe they will never give organizations that use information systems a justifiable cause for security-related concerns.

Still, the marriage of programmer training and juvenile delinquency is somehow vaguely unsettling — if only because it reminds organizations of how grievously information security can be compromised by proliferating microcomputers and irresponsible users.

Beeler is West Coast bureau chief for Computerworld.

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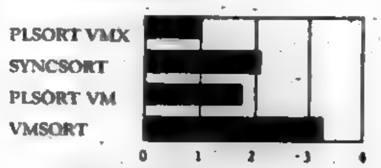

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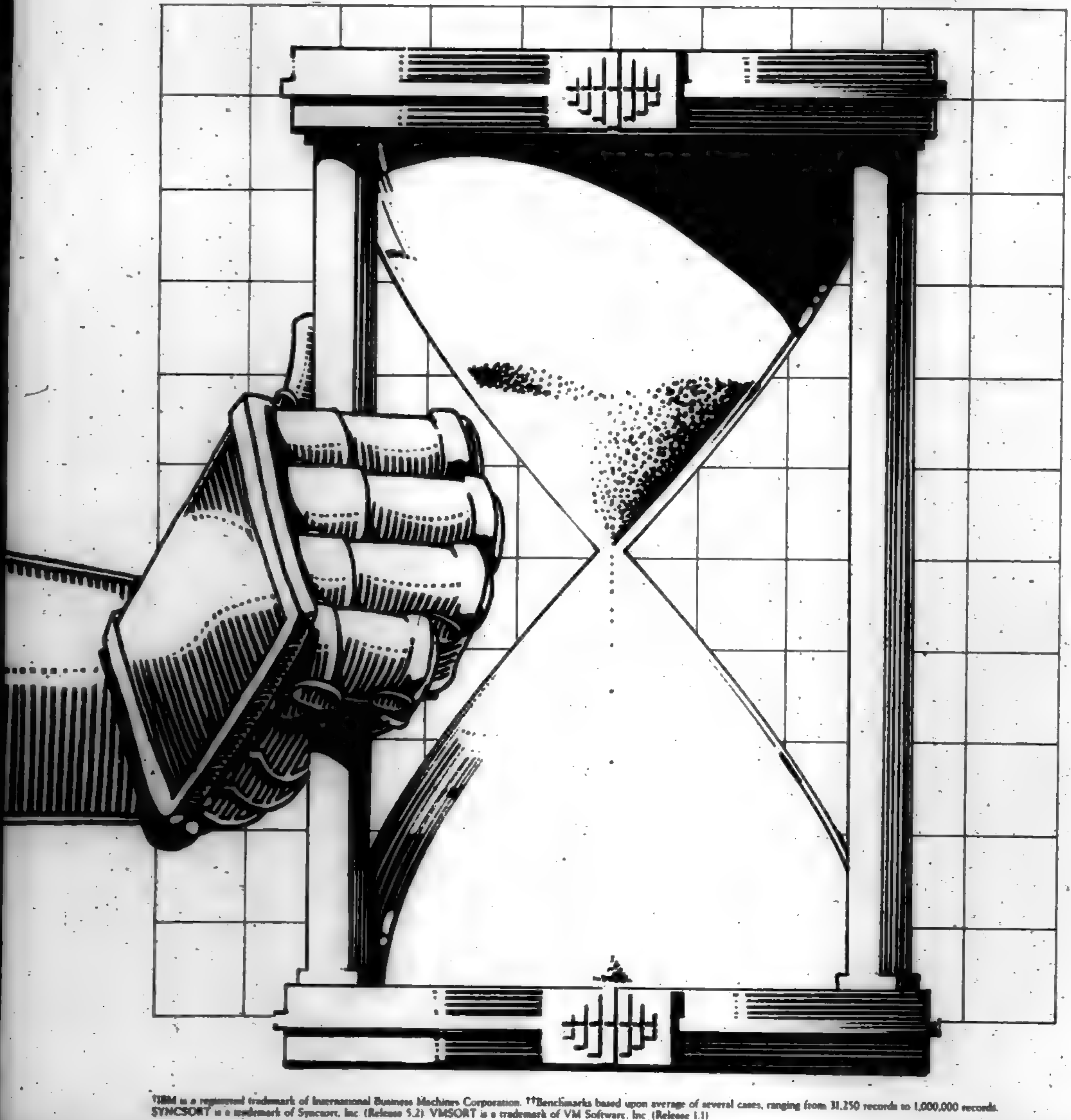

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MICROCOMPUTERS

SMALL TALK
Paul Korzeniowski
CW Senior Writer

End of trail for micro pioneers

Steven Jobs' recent departure represents more than a corporate shake-up in a maturing industry. Jobs was one of the last of the microcomputer industry's forefathers still running his company. The list of microcomputer founders now resembles the cast in Agatha Christie's *Ten Little Indians.*

Gone — or at least transformed — are the industry's pioneers. Nolan Bushnell no longer manages Atari Corp. and has essentially faded from sight in the personal computer industry. Jack Tramiel, who once ruled Commodore Business Machines, Inc., has taken his bravado managerial style to Atari Corp. Adam Osborne, founder of Osborne Computer Corp., has stopped peddling hardware and is pushing software. Gary Kildall has left active management at Digital Research, Inc. for Activenture Corp., a start-up company exploring compact disk read-only memory applications. George Tate of Ashton-Tate has passed away. Software Arts, Inc.'s Dan Bricklin is attempting to put a second company together as his alter ego Robert Frankston plies his technical skills at Lotus Development Corp. Visicorp founder Dan Fylstra is now a consultant, and his company has gone the way of the buffalo.

Jobs and company entered an industry where a sound idea backed by good technical expertise and bold marketing could transform an operation housed in a garage into a billion-dollar firm.

If in 1984, Jobs had started out from his garage in an attempt to market the Apple Computer, Inc. Macintosh, the machine probably would have failed. In

Continued on page 23

Microrim's R:Base 5000 out for local-area nets

By Eric Bender

BELLEVUE, Wash. — Microrim, Inc. next month will become the first leading vendor of microcomputer data base managers to ship a version fully tailored for local-area networks.

As expected, R:Base 5000 Multiuser will run on PC-DOS-based networks, will cost $1,500 per server and will not be copy protected.

"To monitor on a per-user basis gets to be a real headache," Microrim Chairman Wayne Erickson said. He noted that most micro nets currently support about four people and that "you don't want to have 50 people doing heads-down data entry."

> *'You don't want to have 50 people doing heads-down data entry.'*
>
> — Wayne Erickson
> Microrim, Inc.

R:Base Multiuser supports item-level locking and concurrency control without any operator intervention, Erickson said. Password security also is built in.

The software includes features of the standard single-user version, including Application Express, which helps users develop applications while learning the system; the CPL language for developing more complex applications; and a compiler, which locks down application code, preventing unwanted tampering.

Most competing offerings for data base management on micro nets have been oriented more toward programmers than toward general users and have been marketed by smaller firms, Erickson said. He acknowledged that Ashton-Tate once sold a network version of Dbase II but pointed out that the product has been withdrawn.

In preliminary tests, R:Base 5000 Multiuser looks very positive, said one beta user at a Chicago accounting firm, who is now experimenting with the package on a four-node IBM PC Network for a client.

John Polick, a senior consultant at Friedman, Eisenstein, Raemer and Schwartz, is automating civil service job information at Northern Illinois University. Handling a data base covering roughly

Continued on page 22

INSIDE

Borland International unveils a RAM-resident data base manager/23

ITT Information Systems expands its line of Xtra Communications Technology systems/23

NEW THIS WEEK

- Kaypro introduces an IBM-compatible Personal Computer
- Software programs abound for the Apple II series
- For more on these and other new products, see pp. 107-134.

INSTANT ANALYSIS

"This is a radically different situation; you are now in a position to tell vendors what it is that you want and to make it stick."

— Data General Corp.'s Robert Miller, addressing the Hammer Forum

Rolm announces Juniper II

IBM's Rolm Corp. subsidiary earlier this month launched Juniper II, an upgraded model of its voice/data add-on for the IBM Personal Computer that will sell for $1,295. Enhancements include compatibility with IBM's Personal Services/PC and Professional Office System/Personal Computer Connection communications programs (with two-way file transfers), support for the Personal Computer AT and pass-through printing capabilities. A future release will provide compatibility with IBM's Token-Ring network, the Santa Clara, Calif., firm said.

Hard-disk system on expansion card bows

Mountain's Drivecard has 20M-byte capacity

By Peggy Watt

SCOTTS VALLEY, Calif. — Mountain Computer, Inc. has gone one-up on the new hard-disk-on-a-card technology by introducing a 20M-byte hard-disk system on an expansion card, with twice the capacity of an earlier announced competitor..

The Drivecard includes a 3½-in. Winchester disk with controller and utilities software for use with the IBM Personal Computer, Personal Computer XT and compatibles, including some Personal Computer AT compatibles, according to Mountain Computer.

The half-slot part of the card fills the nonconnector half of a full card slot, leaving the connector open for another half card. The card can be installed by the user and carries a one-year warranty.

Mountain's suggested retail price is $1,195. A 10M-byte version is also available for $995.

Deliveries of the Mountain Drive card system were scheduled to begin this month, just as the Hardcard, a similar product introduced last June by Plus Development Corp. of Milpitas, Calif., was expected to ship.

The Hardcard also offers a hard disk on a plug-in card for IBM Personal Computer compatibles but provides 10M bytes with a controller and file management software and costs $1,095. It takes up one expansion slot on an IBM Personal Computer or compatible board and can be installed by the user. It also has a one-year warranty.

Mountain's Drivecard utilities software is optional for the hard disk's operation but allows the user to divide the drive into 11 segments for quicker access and easier backup when only parts of the drive need to be backed up.

Mountain also recently announced its TD-4000 40M-byte tape drive, with versions for external or internal use.

The internal tape system is priced at $750 and can be installed in the slot for a 5¼-in. floppy disk drive in the IBM Personal Computer and most compatibles. The external version is used as a separate unit and costs $995. It can be used in Apple Computer, Inc. computers and some other machines not compatible with the IBM micro.

Both tape drive versions are due to be shipped in December.

CXI graphics board debuts

By John Desmond

CXI, Inc. of Palo Alto, Calif., has announced Pcox/Graphics, an add-on graphics board that provides full IBM 3279 Model S3G emulation for IBM Personal Computers. The board gives microcomputer users access to host graphics and alphanumeric data.

The Pcox/Graphics connection supports the use of graphics programs resident on the host, including SAS Institute, Inc.'s SAS Graph, Issco Graphic, Inc.'s Disspla and IBM's GDDM software. Users switch from terminal emulation to Personal Computer mode with a single keystroke.

Pcox/Graphics is intended for use with high-resolution monitors such

Continued on page 22

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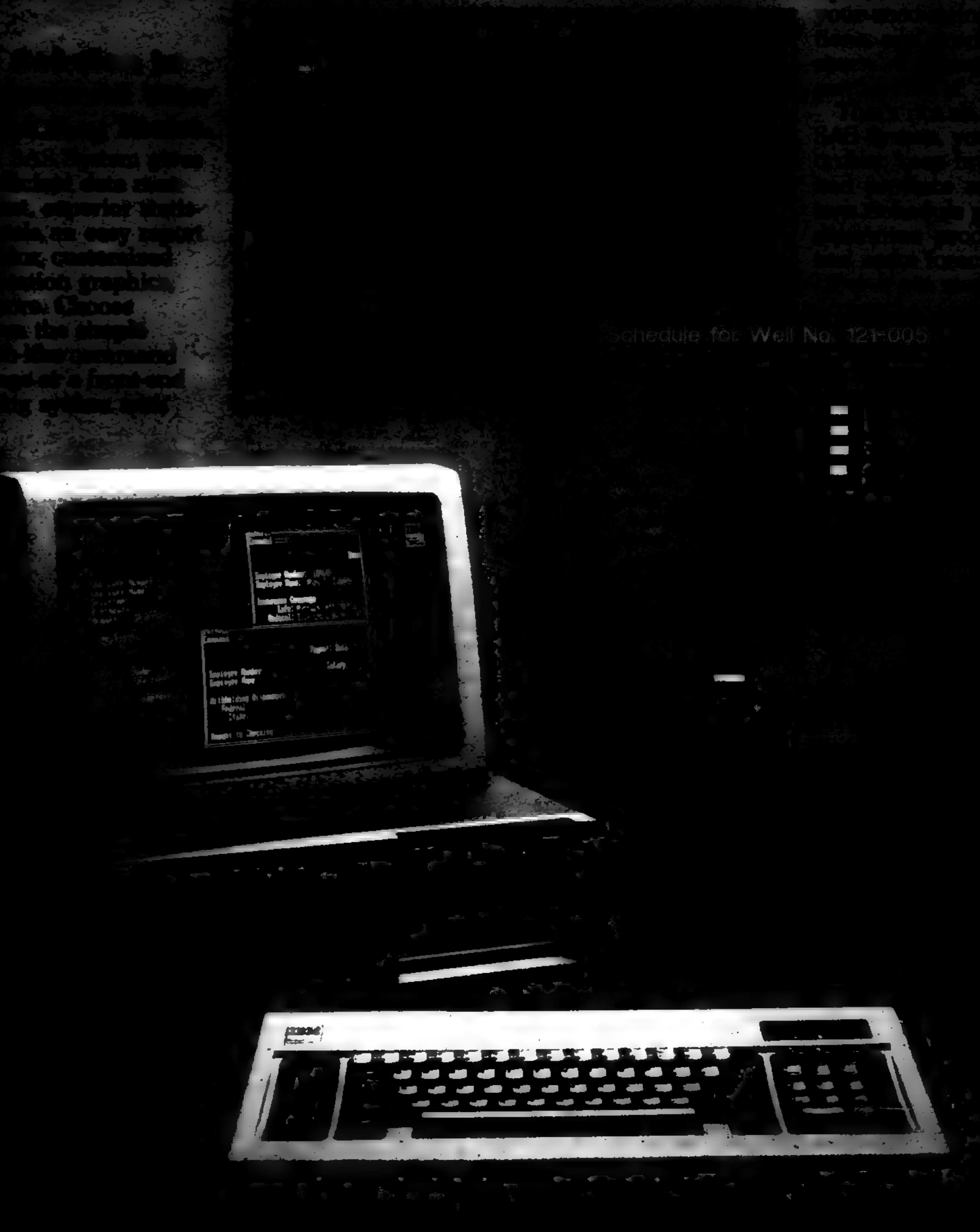

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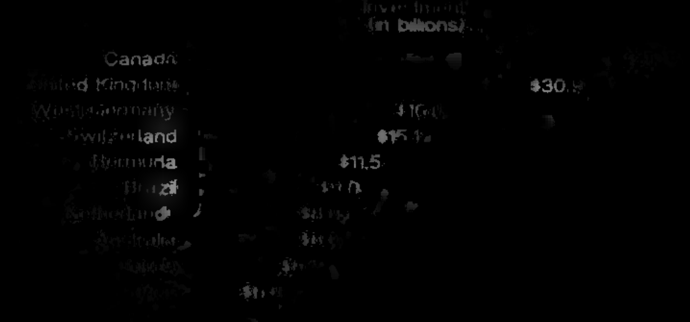


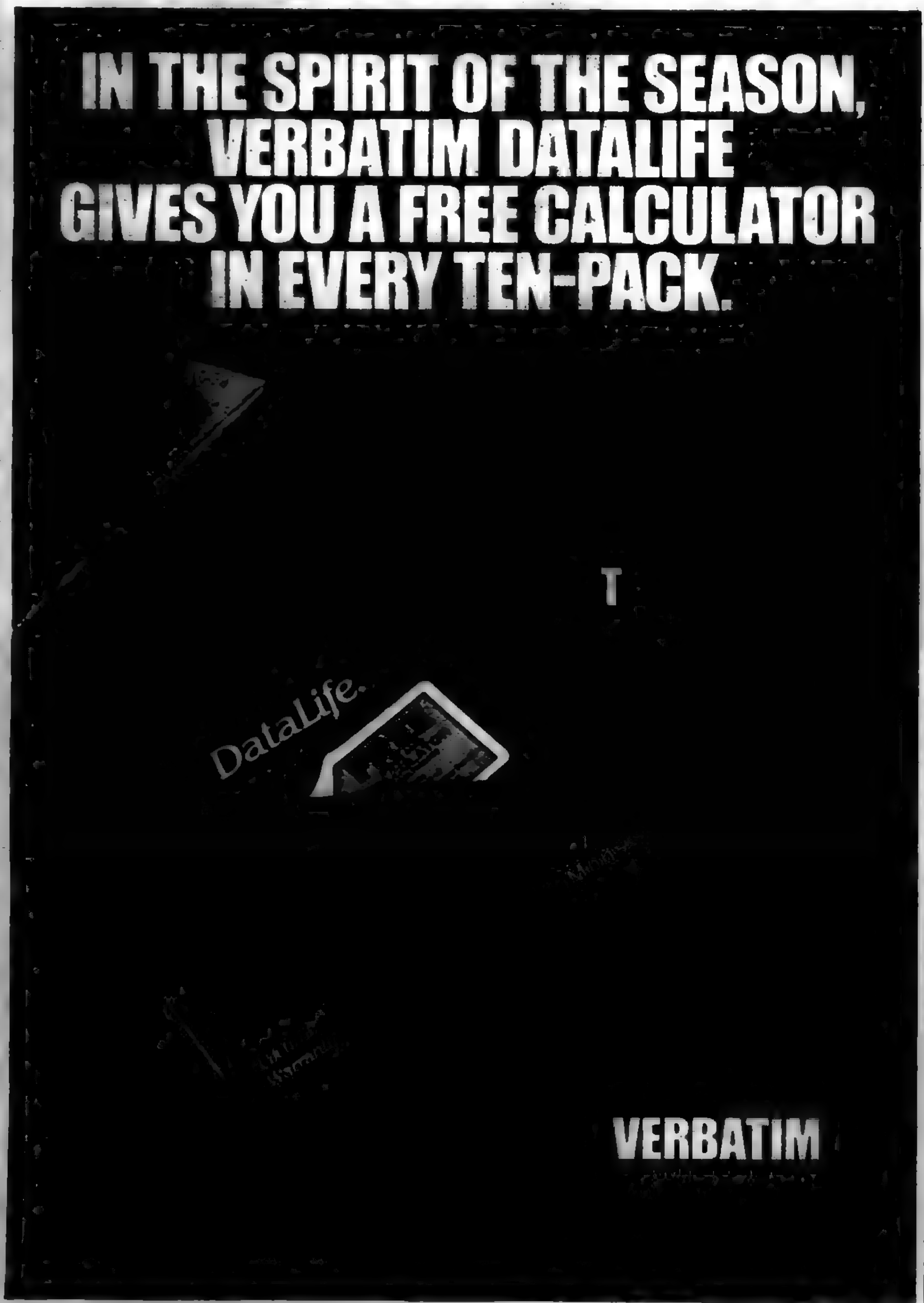
IBM XT clone out in China

SHANGHAI (CWN) — A personal computer compatible with the IBM Personal Computer XT was unveiled recently by one of the only computer manufacturers in the world still lacking such a machine, the Shanghai Electronic Computer Factory.

While XT compatibility may not make the TQ-0520 C a head turner, the machine's features — an Intel Corp.-style 8088 microprocessor, 640K bytes of memory and eight expansion slots — go a long way toward dispelling the myth that the Chinese are lagging far behind in personal computer technology. No price or plans for foreign distribution were announced.

According to its developers, the TQ-0520 is "100% IBM compatible." More remarkable is the means by which the TQ-0520 copes with the fact that most IBM software is written in English while most Chinese write in Hanzi. The machine supports both English characters and Hanzi's 6,763 characters, though it can only display 40 of the larger Hanzi characters per line.

The machine's developers claim that Hanzi versions of Lotus Development Corp.'s 1-2-3, Micropro International Corp.'s Wordstar and Ashton-Tate's Dbase II and Dbase III are available. Spokesmen for Lotus and Ashton-Tate, however, said that they were unaware of any Hanzi versions of their software.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From page 19

Microrim's R:Base out for local nets

1,500 people looks like "a perfect application" for the software, Polick said. He reported no major problems in developing the application on a single-user system and running it on the network.

The software will run on nets that conform to the IBM PC-DOS 3.1 network standard, Microrim said. It will be sold through dealers. Additional license/manual packages will be available directly from Microrim for $100 per user. A $600 trade-up package from single-user R:Base 5000 or R:Base 4000 packages also will be offered through the vendor.

From page 19

CXI graphics board debuts

as the IBM 5154 Enhanced Color Display or with the standard IBM 5153 Personal Computer Color Display.

Pcox/Graphics features a screen-save utility, capable of saving a full S3G graphics presentation space on the Personal Computer for use at a later time. CXI uses noninterlace mode, compatible with the 3279-S3G display requirements of 720 pixels on each of 396 scan lines for high-resolution display in seven colors.

The product is compatible with Digital Communications Associates, Inc.'s Irma board and micro-mainframe software designed for the Irma board.

Pcox/Graphics is is scheduled to be available in November and will cost $1,995. The Pcox/File Transfer upgrade costs $100.

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ITT expands business microcomputer line

ITT Information Systems of San Jose, Calif., has announced two additional models of its ITT Xtra Communications Technology business computer, a microcomputer that can access IBM TSO or CMS mainframe files.

Models III and IV are said to offer communications, by synchronous modem, at speeds of up to 19.2K bit/sec. Model III provides IBM 3278 and 3279 emulation; Model IV provides IBM 3270 Personal Computer emulation. Models III and IV eliminate the need for IBM 3274 and 3276 cluster controllers, the vendor said.

The Model III and IV packages include the ITT Xtra Personal Computer, a single expansion card with modem connector and communications software. Each micro is built around an Intel Corp. 8088 processor and comes configured with a double-sided, double-density floppy diskette, a 10M-byte hard disk, a monochrome or color display and a keyboard template for IBM 3270 operations.

Model III has 384K bytes of memory and can show up to four windows, either full-screen size or together in various combinations. Model III communicates with the mainframe via one host session. Model IV contains 640K bytes of memory and supports multiple concurrent terminal emulation. Up to eight active windows are available simultaneously. Model IV communicates with the mainframe via one of five host sessions.

Both models include the ability to print screens, save a window to disk and copy data from one window to another.

Communications software allows transfer of both text and binary files.

Model III is priced at $3,715; Model IV at $4,280, the vendor said.

Borland offers resource tools

Borland International of Scotts Valley, Calif., has launched a line of resource programs to accompany a new random-access memory (RAM)-resident data base for IBM Personal Computers and compatibles and is shipping another utility program for its Turbo Pascal family.

Turbo Lightning and the Turbo Lightning Library reportedly offer quick access to data base index files stored in RAM, in a similar manner to Borland's Sidekick "helpware" program.

The Random House Spelling Dictionary and Random House Thesaurus programs in the Lightning Library can be accessed by pull-down menus like those in Borland's macro processor, Superkey. For example, a menu will list synonyms for the word marked by the cursor in a document being edited. The user can also add words to the dictionary.

Lightning requires only 64K bytes of RAM, due to a Borland data-compression method, the company said. Function keys also speed the search, the vendor said.

Turbo Lightning, including the dictionary and thesaurus, will be available in November for $99.95.

The newest Turbo Pascal utility is a Turbo Editor Toolbox, which includes source code to enable Turbo Pascal users to build or customize editors and word processors.

The $69.95 utility includes the word processing program Microstar, which Borland said is similar to Micropro International Corp.'s Wordstar, and 16 software modules with layered access to streams of text via windows. Editors designed with the Toolbox are compatible with Superkey and Sidekick.

The Turbo Editor Toolbox joins the Turbo Pascal line, which is led by the Turbo Pascal programming language introduced in November 1983 and which also includes the Turbo Database Toolbox, Turbo Graphics and Turbo Gameworks.

From page 19

End of trail for micro pioneers

some ways, Mindset Computer Corp.'s machine was similar to the Mac. The microcomputer featured extensive graphics capabilities, received good reviews and could run most IBM Personal Computer software, a feature that the Mac still lacks. Rather than lauhching a billion-dollar company, the machine took its founders into Chapter 11.

Despite his stature, Jobs will have difficulty launching his new company. The ante is of a higher magnitude than when Apple started. Even established companies, such as Digital Equipment Corp. and Wang Laboratories, Inc., have proven relatively unsuccessful in new micro markets.

The opportunities in standard software applications also may be limited. Ashton-Tate's Dbase II and Lotus' 1-2-3 and their enhanced versions have locked up the largest portions of data base and spreadsheet markets.

Competitors have had little success in breaking these strangleholds. For example, last year, Analytica Corp., backed by a lot of venture capital, ballyhooed its introduction of the Reflex data base management package. The package made slow inroads, and the company recently was sold to Borland International.

Borland was one of the few companies last year to launch a product successfully. Sidekick, a desktop manager, became a best-seller and was listed as one of the leading software products by a number of publications. Yet Sidekick complements packages like 1-2-3 and could not be used on its own.

Jobs' departure may signify the start of an era dominated by software products like Sidekick and hardware that mimics whatever IBM produces. Surely, there is a place for reliable products like Sidekick, but in the long run users may be the big losers if nothing more dramatic comes along.

With Jobs gone from Apple, the firm will probably be less likely to produce something like the Mac and more likely to go with the status quo. Apple executives now talk of coexistence with IBM, and Apple engineers are working to let the Mac talk to Big Blue mainframes.

Coexistence makes sense from a fiscal standpoint, and many analysts think it is the only way the company can prosper. But if Apple is unwilling to challenge the status quo, what company will?

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SOFTWARE & SERVICES

SOFTALK
John Gallant
CW Senior Editor

IBM VM/CMS ascending star

IBM's recent offering of CICS support within VM/CMS [CW Oct. 21] should convince even the most doubting users that VM has become one of IBM's most important software products for the future.

The introduction of CICS/CMS is only the latest major announcement from IBM concerning VM. Already this year IBM has released the long-awaited Extended Architecture (XA) version of VM, an entry-level VM offering for smaller machines and a supported implementation of AT&T Unix System V running as a guest under VM. It would be difficult to pinpoint another IBM software product that has been the focus of such intense development activity in the recent past.

That VM has become such a big name in the IBM stable of software stars is ironic. Born in the late 1960s, VM, much like its oft-mentioned AT&T counterpart Unix, was something of a lesser child in its early days at IBM. All the attention went to other operating systems on which IBM had laid its foundations for the future.

As opposed to being primarily a batch processing operating system, VM/CMS was designed to provide an interactive environment oriented to program development. VM, or CP/CMS as it was known then, was designed in two portions. The Control Program component was built to be a very efficient system software core that provided what appeared to be a dedicated computer system for each user — thus the term "virtual machine."

The Conversational Monitor System, known originally as the Cambridge Monitor System, was designed as a VM

Continued on page 32

Info '85 knocks industry

Nies critical of vendors, outmoded software design

By Donna Raimondi

NEW YORK — The software industry took some heavy punches from a panel of experts at the recent Information Management Exposition and Conference (Info '85) held in this city.

Software design is trapped in the past, a problem that is largely the fault of software vendors themselves, said Tom Nies, chief executive officer of Cincinnati-based Cincom Systems, Inc. Nies spoke at Info '85 on the need to dislodge software from its technological rut to meet the goals of users today and in the future.

According to Nies, software costs continue to rise dramatically, while user satisfaction with systems continues to decrease. "That trend is what triggered [the use of personal computers]," he said.

The accelerated rate of change in end-user requirements means that existing programs must be modified frequently, a situation that leads to overly complex systems, Nies said. And in many cases, the development time involved in producing a software package now exceeds the useful life of the product, he added.

Current software systems do not address the major problems that data processing managers face, Nies said. The two most important of those problems include programmer productivity and response time. So-called fourth-generation software, decision support systems and other highly touted packages take up so much memory and are so clumsy in execution that their usefulness is limited, he said. Fourth-generation languages, for example, are useful as development tools in only about one-tenth of all situations, he said.

"We are in a software Bermuda triangle," Nies said. To escape, software development time must decrease from the current average of 18 months to two or three months. Most changes made to software occur at the end of the development cycle, when they are expensive to implement.

Continued on page 30

Burroughs MCP/AS bows

By John Desmond

DETROIT — Among a series of software announcements for its A series mainframe computers, Burroughs Corp. announced MCP/AS, a new version of its MCP operating system that extends address space.

MCP/AS can address 24G bytes of main memory; MCP was limited to a 6M-byte address space. The announcements, contained in A Series Software Release 3.6, are aimed at providing improved system performance and productivity, extending workstation integration facilities and adding continuous processing capabilities.

According to William Maclean, Burroughs program manager, "We're trying to improve performance, particularly for the transaction processing environment. We believe that every one of our customers

Continued on page 30

Manufacturing software out

By James A. Martin

ATLANTA — American Software, Inc. announced last week a line of financial, manufacturing and distribution software packages for the IBM System/38.

The MRP/38 and DRP/38 packages are based on American Software's manufacturing and distribution programs, MRP-8 and DRP-8, for IBM mainframes and are the firm's first venture into the minicomputer market, according to Paul DiBono, vice-president of marketing.

MRP/38 consists of eight integrated modules including demand forecasting, manufacturing planning and procurement. The system is said to convert and generate manufacturing forecasts into a master schedule to determine component and raw material requirements. In addition, MRP/

Continued on page 30

INSIDE

Tandem Computer introduces security products for its line of processors/26

Arthur Andersen unveils a service aimed at helping clients install packaged applications/32

NEW THIS WEEK

- Landmark enhances the Monitor for CICS
- Hewlett-Packard ports Basic to the HP 3000
- Westinghouse improves Malltronic
- For more on these and other new products, see pp. 107-134.

INSTANT ANALYSIS

"Ada is progressing as swiftly as I thought it would. The perspective of others may be different because they overlooked the difficulty of developing compilers."

— **Dr. Jean Ichbiah**
developer of Ada

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS

Tandem breaks out Safe system security products

Cupertino, Calif.-based Tandem Computers, Inc. has announced the first two in a planned series of Safe system security products for Tandem processors.

The initial products are Safeguard, for users of distributed networks, and Safe-T-Net, a data encryption subsystem. The products are intended to complement the data integrity and networking features of Tandem Nonstop systems for on-line transaction processing.

Safeguard, which works with Tandem's Guardian 90 operating system, provides Tandem network users with authentication, authorization and auditing services. Safeguard is intended to control access to shared resources in the network including terminals, processors, printers, encryption devices, tape drives and communications lines.

Safe-T-Net is a channel-attached peripheral that provides encryption, message authentication and an on-line master key change mechanism. The initial product will provide for encryption of terminal sessions on IBM 3270 terminals and IBM Personal Computers with encryption capabilities and for general purpose encryption with a file system interface. The encryption is performed in compliance with the National Bureau of Standards Data Encryption Standard algorithm.

Safeguard, to be available in mid-1986, costs $1,000 plus $760 per month for Nonstop II and Nonstop TXP systems.

The initial licensing fee for Safeguard on Nonstop EXT systems is $500 per system plus a monthly fee of $380 per system.

Safe-T-Net is available now for $35,000.

Prime decision support tools out

Prime Computer, Inc. of Natick, Mass., has unveiled a set of decision support tools designed to work in conjunction with its Information data base management system. Prime also announced correspondence management software for its 50 series processors.

Prime's Information Connection package for the 50 series is said to enable users to manipulate data drawn from Information data base files through word processing, spreadsheet and graphics functions. Information Connection consists of the following three components:

- Word Connection word processing software.
- Financial Connection, a spreadsheet that supports mathematical, trigonometric, statistical and financial functions.
- Graph Connection graphics software offering a variety of standard templates with which users can create line, bar, pie or scatter charts.

Information Connection will be available in December at a price of $9,000 for office environment computers and $13,500 for computer room systems.

The Prime Correspondent correspondence management system is being marketed by Prime through an agreement with the software's developer Selkirk Associates. It integrates data management, word processing, mail-merge and calendar management capabilities and allows users to track and schedule projects and generate personalized correspondence, the vendor said.

The Prime Correspondent system will be available in November at $12,000 for office systems and $20,000 for computer room systems.

Burroughs ←——→ Micros

- B1000
- B2000, B3000, B4000
- B5000, B6000, B7000
- A3, A9, A15

- Apple
- B20/B25
- IBM PC
- XE500
- and others.

There are twelve products currently available to extract Burroughs mainframe data so that it can be used in LOTUS(tm), MultiPlan(tm), dBase II(tm), and other microcomputer software packages. Michael Stahura and Associates, Inc. now offers an analysis of these packages.

The report answers a number of questions including:

- Which packages run on your mainframe
- The differences between the packages
- Data and user security features
- Mainframe resource controls
- Cost analysis

The Data Extraction Product Analysis is available for $90 plus $5 shipping from

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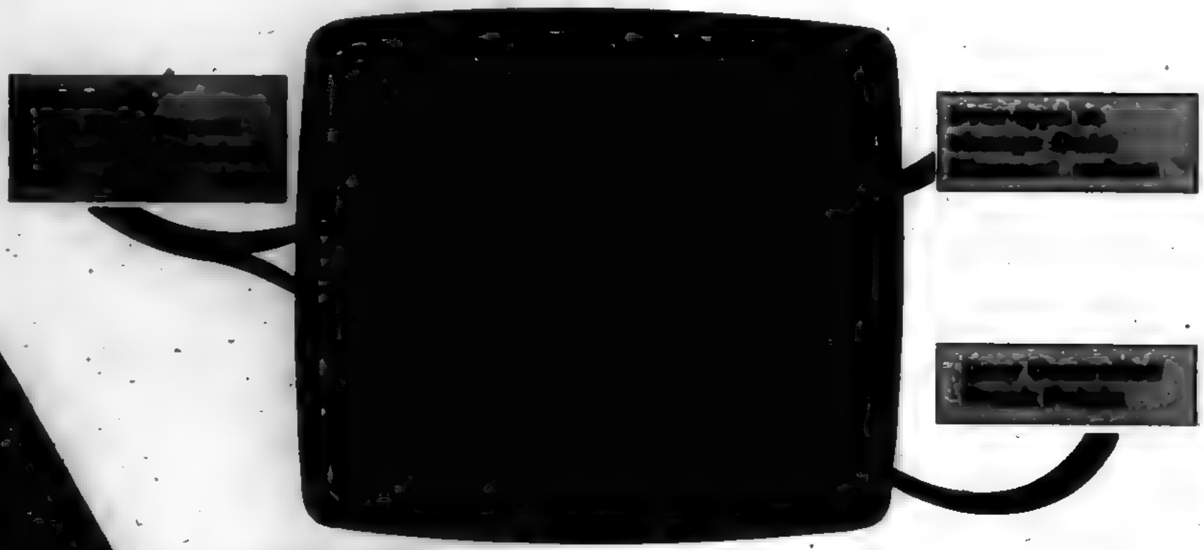

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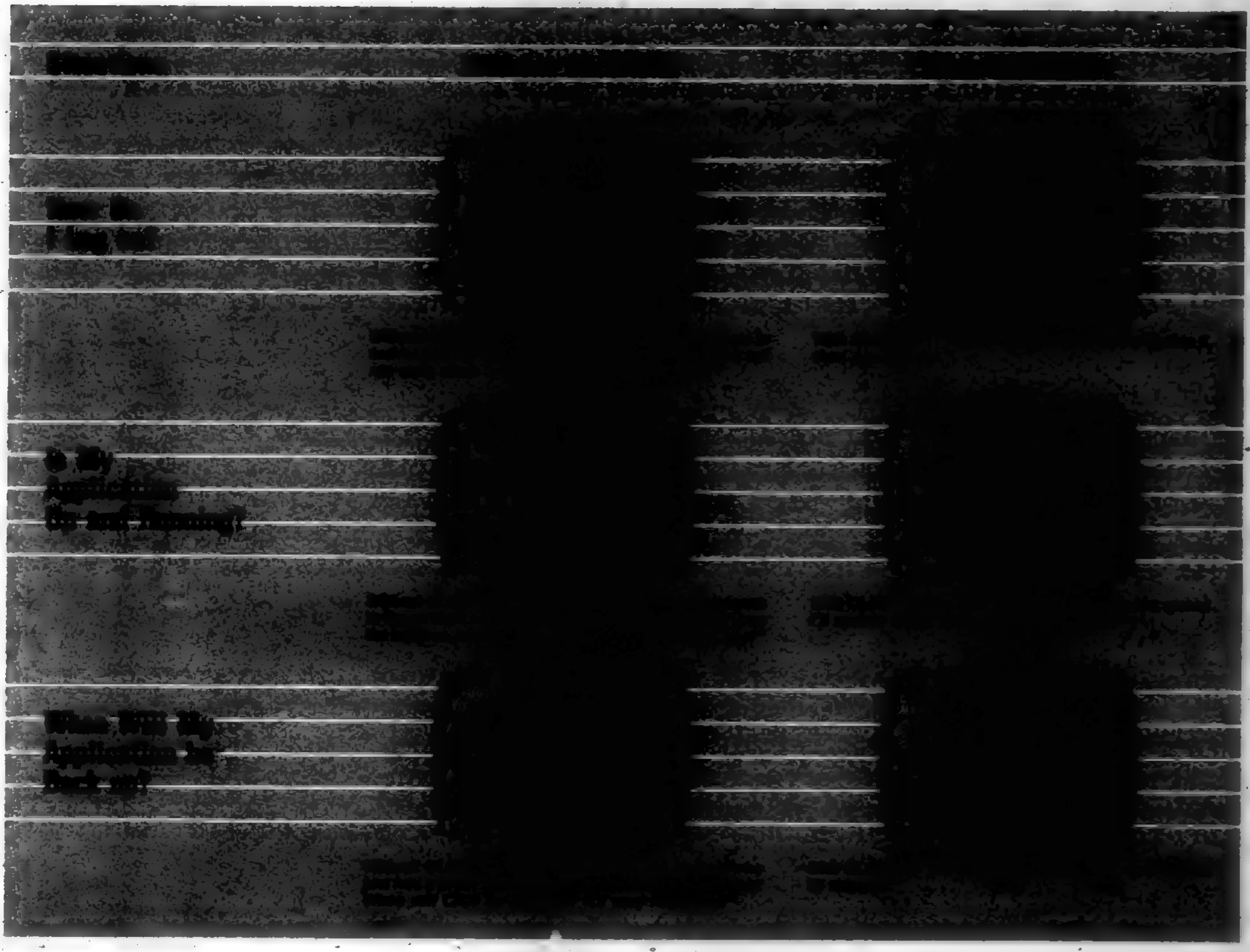

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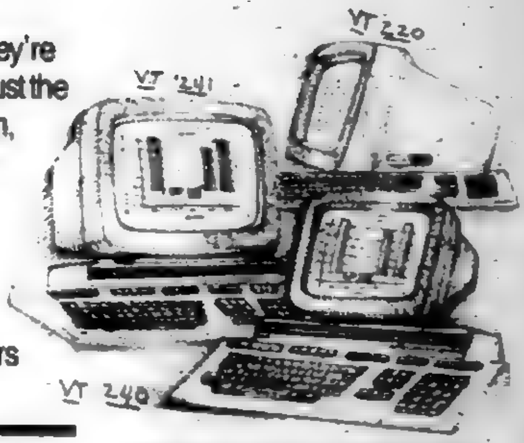

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From page 25

Manufacturing software out

38 determines whether resulting production and purchasing decisions are feasible, based on the master schedule, and provides more accurate shipment date expectations.

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Costs for the systems, which are currently available and can be purchased separately or as a package, vary depending upon the combination of modules chosen. A system containing one functional area is $40,000, whereas a combination of systems can range from $200,000 to $300,000.

From page 25

Burroughs MCP/AS bows for A series

needs one or more of these features."

Users of A Series Software Release 3.6 and Burroughs' Beta Management System II data base management system, can upgrade to MCP/AS without recompiling programs. The expanded memory addressing capability is said to improve overall system performance. Because MCP/AS is now in beta test, the vendor said, no comparative benchmark figures for performance were available.

Memory Disk, an additional feature for MCP and MCP/AS, enables users to designate up to 120M bytes of system memory as disk storage. Programs can interact with the Memory Disk unit as they would a disk drive but at a faster speed, the vendor said. MCP/AS is priced from $6,188 on the A 3 mainframe to $202,500 on the A 15 Model M four-processor mainframe. (All prices are for four-year licenses.)

Also announced were the Intelligent Distributed Editor (IDE) and the Test and Debug System (TADS) features, which are aimed at improving programmer productivity. IDE distributes editing and other programmer functions among Burroughs workstations, including the ET 2000 intelligent workstation or the B25 microcomputer.

TADS provides programmers with a high-level, symbolic debugging facility said to reduce the time required to find and correct errors in application programs. IDE and TADS work with Cobol 74, Fortran 77 and Algol languages. IDE is priced from $1,560 on the A 3 to $10,800 on the A 15. TADS is priced from $2,080 on the A 3 to $7,200 on the A 15.

Prints and Reprints, two new products, are for managing printing resources and print requests. Prints controls printing functions for on-site printers. Reprints extends the same functions to remote printers. Prints is bundled with MCP/AS; Reprints is priced at $3,120 for the A 3 and $10,800 for the A 15.

Infoview II offers a multiwindow capability for B25s and ET 2000s. Infoview II supports up to five mainframe windows and one local microcomptuer window concurrently. Features such as cut and paste across windows are included.

Infoview II is priced at $199 per copy for up to 20 copies and $40 per copy thereafter.

A Series 3.6 software is scheduled for December availability.

From page 25

Experts at Info knock software industry

Modifications, Nies said, should be made during the design stage, when they are relatively inexpensive to implement.

What is needed is a new mind-set, Nies said. Software developers must change their approach to building software, he said.

"We don't progress in software," Nies said. "The term 'generations' that is applied to software developments is a hoax — [the products] are merely enhancements and improvements to products that have been around for years." The oldest concept is the reliance on compilers, which are hopelessly obsolete, he said.

Shaku Atre, president of Atre International Consultants, Inc. also chided software vendors during the session. She said software marketers subscribe to the theory that, if they cannot dazzle the user with technology, they can at least confuse them with buzzwords.

Those buzzwords add confusion to an already mystifying array of products, she said.

IBM has about 25 incompatible operating systems, Atre said. That makes software development more and more difficult. And personal computer users are repeating a mistake already made in the mainframe arena — using more and more disk space.

Three or four software packages, including a word processing package and a spreadsheet, should be sufficient for most personal computer users, Atre said. Some of the solutions to the microcomputer software confusion are fairly simple, she said. Users need a single interface for the few software packages they will use so that they do not have to remember the mnemonics of different packages.

Lightening the tone of the panel somewhat, Philip Ross Jr., director of research and development at Management Science America, Inc. predicted that in 20 or 30 years, new software technologies will meet all user needs and be transparent at the same time.

The growth of networks will make computing much easier, Ross said. Soon the micro-to-mainframe link will be like using a telephone line, where users push the right buttons and get what they want without having to know from where or how the data is coming.

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All seminars through January 31 are listed below. Call for information on later seminars.

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				Manufacturing	Financial	Human Resources
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ARKANSAS						
Little Rock	1-23-86	●	●	●	●	●
CONNECTICUT						
Hartford	11-19-85	●	●	●	●	●
DISTRICT OF COLUMBIA						
Washington, D.C.	11-26-85	●	●	●	●	●
Washington, D.C.	1-22-86	●	●	●	●	●
FLORIDA						
Jacksonville	11-20-85	●				
Tallahassee	12-5-85	●				
GEORGIA						
Atlanta	12-11-85	●	●	●	●	●
HAWAII						
Honolulu	11-26-85	●				
ILLINOIS						
Chicago	12-4-85	●	●	●	●	●
Chicago	1-17-86	●	●	●	●	●
INDIANA						
Indianapolis	12-11-85	●	●	●	●	●
South Bend	12-3-85	●	●	●	●	●
LOUISIANA						
New Orleans	1-16-86	●	●	●	●	●
MASSACHUSETTS						
Boston	12-12-85	●	●	●	●	
MICHIGAN						
Detroit	1-16-86	●	●	●	●	●
MINNESOTA						
Minneapolis	12-12-85	●	●	●		
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Amarillo	12-4-85	●				
Austin	12-12-85	●	●	●	●	●
VIRGINIA						
Lynchburg	12-17-85	●				
WASHINGTON						
Seattle	12-12-85	●	●	●	●	●
WISCONSIN						
Milwaukee	1-15-86	●	●	●	●	●

CULLINET SEMINARS/CANADA FALL/WINTER 1985

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ALBERTA						
Calgary	1-16-86	●	●	●	●	
Edmonton	1-15-86	●	●	●	●	
BRITISH COLUMBIA						
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Arthur Andersen offers software aid

Arthur Andersen & Co. of Chicago recently introduced a service designed to help users install packaged applications software.

As part of its minicomputer- and mainframe-oriented Application Software Information Service, Arthur Andersen has entered into agreements with Management Science America, Inc. (MSA) and McCormack & Dodge Corp.

The applications vendors will supply their products to Arthur Andersen's Advanced Systems Development Centers in Chicago and New York to provide Arthur Andersen personnel with training in the installation and use of the products. Other Arthur Andersen offices will be connected to the centers via leased lines.

A spokesman for Arthur Andersen said consultants for the Application Software Information Service will provide clients with functional and technical guidance in the installation and use of packaged applications. Beyond MSA and M&D, the spokesman said, Arthur Andersen plans to seek the participation of other leading applications vendors.

In the minicomputer market, the program will initially focus on Arthur Andersen's line of IBM System/38 applications.

From page 25

IBM VM/CMS ascending star

operating system, working under the control of CP, that provided an excellent development environment. CMS featured a powerful on-line editor and supported standard compilers.

But in VM's youth, machine cycles were costly, and interactive processing ate up more cycles. Thus, users tended to go with the more efficient batch operating systems and VM was provided at no cost — and with no support — by IBM.

Over the years, VM slowly but surely continued to win over users. In 1972, rumor has it, a top IBM official attended a meeting of MVS developers who tried to convince him that VM should be killed and not released as a supported product. But when the official toured the development facility, he found that the MVS experts were running that operating system as a guest under VM.

The official concluded that if VM was good enough for IBM, it was good enough for IBM's customers. That year, CP/CMS was released as VM/370.

Targeting other areas

Just because IBM was selling and supporting VM didn't mean that IBM was emphasizing it as a strategic product. The bulk of Big Blue's development dollars was targeted to other areas. In recent years, MVS and its bigger brother, MVS/XA, seemed to be the sole focus of IBM's attention in the operating system arena.

VM still won loyal adherents in programming environments and among users migrating to another operating system. For example, a DOS user moving up to MVS could run both operating systems under VM during the transitional phase. But there seemed to be no clear indication from IBM as to what the future held for VM.

Times have changed, however. Hardware costs have fallen, and interactive processing has taken on a new importance. But IBM's batch operating systems have, at best, marginal interactive capabilites. Not surprisingly, user and IBM interest in VM has grown. VM/CMS provides the interactive facilities that are so vital.

IBM, in response, has moved to strengthen VM — enter VM/XA — and to make more of its mainline programs available for that environment. According to insiders, IBM has really begun to push users toward VM.

Many analysts posit a two-pronged operating system strategy for IBM's future. MVS/XA, they said, will remain the workhorse operating system for batch processing. VM, on the other hand, will become the mainstay of interactive processing, facilitating on-line program development and end-user and distributed processing. Those pundits who picked VM as the sleeper operating system appear to have been correct.

> ”
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> *Those pundits who picked VM as the sleeper operating system appear to have been correct.*

What this seems to portend, then, is that the features and functionality of VM will continue to be bolstered by IBM. The tools and functions VM currently lacks will be supplied in short order, analysts predict, and IBM sales representatives will no doubt be singing the praises of VM to users.

Users who may have questioned IBM's commitment to VM will see little reason to abstain from enjoying its strengths. It is not inconceivable that VM may one day even replace MVS as the flagship of IBM's software fleet. Once the forgotten child, VM appears to be outshining its siblings.

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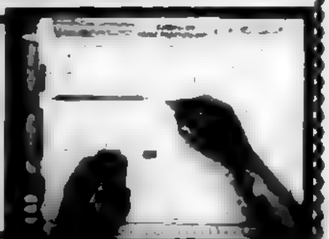

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COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

Token-Ring here too late?

Late is a relative term. From IBM's perspective, the Token-Ring network it unveiled two weeks ago isn't late. But many users think it is.

Customers needing local networks have been forced to employ stopgap measures — chink the gaps with equipment on short-term lease — or seek alternatives. As an example of the latter, one large university decided last year it could no longer afford to wait for IBM to show its network hand and made plans to install a broadband net.

While the university hasn't signed any contracts yet, the IBM Token-Ring is probably too late and too little for the school to throw away all the planning it has done to date.

Be that as it may, IBM is not really late to market. The local-net industry is still relatively small, with revenues totaling roughly $250 million in 1984. But history might show 1985 as a pivotal point; many multimillion-dollar network contracts have been signed this year. One company claimed it has a contract to provide a $16 million, 30,000- to 40,000-port local network to a branch of the armed services.

As announced, the IBM Token-Ring couldn't hope to compete for such contracts. Indeed, the net does little if anything more than the older IBM PC Network. In IBM's own words, "Both of these [local-area networks] have essentially the same level of announced support." Both connect Personal Computers. The difference is in product commitment and future capabilities.

Continued on page 34

Net standards sought

Westinghouse tries to tie disparate systems together

By Paul Korzeniowski

PITTSBURGH — Paul Sutcliffe understands the problems MIS managers faced in the early 1980s in trying to establish policies for emerging microcomputer technology.

Sutcliffe, senior engineer at the Advanced Product Technology System division of Westinghouse Electric Corp., is charged with formulating policies and choosing products for automation of design and the initial production processes for products his division manufactures. "The factory automation market may not be as large as the microcomputer market, but the challenges are the same," he noted.

Westinghouse, like other large corporations such as General Motors Corp., is undertaking this task despite the fact that fully specified, clear-cut standards will not emerge for at least a few years.

Standards are needed because factories typically are equipped with a myriad of equipment from a variety of vendors. In Sutcliffe's division, there are Sun Microsystems, Inc. 120 workstations; Apollo Computer, Inc. DN320 superminicomputers; Digital Equipment Corp. VAX superminicomputers; Xerox Corp. Star microcomputers; and IBM Personal Computers.

Tying these systems together has proved to be an arduous process of mixing and matching a number of different vendors' products. In 1981, Westinghouse took its first step in this direction when Sutcliffe's division purchased a personal computer local-area network from Davong Systems, Inc.

Sutcliffe said the product was reliable

Continued on page 35

Phone company ditches switch

By Bryan Wilkins

BALTIMORE — It is not often that a local telephone company will pull the plug on a 4-year-old central office switch when it is working fine.

But when the largest customer supported by a switch is considering giving up Centrex service and installing an in-house telephone system to serve 18,000 employees, the telephone company may go to extremes to try to keep its customer.

Chesapeake & Potomac Telephone Co. of Maryland, a subsidiary of Bell Atlantic Corp., did just that. It recently announced that it will install a Northern Telecom, Inc. DMS 100 digital central-office switch to serve Westinghouse Electric Corp.'s Defense and Electronics Center, a 16-building complex.

"It's not often that a telephone company will pull out a 4-year-old [1 ESS] switch when its customer wants something else," commented Sandy Murphy, the project manager for the defense group's upgrade of telecommunications facilities. "But when you are the largest customer of Centrex service in the area, it really is in the best interests of the company," she added.

Westinghouse's decision to go with Centrex instead of installing a private branch exchange was driven by a comparison of costs, Murphy said. "We would have had an administrative nightmare if we had put in our own PBX, especially with the costs of rewiring the entire facility. With the DMS 100 we won't have any up-front costs. The only rewiring will affect existing key sets, which should cause minimal disruption to daily operations."

The six-year contract with Chesapeake & Potomac of Maryland is worth several million dollars, according to Westinghouse officials who refused to disclose the total value of the contract. The new switch is scheduled to be operational by December.

Continued on page 34

INSIDE

Gould released a gateway that connects its Modway local-area network to networks that support General Motor's MAP/34

NEW THIS WEEK

- Versitron offers Fiber-Optic Multiplexer
- Communications Research Group adds Vaxblast to its line of Blast software
- For more on these and other new products, see pp. 107-134.

INSTANT ANALYSIS

"There will be two network standards: Ethernet and IBM Token-Ring. Ethernet is too well established now not to survive."

Howard Frank
network consultant

Harris unveils digital PBX

Switch based on 20-20 tandem already out

By Paul Korzeniowski

NOVATO, Calif. — Harris Corp.'s Digital Telephone Systems Division has released a digital private branch exchange based on the 20-20 tandem switch the company introduced earlier this year.

The digital switch supports integrated voice and data. Although Harris billed the product as a fourth-generation PBX, industry analysts did not. "True fourth-generation PBXs offer distributed networking capabilities, a feature that the Harris product lacks," noted Doane Perry, an analyst at International Data Corp., a Framingham, Mass.-based market research firm.

The modular PBX has 1,920 lines, nonblocking for 960 and employs pulse-code modulation. Features include the ability to group time slots in multiples of two for up to 32 channels transmitting data at speeds of up to 2.048M bit/sec. Port-to-port digital transmission can operate at speeds of up to 64K bit/sec. and each time slot is equipped with a separate signaling channel.

The product supports data transmission that complies with T1/D3 standards over digital multiplexed interface or twisted-pair lines.

The 20-20 PBX is said to be designed to support Integrated Services Digital Network standards and complement AT&T's Software Defined Network. It supports several protocols including IBM's Binary Synchronous and Synchronous Data Link Control, X.25 and asynchronous.

A modem pooling feature enables a terminal or teleset to call up a specific modem or group of modems. The

Continued on page 35

Amdahl introduces series of communications tools

By Paul Korzeniowski

Amdahl Corp. has decided to increase its presence in the communications market by announcing a series of product families. The Marina Del Rey, Calif., company has added X.25 packet assembler/disassembler (PAD) equipment, statistical multiplexers and a family of modems to its product line.

The 4445 asynchronous X.25 PAD is compatible with a number of packet-switching networks including GTE Telenet Communications Corp.'s Telenet and McDonnell Douglas Network Systems, Inc. Tymnet. The PAD supports up to 16 devices transmitting data at a maximum speed of 9.6K bit/sec. The outbound line works at a maximum speed of 19.2K bit/sec.

A user can send up to 160 packets of information with a maximum of 4,400 characters. The device supports CCITT X.3, X.28 and X.29 standards. Prices for the product range from $3,300 to $5,500.

The company's 2500 series statistical multiplexers support up to 16 users sending data at rates up to 9.6K bit/sec. The line works at speeds from 1,200 to 64K bit/sec. There are two models in the product line: nonswitching and switching. The switching multiplexer's contention feature permits a number of terminal users to share a smaller number of ports.

The devices feature either local or remote network control. Individual channel monitoring and diagnostic capabilities include status checks and loop-back tests.

Multiplexer prices range from $3,100 to $9,600.

Continued on page 35

Gould offers gateway for Modway net

Gould, Inc. in Andover, Mass., has announced a gateway from its Modway local-area network to networks that support General Motor Corp.'s Manufacturing Automation Protocol (MAP), a seven-layer network model.

The Gould product, which is supplied by the company's Industrial Automation division, consists of a CPU board equipped with a Motorola, Inc. 68010 microprocessor and 500K bits of random-access memory, a MAP controller board based on a Motorola VMEbus and a 10M bit/sec. modem board.

The gateway supports transmission speeds up to 10M bit/sec. and is compatible with the latest MAP specification, Version 2.1. MAP standards are in the planning stage and certain layers have not yet been fully approved.

Gould stated that the gateway fully complies with all MAP layers except for the presentation and session layers, which are still unspecified.

Prices for the gateway range from $20,000 to $25,000.

From page 33

Phone company ditches switch

The Centrex service will provide both simultaneous voice and data communications, supporting data transmissions at speeds up to 56K bit/sec.

Westinghouse will control moves and changes, least-cost routing, station message-detail recording, and custom calling.

Beside providing for local calling within the complex facility, the DMS 100 will serve as an electronic tandem switch for Westinghouse's nationwide private network. The decision to use the local telephone company's Centrex service instead of installing a dedicated company facility runs counter to Westinghouse's stated policy of establishing less dependence on local-telephone company and long-distance carrier facilities.

"In this case it was more cost-effective for us, and there were security considerations," commented Glenn Brown, director of public affairs.

Murphy says the Defense and Electronics Center is currently in the process of evaluating what type of dedicated data communications technology it wants to use for its computer-to-computer links.

From page 33

Token-Ring here too late?

IBM's technical journals and statements of direction regarding networking make it clear that the Token-Ring will become the company's primary office communications transport.

Over time IBM will flesh out the Token-Ring by building interface boards for various pieces of its hardware — probably other low-end machines and processors in the System/34, 36 and 38 family initially — and smooth out the rough edges between IBM systems through software.

Interestingly, IBM is using the open architecture recipe for success for the Token-Ring first discovered with the Personal Computer, not a proprietary method reminiscent of its Systems Network Architecture (SNA), now a de facto industry standard.

The Token-Ring and IBM Cabling System are tactical weapons, and SNA is still IBM's grand strategy. Networks like the Token-Ring provide basic transport duties far less critical than SNA, duties that are correspondingly easier to replicate with other technologies.

However, nearly every major network company has said it will offer Token-Ring-compatible networks, products and gateways.

A few of IBM's competitors in the computer mart haven't been so anxious to follow suit. It can't be too long, however, before companies like Digital Equipment Corp. and Wang Laboratories, Inc. give in, just as they did with network architectures.

Regardless of initial capabilities and industry reaction, the IBM Token-Ring network will likely achieve wide industry support as it matures and is enhanced by IBM and others looking to hitch their carts to Big Blue.

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COMMUNICATIONS

From page 33

Amdahl modems introduced

The 1000 series modems, a six-product line, can transmit data at rates from 1,200 to 14.4K bit/sec. The low-end device is a 1,200 or 2,400 bit/sec. dial-up modem that costs $900.

The high-end 14.4K bit/sec. modem was designed for multiport applications, features trellis-coded error detection and costs $6,000.

From page 33

Harris unveils digital PBX

20-20 PBX includes an on-line traffic analysis capability. The package includes an automatic least-cost routing feature. A software editor can be accessed from any ASCII terminal to change networking schemes or data bases.

Prices range from $400/line to $800/line and $350 for each handset.

From page 33

Net standards sought

and beneficial but limited to only personal computers. Once the division's engineers got a taste of networking, they wanted to interconnect larger systems.

So, Sutcliffe examined more flexible broadband and baseband network alternatives before choosing an Ethernet offering from Xerox Corp.

At first, the network connected a few Xerox Stars, some laser printers and a DEC VAX superminicomputer.

Gradually, the department began to add some products such as 3Com Corp. file servers and capabilities to the network so that 40 users were on the network in December 1983. The purchase of a terminal server resulted in disaster. "The product's software worked fine in the laboratory, but once we hooked a number of devices to it, it fell apart," Sutcliffe said.

Compounding the problems, some of the network's connections ran off of the end of a Westinghouse power line. Whenever there was a power outage — a common occurrence — the device would stop functioning, and the network would grind to a halt.

An alternative was sought. "We looked at literature from other terminal server companies but only tested the [Bridge Communications, Inc.] offering," Sutcliffe noted. Bridge's CS/100 can serve as a terminal server, cluster controller or front-end processor. It can manage port selection, contention and speeds on an Ethernet network.

> *'The product's software worked fine in the laboratory, but once we hooked a number of devices to it, it fell apart.'*
>
> **— Paul Sutcliffe**
> **Westinghouse Electric Corp.**

Bridge's CS/1HSM, a front-end processor, connects 64 terminal sessions from Ethernet nodes to a VAX over a single serial line. Together, the Bridge products enabled users to access any system on the network and transfer data at speeds equal to that system's terminal.

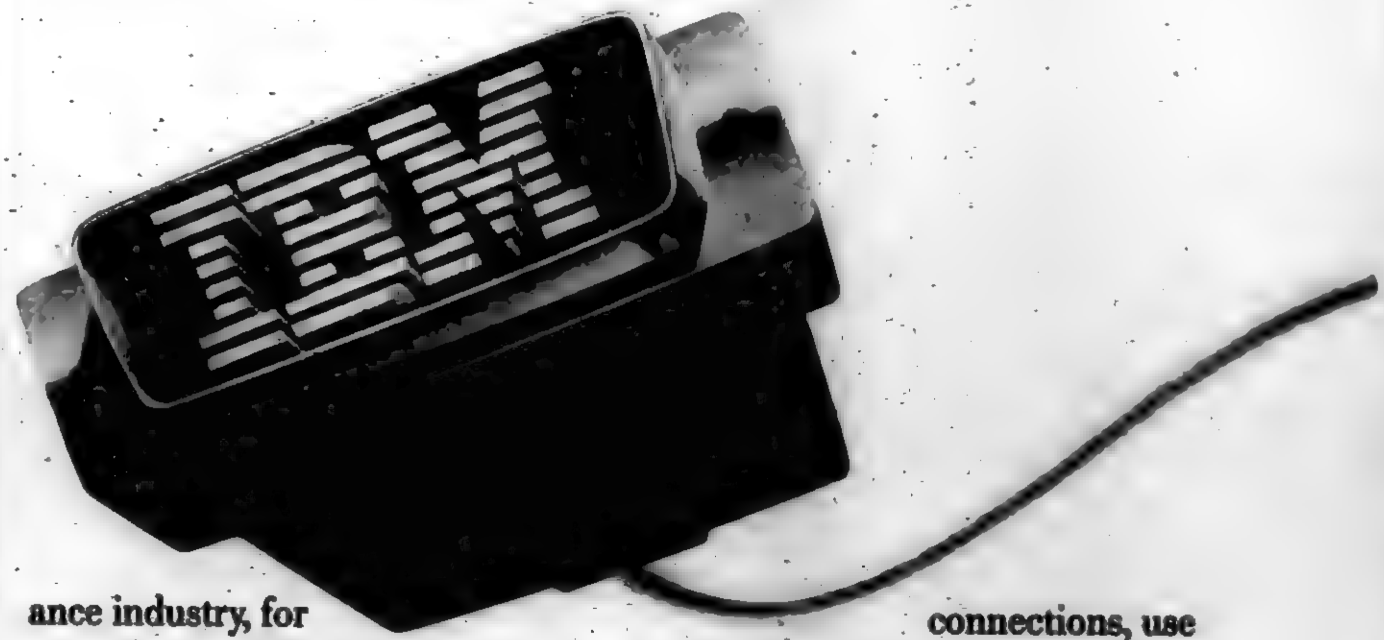
Since the initial Bridge installation, the network has been expanded to include three CS/100 units. The original personal computer network was incorporated into the Ethernet network in July 1985. "Our growth has been a real patchwork process," Sutcliffe noted.

Further expansion

Further expansion is planned, according to Sutcliffe. By the end of the year, 80 users will be attached to the network, a protocol converter will link an IBM 4361 mainframe to the network, and a gateway will link computer users through a packet-switching network.

Although he has not completed a full cost-benefit analysis, the manager believes that the $50,000 investment has paid for itself.

Sutcliffe would like to expand the network's capabilities from baseband to broadband. "The division could test some [GM Manufacturing Automation Protocol] software when it becomes available on the broadband network," he noted. "Gradually, the two networks could be tied together or at least bridged."



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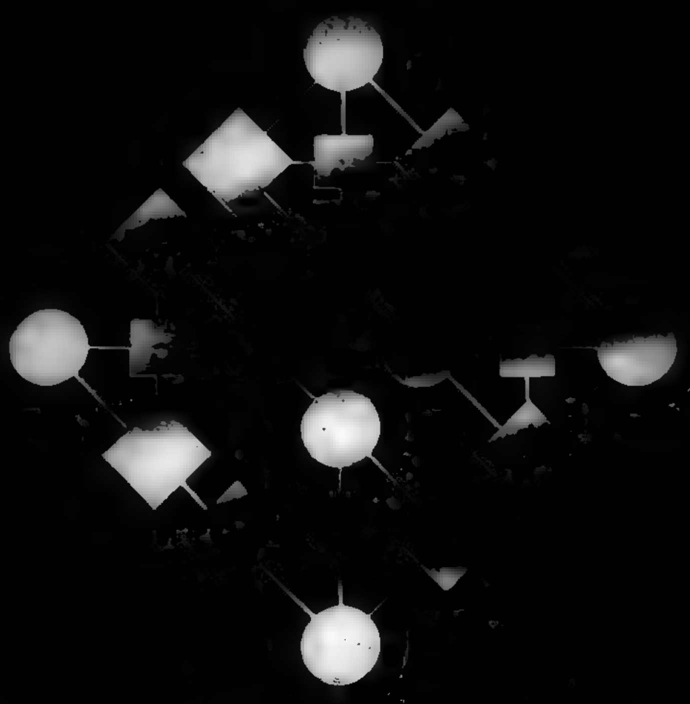

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HARD TALK
James Connolly
CW Senior Editor

Still another niche for IBM

While the computing world focused its attention on the long-awaited Token-Ring local-area network on Oct. 15, 44 other IBM product releases would have been easy to overlook. If you're not a kindergarten teacher, it's easy to miss program announcements such as "Bouncy Bee Learns Letters" and "Bouncy Bee Learns Words."

But one product that stood out in the avalanche of 45 announcements generated excitement in the office automation arena while filling a gap in the IBM product line.

The 3812 Pageprinter may seem like just another printer. It isn't the first 12-page-per-minute printer, or the first to use LED technology or the first to support multiple personal computers on local-area networks or as a shared resource. Its reviews by analysts featured words like "steady" and "solid."

There was more to say, however, because the product was IBM's, even if it reportedly is made for IBM by a New Jersey firm with manufacturing facilities in Japan. The announcement means that IBM has found one more niche in which it can either dominate or influence the market.

The $7,490 price tag is comparable to and, in some cases, several thousand dollars below the costs for competing printers from Xerox Corp., Ricoh Corp. and Kentek Information Systems, Inc., the company reported to be making the IBM product. In addition, the 3812 is designed to print 18,000 sheets per month and apparently is available

Continued on page 39

IBM printer entry packs wallop in marketplace

By James Connolly

RYE BROOK, N.Y. — IBM's recent announcement of a nonimpact printer for shared-resource or departmental printing was received as an explosive entry that will give IBM leverage in the low- to medium-volume market.

IBM introduced the 3812 Pageprinter while announcing the IBM Token-Ring network and emphasized that the electrophotographic printer can be used on networks to serve IBM Personal Computers or can be attached to IBM minicomputers and mainframes.

The Pageprinter fits into a low- to midrange niche for IBM, as a $7,490 product printing 12 page/min, well above the IBM Personal Computer-oriented Quietwriter but below the 20 page/min IBM 3820 laser printer.

Using LEDs and a print head containing gallium arsenide, the Pageprinter prints text and graphics when attached to Personal Computers or to mainframes. However, it only prints text when used with IBM's System/36 and System/38 minicomputers and superminicomputers.

An IBM spokeswoman said the text-only limitation for the System/36 and 38 was a "business decision based on the fact that text-only fits the applications of the System/36 and System/38 users." She said there were no technical limitations barring development of a System/36 and 38 graphics interface.

"We view it as an explosive announcement. We think IBM did an excellent job of packaging the product at a reasonable price. As a shared printer in a purely [IBM Personal Computer] environment, it would provide group-level printing at $1,049 per

Continued on page 39

Multiprocessing fills DP void

By James Connolly

CUPERTINO, Calif. — Multiprocessing, a concept that many in the computer industry relegate to expensive commercial fault-tolerant and scientific machines, may be best used in the everyday commercial data processing environment, filling the void between mainframe and personal computer.

That suggestion — that multiprocessors can run best in the middle ground as distributed processors or departmental processors — was offered by one of the most senior Tandem Computers, Inc. executives, David R. Mackie, after he resigned this month to assume a position with Arete Systems Corp.

Mackie joins Arete in marketing.

"There are two basic philosophies about personal computers and mainframes. One is that [personal computers] are going to come up to the mainframe with nothing in the middle. The second is that there will be a middle market there. It's that middle area that is of particular interest to me and to Arete. There has to be something there for [personal computers] to talk to, something to take the load off the mainframe," said Mackie in an interview shortly after he resigned as vice-president for U.S. marketing at Tandem. Mackie, who will become vice-president of marketing with San Jose, Calif.-based Arete, joined Tandem of Cupertino from Hewlett-Packard Co. two months after Tandem's found-

Continued on page 40

INSIDE

DEC releases new models in its Vaxstation 500 line that can connect via Ethernet to other VAX machines and PDP-11 systems/40

NEW THIS WEEK

- Lanpar expands its Vision II terminal line
- Adage introduces a family of stand-alone workstations
- Talaris announces a desktop laser printer
- For more on these and other new products, see pp. 107-134.

INSTANT ANALYSIS

"IBM is using almost every technology there is for putting marks on paper."

— C. A. Pesko Associates, Inc.
Steve Pytka on IBM's 3812 Pageprinter

Supermicros signal shift in market function, strategy

Datamedia architecture relieves CPU work load with three processors

By James Connolly

NASHUA, N.H. — Datamedia Corp. has introduced a supermicrocomputer featuring a three-processor architecture designed to relieve the central processor of responsibilities.

The Model 1640, Datamedia's second supermicro based on AT&T's Unix, uses three 32-bit, 10 MHz Motorola, Inc. 68000 microprocessors in a tightly coupled configuration. The three processors reportedly split communications processing, file processing and applications processing for networked general computing applications in medium-size and large companies, according to the vendor.

Datamedia, which also sells supermicros running Pick Systems' Pick operating system, had introduced its first Unix System V-based system, the single-processor Model 1620 in 1984.

A company official said the multiprocessor approach was designed to balance on-line, network and data base functions in departmental computing. He said the overhead associated with communications processing and network management is off-loaded to a dedicated processor, leaving the CPU free to run application code. For data base applications, a separate processor manages files while the other processors run the application code and communications processing in parallel operations.

A typical application would be management of an MIS/DP project that involves multiple branch locations, according to the vendor.

The vendor also said the communi-

Continued on page 39

Wicat strays from general-purpose mart with introductions

OREM, Utah — Wicat Systems, Inc. has announced three supermicrocomputers and a strategic shift out of the general-purpose supermicro marketplace.

The company announced replacements for its Systems 150, 155 and 160 Motorola, Inc. 68000-based supermicros. The systems, available Nov. 1, are the Systems 1250, 1255 and 1260. The company said the replacement systems support more users than their predecessors and feature 75% less expensive memory options and 30% less expensive disk-storage options. They are said to be more compact configurations with single processor boards replacing up to four boards.

The three systems fit below what will continue as Wicat's high-end system, the 64-user System 2220.

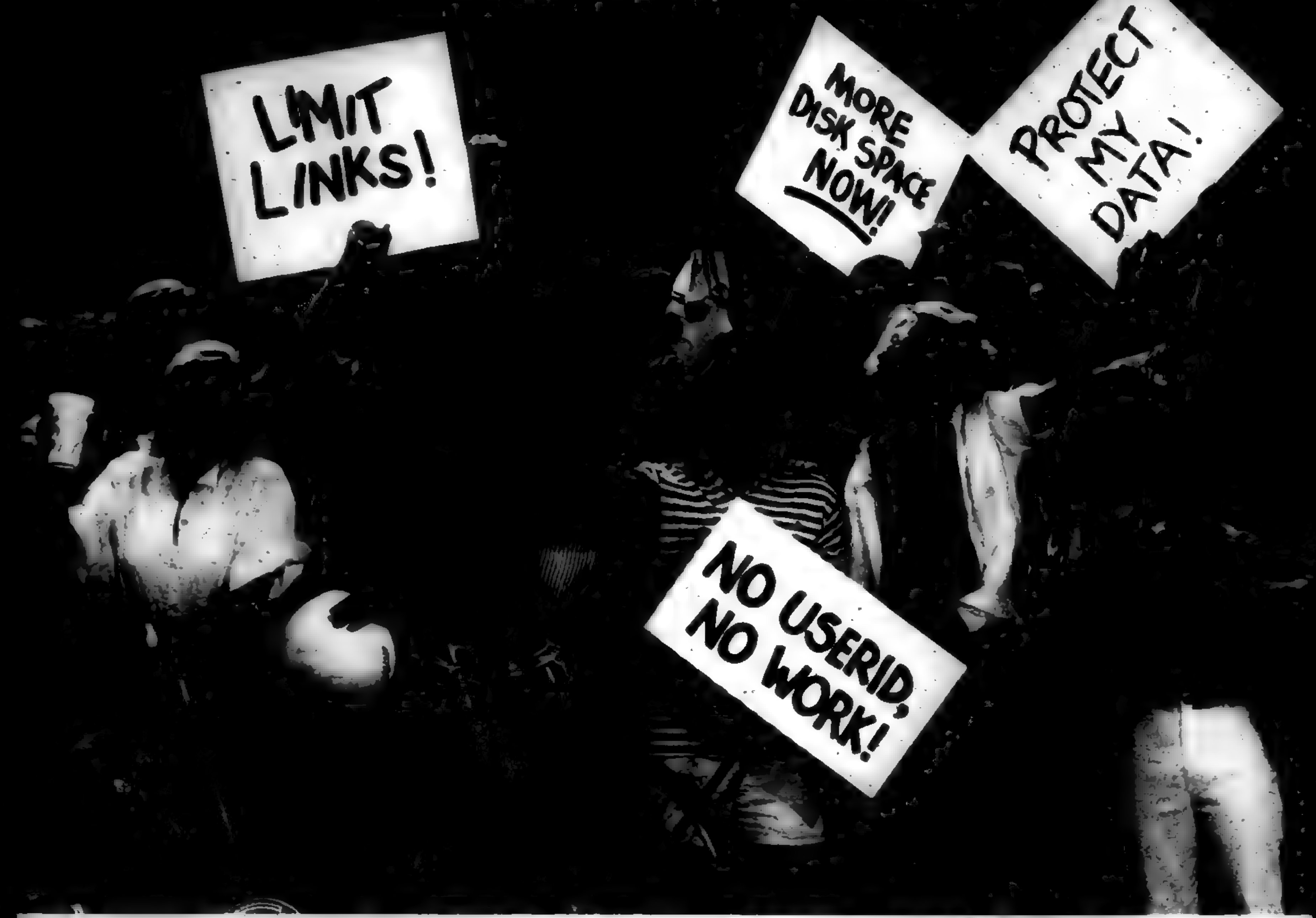
A spokesman said all Wicat supermicros will be targeted at niches in the market with value-added resellers and distributors selling systems primarily to existing Wicat customers, users of Pick Systems' Pick-based systems, Datapoint Corp. system users and AT&T Unix system developers.

The official noted that Wicat does not want to compete head-on with large, established multipurpose supermicro vendors such as Digital Equipment Corp.

Replacing the eight-user System 150, the System 1250 supports 16 users and is available in a desktop or tower cabinet. It is available with up to 5M bytes of random-access memory (RAM) and 28M to 39M bytes of

Continued on page 39

VMSECURE... Controls User Unrest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From page 37

IBM printer entry packs wallop

user for eight users," said Peter Steiner, vice-president of Dataquest, Inc., a San Jose, Calif., market research company.

Steiner said the announcement opens up the competition for the shared printing environment and could force competitors to lower their prices for LED or laser printers. He said one selling point for the printer is the absence of a "click charge," a limit on the number of copies a customer can make without an increase in maintenance costs.

Steve Pytko, vice-president of C. A. Pesko Associates, Inc., a Marshfield, Mass., research company specializing in printers, added, "IBM is setting a new price-performance standard for that class of printer. It's not a highly featured product, but it is solid, steady and very reliable as a shared-resource printer for word processing, distributed processing, spreadsheet, graphics, things like that."

IBM said the printer supports up to eight Personal Computers as a shared-resource printer using an optional $495 sharing card and directly attaches to either the IBM Token-Ring or PC Network. It attaches to IBM mainframes under IBM VM, including the 370/138 to the 370/168 and the 4300, 3030, 3080 and 3090 processor lines.

Up to 18,000 page/mo

It was designed to print up to 18,000 page/mo with a resolution of 240 by 240 picture elements. The printer uses two paper cartridges, one holding 550 sheets and another holding 250 sheets, and prints 12 page/min on 8½- by 11-in. cut sheet paper and 9.6 page/min on legal-size paper.

It also prints on sheets of gummed labels. It features 61 standard fonts for Personal Computers, 64 fonts for the System/36 and 38 and 67 standard fonts or 148 typographic and mathematical fonts in VM environments.

The 3812 Pageprinter will be available in November for Personal Computer and VM systems and in February for the System/36 and 38. It is offered with an optional $325 printer stand, a $995 System/36 and 38 attachment feature, a $1,900 Pageprinter VM program and a $49 Personal Computer Pageprinter driver program that is required for each Personal Computer attached to the Pageprinter through the sharing card, according to the vendor.

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From page 37

Still another niche for IBM

without a maintenance fee tied to a number of copies.

The market impact is expected to be felt in price cuts by competitors or added features on competing equipment so that non-IBM vendors can justify heftier price tags. The 3812 also places IBM's stamp of approval on LED technology, which requires fewer moving parts than laser printing, a method IBM uses elsewhere in its product line.

The 3812 Pageprinter also represents one more step in IBM's slow trek toward full office automation and integration. It is an endorsement of the concept of shared resources in an office environment, the idea that not every personal computer needs its own high-quality text and graphics printer.

But as usual, IBM left a few gaps. IBM chose to make the 3812 directly connectible to the controllers in VM mainframes, systems that seldom need 12 page/min printers. The company also allows connections to mid-range systems such as the System/36, System/38 and System/88 but only for text, not graphic, production. IBM's explanation is that the mid-range systems are used primarily for text. The irony is that none of those systems is directly connectible to the Token-Ring local-area network, which is a major selling point for the 3812.

If IBM follows its usual pattern, those gaps will be plugged at some point and for a price. Analysts noted that a graphics interface for at least the System/36 — one of the keystones in IBM's office strategy — will appear in the future and that at least the System/36 will interface with the Token-Ring at another point.

From page 37

Wicat strays from mart

hard-disk storage. A 1M-byte system with eight ports, a 28M-byte hard disk, diskette backup and Wicat's Multiuser Control System or Unisoft System Corp. Uniplus+ version of AT&T's Unix System V costs $14,800.

The System 1255 supports up to 24 users and replaces the 16-user System 155. It is available in a tower cabinet with a 12-slot Intel Corp. Multibus backplane, up to 5M bytes of RAM, 28M to 78M bytes of hard-disk storage and diskette or cartridge backup. It costs $17,700 with a 28M-byte disk, diskette backup, 1M byte of RAM, eight ports and the Multiuser Control System or Uniplus+.

The System 1260 replaces the 16-user System 160 and supports up to 32 users. It is available with a maximum of 7M bytes of RAM, 80M to 474M bytes of hard-disk storage and two tape drives for backup. A $25,700 system includes an 80M-byte hard disk, a cartridge tape backup, 1M byte of RAM, eight ports and the Multiuser Control System or Uniplus+.

— James Connolly

From page 37

Datamedia lowers CPU work load

cations processor supports links to multiple hosts using different protocols such as IBM's Systems Network Architecture/Synchronous Data Link Control and X.25.

Each Model 1640 is said to support up to 26 users with a maximum main memory of 12M bytes and a disk capacity of 572M bytes.

A basic system includes an applications processor with 2M bytes of memory, a communications processor with 500K bytes of memory, a storage processor with 500K bytes of memory, a 52M-byte Winchester disk drive, an 80M-byte streaming tape drive, Unix System V and Datamedia's multiuser windowing package.

The system costs $16,500.

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DEC workstations debut

Vaxstation 500 units use Microvax II base

Three Vaxstation 500 family workstations that use the Microvax II as a base have been announced by Digital Equipment Corp.

The Maynard, Mass., company released the VS550, VS555 and VS565 desk-side systems for stand-alone or networked applications that require two- and three-dimensional wire-frame and 3-D color-shaded solids images.

With an Ethernet interface, the Vaxstations can be connected to local-area networks of DEC VAX and PDP-11 computers, a spokesman said.

This arrangement is said to enable the Vaxstations to share resources with other workstations and larger systems, including DEC Vaxcluster systems.

Target applications

The workstations are geared toward electrical and mechanical computer-aided design and earth science applications.

Through network gateways, the Vaxstations can also access networks and computers of other vendors, a spokesman said.

The workstations feature a direct memory access (DMA) interface between the Microvax II computer and the Tektronix, Inc. 4125 graphics subsystem.

The DMA interface provides faster interactive image creation as compared with earlier Vaxstation 500 models that use the serial interface, a spokesman said.

The Tektronix subsystem includes 1,280- by 1,024-pixel resolution, two frame buffers (expandable to eight), 256K bytes of display-list memory (expandable to 768K bytes) and a palette of more than 16 million colors.

A VS5XX-UC option, available for $15,050, upgrades the subsystem to display 3-D wire-frame and 3-D color-shaded solids images. The option converts the subsystem to the equivalent of the Tektronix 4128 and 4129 subsystems.

A typical VS550 package costs $55,030 and reportedly includes the Microvax II with 3M bytes of memory, floating-point accelerator, Ethernet interface, DEC RD53 disk drive, DEC's TK50 ½-in. streaming-tape drive, a DEC MicroVMS operating system license, the DMA interface and driver and a Tektronix 4125 graphics subsystem. It is housed in a pedestal enclosure.

The VS555 is packaged in a Microvax II cabinet that has additional back-plane and mass-storage slots. A typical configuration costs $58,080 and has 3M bytes of main memory, DEC said.

The $73,130 VS565 configuration also comes in the larger cabinet and has the same main memory as the VS555.

It has a standard 8-bit plane, 3-D wire-frame and 3-D color-shading hardware that is additional on the other two models, according to the company.

From page 37

Multiprocessing fills data processing void

ing in 1974.

In earlier positions with Tandem, a maker of fault-tolerant transaction processors, Mackie had been responsible for technical support and product development, "determining what the market wanted out of a system," he said.

But Mackie noted that the computer market has changed in several ways in the decade since Tandem developed its fault-tolerant systems — systems that he said Arete does not seek to challenge. Arete reportedly has sold about 500 of its 16- to 88-user Series 1000 minicomputers.

Machines' functions refocused

"One thing that happened is that where terminals used to be used at certain levels of the organization where the work was fairly routine, there are now entirely different functions for terminals and [personal computers]. There is a much higher level of interaction with the host, so one needs a system that is very, very strong in the I/O area. It doesn't have to be strong in the compute area," Mackie said.

In that respect — the need to manage a heavy I/O load — Mackie's vision of the multiprocessor's role is similar to the role that Tandem's systems play, although Tandem addresses high-end markets such as financial network management, according to Mackie.

He said the system that fits into the middle ground cannot adopt the multiprocessor architecture used by supercomputers and the minisupercomputers now reaching the market. Those systems have a single CPU controlling multiple auxiliary processors or I/O processors for work on a single application.

Instead, the departmental or distributed processing system should allow the various users in a department to run their varied applications — the result of the different functions developed in recent years — over different microprocessors within the same system, Mackie said.

"There are a lot of other micro-based systems out there, but they don't spread their operating systems over the multiple processors. Tandem does it, but they are well out of our [Arete] price range," he added.

Future outlook

Mackie said he sees a future where multiple microprocessor systems routinely fill the micro-to-mainframe gap as departmental processors.

He said those systems could periodically draw down, from the mainframe's data base, information that is likely to be used by the microcomputers and terminals as well as periodically update the mainframe with edited files.

A native of the England, Mackie holds bachelor degrees in electrical engineering and business administration. His experience includes nine years of work on military computer systems and four years of developmental work on multiprocessing for HP computers.

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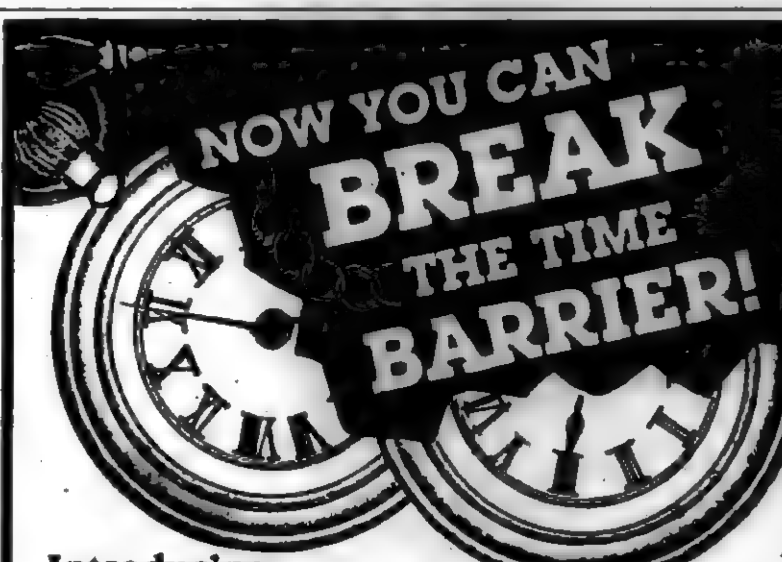

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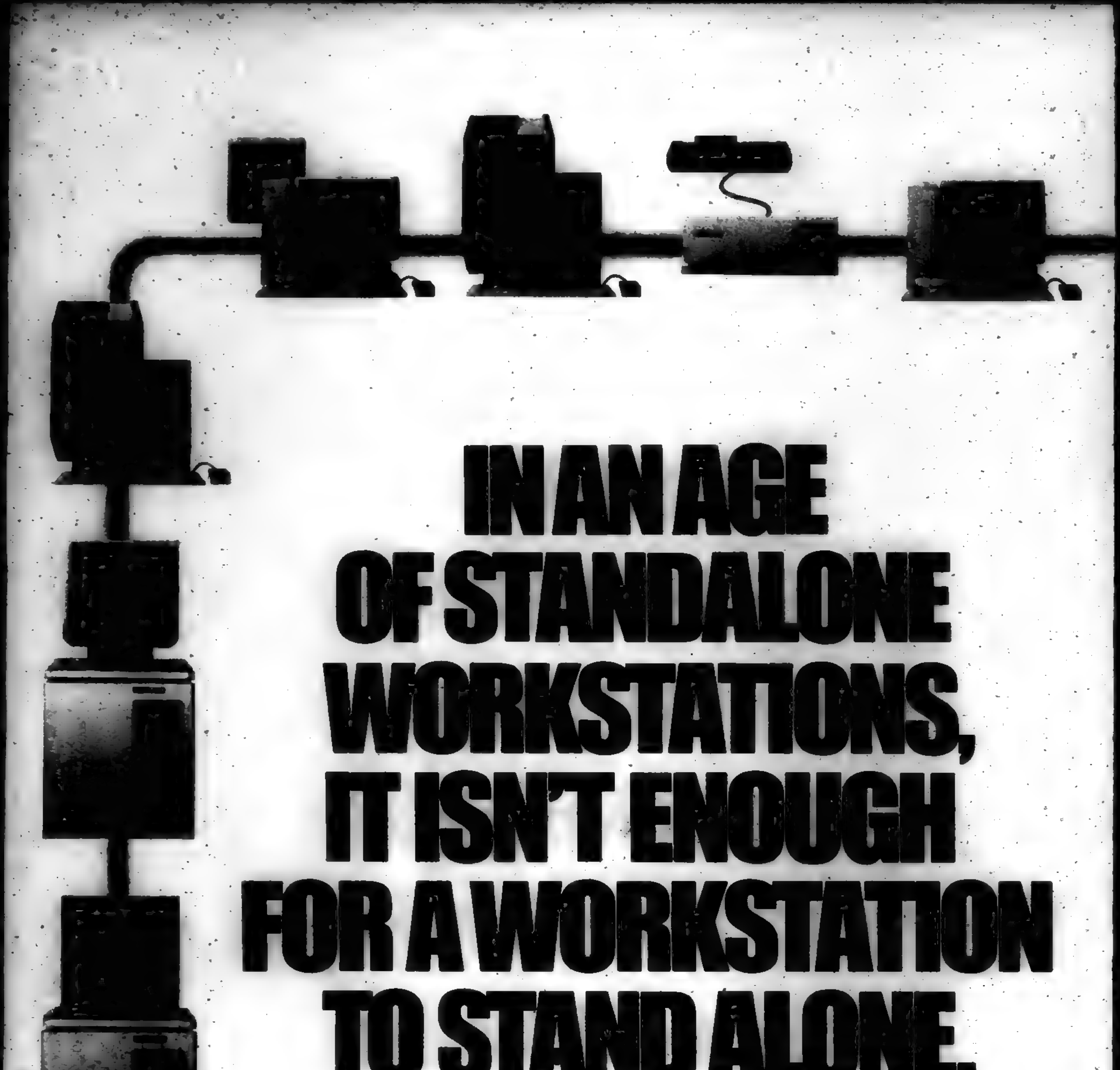
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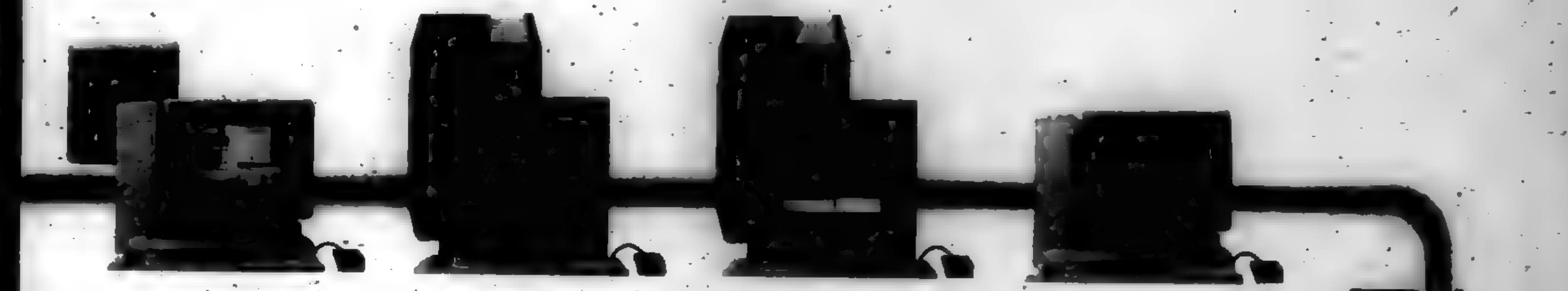

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OFF THE PRESS
George Harrar
CW Features Editor

PRACTICAL PROJECT MANAGEMENT
By Meilir Page-Jones

When does one general manager equal a dozen technical ones? When that manager is incompetent, says Meilir Page-Jones. The incompetence of one can nullify the productivity of 12.

This book explores managing software development — all the twists and turns that must be negotiated on the way to a successful system. It is the kind of journey that often goes unheralded by the computer industry press — unless the system falls apart quite publicly.

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Page-Jones subtitles his book, *Restoring Quality to DP Projects and Systems*. But was there ever a time when quality was the primary criterion on which systems were judged?

Practical Project Management is a promising first publication produced by Dorset House, which was founded by editors and managers formerly at Yourdon Press. An excerpt of this work appeared in the Sept. 30 issue of *Computerworld*.

Paperback, 230 pages, $28, ISBN 0-932633-00-5, by Dorset House Publishing, 353 W. 12th St., New York, N.Y. 10014.

THE IBM PC IN YOUR CORPORATION
By Jeff Walden

Sprinkled liberally with stories about Clorox Co., Corning Glass Works, Kimberley-Clark Corp. and other well-known users, this book has the feel of the real world on every page.

Jeff Walden writes like a reporter, freely quoting sources by name. The problems and solutions ring true because someone with a name and corporate affiliation is telling you they are.

This book is offered to "nontechnical managers," yet data processing and MIS people, particularly those involved with the information center and end-user training, will benefit from reading about the IBM Personal Computer's auspicious entry into the U.S. corporation.

Walden offers some solace to managers who don't have the resources to train end users. "Training is a much bigger issue now than it will be in five years," he writes. "User interfaces will become self-explanatory."

In another section Walden says, "The team that brings personal computers into the organization needs technical grounding, an understanding of the MIS department and an understanding of the needs of the end user."

One can argue with the assumption even if not the sentiment. This quote assumes that DP/MIS isn't the team bringing in the micros. Yet the trend seems to be that traditional DP is taking much more of the responsibility now for micros.

Paperback, 203 pages, $17.95, ISBN 0471-80849-0, by John Wiley & Sons, Inc., One Wiley Drive, Somerset, N.J. 08873.

HANDS-ON GUIDE TO PC AND MS-DOS
By Alan Hoenig

This guide, which includes all DOS versions up to 3.1, is clearly aimed at the end user with little experience in the intricacies of operating systems and little interest in gaining that experience the hard way.

The easy way is an orderly walk through conversational DOS with Hoenig as guide. The book teaches new users how to find out what is on any disk, enter new data while printing old, recover data from damaged disks — all practical problems requiring practical solutions.

Paperback, 221 pages, $15.95, ISBN 0-316-368121, by Little, Brown and Co., 34 Beacon St., Boston, Mass. 02106.

THE LOTUS GUIDE TO JAZZ IN BUSINESS
By Lotus Development Corp.

Lotus' own guidebook to the Jazz software program (developed for the Apple Computer, Inc. Macintosh with 512K bytes) is divided into five activities common to most businesses:

- Communications — connecting to Compuserve, Inc.'s and other electronic services for access to stock prices, airline schedules and so on.
- Tracking — such as addresses of vendors.
- Analyzing — break-even analysis, financial statements.
- Planning — revenue prediction, scheduling individual work tasks.
- Graphing — from analysis to presentation.

The book is clearly organized, easy to follow, well diagrammed — everything you would expect from the people who wrote the program.

Paperback, 352 pages, $19.95, ISBN 0-201-16673-9, by Addison-Wesley Publishing Co., Reading, Mass. 01867.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, *P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

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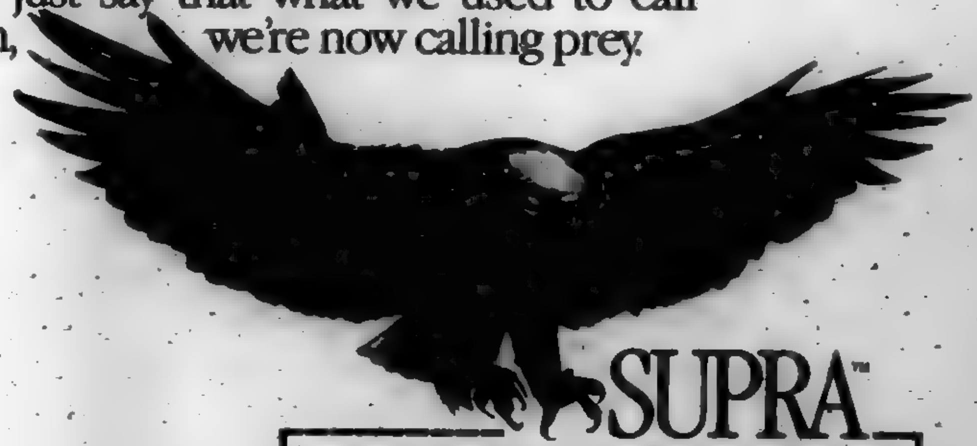

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CALENDAR

WEEK OF NOVEMBER 3

NOVEMBER 3-7, PHOENIX — **Sixth Annual Data Training Conference & Exposition.** Contact: Val Adell, Conference Registrar, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

NOVEMBER 4-5, NEW YORK — **Computer-Aided Design & Facilities Management Conference.** Contact: Nancy Furtak, Gralla Conferences, 1515 Broadway, New York, N.Y. 10036.

NOVEMBER 4-6, MONTE CARLO, MONACO — **Conference on Advanced Medical Computer Applications.** Contact: Dr. J-C Boiselle, Hippocrate 2001, Princess Grace Hospital, Monte Carlo, Principality of Monaco 98000.

NOVEMBER 5-7, PHOENIX — **Southwest Semiconductor & Electronics Exposition and Technical Conference.** Contact: Joyce Estill, Southwest Semiconductor & Electronics Exposition, c/o Cartlidge & Associates, Inc., M259, 1101 South Winchester Blvd., San Jose, Calif. 95128.

NOVEMBER 5-7, PHILADELPHIA — **ARTELL '85 — The International Symposium and Exposition on the Industrial Applications of Artificial Intelligence.** Contact: Access Conference Associates, P.O. Box 160, Gaithersburg, Md. 20877.

NOVEMBER 6-7, WALTHAM, MASS. — **Information Systems Audit Seminar.** Contact: EDP Auditors Association, Inc., New England Chapter, P.O. Box 516, Boston, Mass. 02102.

NOVEMBER 6-8, NEW YORK — **Voice Processing: The Applications Revolution.** Contact: Probe Research, Inc., P.O. Box 590, Morristown, N.J. 07960.

NOVEMBER 6-8, COLUMBUS, OHIO — **VM/SP Structure, Flow and Tuning.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214. Also being held on Dec. 9-11 in Orlando, Fla.

NOVEMBER 6-8, ATLANTA — **CICS Command-Level Programming.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214. Also being held Dec. 2-4 in Dallas.

WEEK OF NOVEMBER 10

NOVEMBER 11, MONTREAL — **VSAM Foundations.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

NOVEMBER 11-12, COLUMBUS, OHIO — **Introduction to VSE/SP 2.1 for Systems Programmers.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

NOVEMBER 11-13, MILWAUKEE — **CICS Internals for Systems Programmers.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

NOVEMBER 11-13, CINCINNATI — **Mainframe Networks.** Contact: Gloria Slyfield, Federation of NCR Users Groups, Mail Station SDC-2, Dayton, Ohio 45479.

NOVEMBER 12-13, MONTREAL — **VSAM OS/DOS Performance & Tuning.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

WEEK OF NOVEMBER 17

NOVEMBER 18-19, BOSTON — **Software Tools Conference.** Contact: Suffolk University, Boston, Mass. 02108.

NOVEMBER 18-19, SAN FRANCISCO — **Real Estate Investment Opportunities for Financial Institutions.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 18-19, TORONTO — **End-User Computing: Managing Information Centers.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

NOVEMBER 18-22, ARLING-

Continued on page 52

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While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

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Chairman of the Board

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The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

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The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

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IDMS/R: More than a relational DBMS

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From page 48

Calendar

TON, VA. — **Tutorial Week Washington '85.** Contact: Martez A. Camilleri, Institute of Electrical and Electronics Engineers, Inc. Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

NOVEMBER 18-22, HOUSTON — **Structured Systems Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop West, Houston, Texas 77092.

NOVEMBER 18-22, SAN FRANCISCO — **Database Management Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop West, Houston, Texas 77092.

NOVEMBER 20, BOSTON — **T-1 Carrier Strategies.** Contact: DMW Group, Inc., Seminar Division, 2020 Hogback Road, Ann Arbor, Mich. 48104.

NOVEMBER 20-21, ROSEMONT, ILL. — **Network Management/Technical Control.** Contact: Louise Myerow, CW/Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

NOVEMBER 20-24, LAS VEGAS — **Comdex/Fall '85.** Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

NOVEMBER 21-22, SAN FRANCISCO — **Import/Export Financing for the Small to Mid-Sized Bank.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 21-22, WASHINGTON, D.C. — **PC as a Programmer/Analyst Workstation.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

WEEK OF NOVEMBER 24

NOVEMBER 29 - DECEMBER 1, PACIFIC GROVE, CALIF. — **Forth Modification Laboratory Conference.** Contact: Forth Interest Group, P.O. Box 8231, San Jose, Calif. 95155.

WEEK OF DECEMBER 1

DECEMBER 2-3, CHICAGO — **Application Prototyping: A Key to Successful Systems Development.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

DECEMBER 2-6, WASHINGTON, D.C. — **Defense Computers and Graphics.** Contact: World Computer Graphics Association, Inc., Suite 399, 2033 M St. N.W., Washington, D.C. 20036.

DECEMBER 3-5, NEW YORK — **Telemarketing/East.** Contact: Telemarketing East/West, Inc., P.O. Box 829, Arnold, Md. 21012.

DECEMBER 4-5, PALO ALTO, CALIF. — **California Computer Show.** Contact: Norm DeNardi Enterprises, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

DECEMBER 4-5, PHOENIX — **Arizona Electronics Expo.** Contact: Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

DECEMBER 5, DALLAS — **CDLA's Regional Reception.** Contact: Dianne L. Sims, Computer Dealers and Lessors Association, Inc., 1212 Potomac St. N.W., Georgetown, Washington, D.C. 20007.

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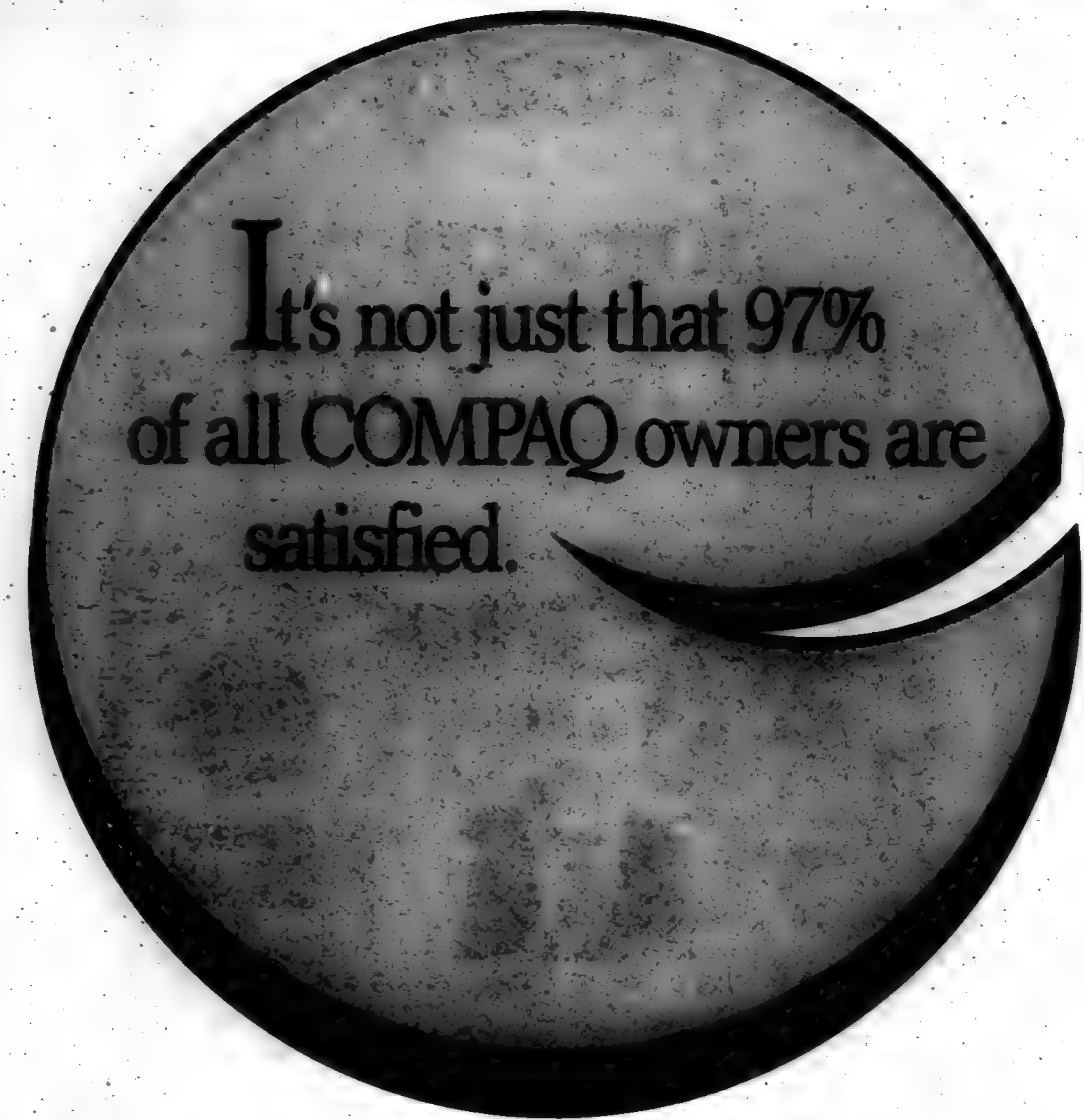

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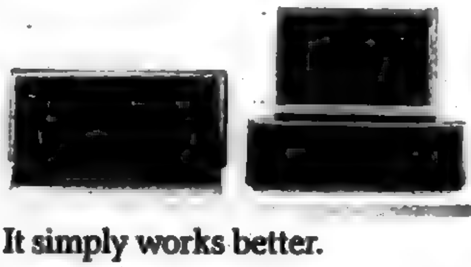

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The information center adapts to corporate America

By Beatrice Garcia

The use of information centers is on the rise. Users include business analysts, clerical staff and DP professionals — all trying to get the most out of their computers.

The information center concept was born in 1976, a brainchild of IBM Canada that was intended to alleviate the critical data processing backlog and to help market IBM's own products. Since then, the information center has grown up, left home and developed an identity of its own.

It didn't take long. Corporate America looked at the concept, quickly recognized a good thing, smoothed it, customized it and adopted it for its own.

The dramatic increase in the number of information centers has been fueled by the compelling benefits of end-user computing. Indeed, according to a recent Computer Intelligence Corp. survey, Fortune 500 companies now average 3.2 information centers each. The information center surfaced as an indispensable tool for helping computer users get the most out of their computer resources. Some DP departments, which at first eyed centers with suspicion, at last welcome them as a separate and valuable helping hand, not a threatening one.

No matter how they are organized, the primary goal of information centers is always the same: to provide end users with the software tools, training and support they need to utilize the power of computers themselves.

Much of the hardware focus has changed during the information center's development stages. Many center staffs now spend as much time training users on micro software as they do on mainframe systems.

And although all information centers share some things in common, each center is unique because each company is unique — each must forge its own set of operating procedures to serve its end users best.

The center's evolution

A recent survey by Crwth Computer Coursewares looked at pilot vs. mature information centers. Crwth defined pilot information centers as those in existence for less than one year and mature centers as those in existence for three years or more.

Of the more than 1,000 companies that responded to Crwth's inquiries, half were Fortune 500 companies, 25% were Fortune 1,000 companies and the other 25% were large organizations not commonly classified by the Fortune labels, such as aerospace firms and government agencies.

Attesting to the recent of growth in the numbers of information centers, only 14% of the centers Crwth surveyed in 1985 existed in 1980. By

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Beatrice Garcia is director of marketing for Crwth Computer Coursewares. Garcia edited the Crwth Information Center Survey, which may be obtained from her through Crwth in Los Angeles.

1981, the number of information centers had doubled. In 1984, 15% of the respondents set up new centers, and an equal number planned to start in 1985.

Centers growing up

The American Management Association 1985 study on information centers reports that 80% of its billion-dollar member companies have set up information centers. Again, the movement is recent: One-third of those started up in 1984, and as many more planned to form in 1985.

A Diebold Group, Inc. survey of 160 large corporations found that 80% had information centers in 1984, an increase of 67% from just a year earlier. Computer Intelligence Corp. estimates that by the end of this year, there will be a total of 6,000 information centers nationwide, confirming that the information center is now a fixture in corporate operations.

The Crwth survey found that the majority (56%) of the pilot information centers responding to its survey supported 24 or fewer end users. But by the third year, a large percentage of centers (70%) were supporting more than 200 end users.

Training is a major part of the information center's responsibilities to its clients. Typically, when the information center is brand new, the manager plus a staff of one try to train everyone in classrooms, small department groups or one-on-one. As the number of a center's clients increases and their needs multiply, the center's staff try other training methods to multiply their effectiveness.

Computer-based training

Computer-based training (CBT) is one inexpensive, effective method. Used alone or in combination with other methods, CBT can be a powerful training tool. It is portable and therefore can go where the students are. CBT doesn't require an instructor but can efficiently and unobtrusively augment classroom training when necessary. Furthermore, CBT is interactive, giving students immediate feedback and individual attention.

Most center managers use a variety of training methods, alone or in combination. Larry Page, manager of training and development for the data systems division of General Dynamics Corp. in St. Louis, and his staff train 4,000 people per year. Spending about 40 hours per person trained, using classes, CBT, multimedia and interactive videodisks, he says, "We use all the tricks in the bag."

Page stresses that instructors are still necessary for at least part of most training sessions. "We find that no matter what we use, there is an increasing need for the facilitator person in the loop to assure effective skills transfer. The part of the class facilitators can provide is the piece that takes the off-the-shelf package and makes it specific to a General Dynamics environment."

Trainers must recognize the difference between training end users and DP professionals and adjust to the students' level. Programmers are easy to train. They see themselves as programmers and get wrapped up in the language. They are also willing to make the long-term intellectual investment before they use the tool because their profession and the tool are almost synonymous.

An end user, on the other hand, only wants to learn enough to satisfy an immediate need. This user may not be willing to invest the time to learn the entire tool before starting to use it. Even expert end users see themselves not as computer experts but as financial analysts or accountants who use Lotus Development Corp.'s 1-2-3, for example, as only one of their tools. Therefore, they may be unwilling to invest the time to learn the entire package thoroughly.

Staffing

The question of how to staff must be carefully considered from the very beginning. "The staff is the key to success in the information center," says Pauline Sheng, manager of Strategic Office Services at Syntex (U.S.A.), Inc. in Palo Alto, Calif. "If you don't have good people, people that want to help others, people who are knowledgeable and can help others, no one will call you. Or they'll call you once but not twice."

Sheng's staff members come from various backgrounds. She employs programmers, end users and former word processors. "They have some things in common: They are understanding, they are caring and patient, and they don't sound like they know it all."

Since starting work at the information center, Sheng says, all of her people have become very technical. "I think that's very appropriate because as the information center matures and the end users become more sophisticated, the level of technical expertise should mature also."

General Dynamics' information center staff is also a "real mixture," Page says. "The interpersonal skills of the staff are more important than their technical skills — though not by much. They have to be technically qualified to maintain their credibility in the minds of the users."

Technical vs. interpersonal

Almost all the Crwth survey respondents considered communications skills an extremely important attribute for center staff members. Of the respondents, 87% believed that an extensive communications aptitude is necessary, and an additional 11% felt that at least some communications skills are necessary.

While virtually all the survey respondents felt that the information center staff should be familiar with DP tools, they differed as to the importance of technical prowess:

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> *It is the "previously unthinkable" projects that are now possible — those that could never even have been considered — that are the major benefits of the information center's successful operations.*

45% said that extensive DP skills are needed; and 54% said only some DP knowledge is needed. At least some managerial experience, sales skills and business background were also judged important by the majority of survey respondents.

A staff with a variety of backgrounds and skills can also more easily relate to the diverse clientele that information centers serve. The centers surveyed by Crwth reported that their clientele is made up of 33% business analysts, 27% clerical and administrative staff, 24% "others" (which included DP professionals) and 16% supervisory personnel.

This means that there is multiplicity of backgrounds, aptitudes and needs among end users, a factor that the information center's staff must take into account.

Not surprisingly, fewer pilot information centers have full-time managers than mature centers do. Centers that are three years old show an increase in full-time positions, with 98% reporting full-time managers and 80% reporting a full-time systems analyst.

Also, as the information center matures, the number on the staff increases dramatically. One to three staff members is common for pilot centers; four to 10 members is common for mature centers.

User benefits

The Crwth survey showed that information center benefits to end users and to the company as a whole continue to increase dramatically over time. Some of the benefits listed by survey respondents may surprise managers considering starting up an information center.

Of significant interest to DP professionals is the news that information centers can promote an appreciation by end users of DP's role in the company and its contribution to their jobs. This primary benefit shows up early. Sixty-five percent of the pilot centers plus 79% of the older centers had already seen the benefit of improved end-user/DP relations.

Obviously, one primary goal of the information center is to develop computer literacy among end users. While only half of the pilot centers felt they had experienced this benefit, 80% of the centers that had been operating for more than three years had achieved this objective.

These more literate end users can then apply this new technology to increase job productivity. Routine and time-consuming clerical tasks can be automated with computer-generated reports, graphs, charts and spreadsheets. While only half of the pilot center personnel felt they had already reached this aim, 86% of the mature centers reported increased job productivity.

When end users can process routine information efficiently to increase productivity, the next step is for them to utilise this information for decision making. For example, business analysts who can access corporate information and then summarize it, analyze it and do "what-if" analysis with it can react faster and better to changes in the marketplace and thus sharpen their corporation's competitive edge.

Of the Crwth respondents, just half of the pilot information centers reported enjoying this benefit, but a solid 86% of the older centers reported that they had attained that goal.

Ed Katerson, information center manager at Manufacturers Bank in Detroit, reports that his company has experienced all of these benefits. Job productivity, for example, has risen significantly among lower staff levels now that manual functions are being computerized. As a result, the work is done faster and more efficiently.

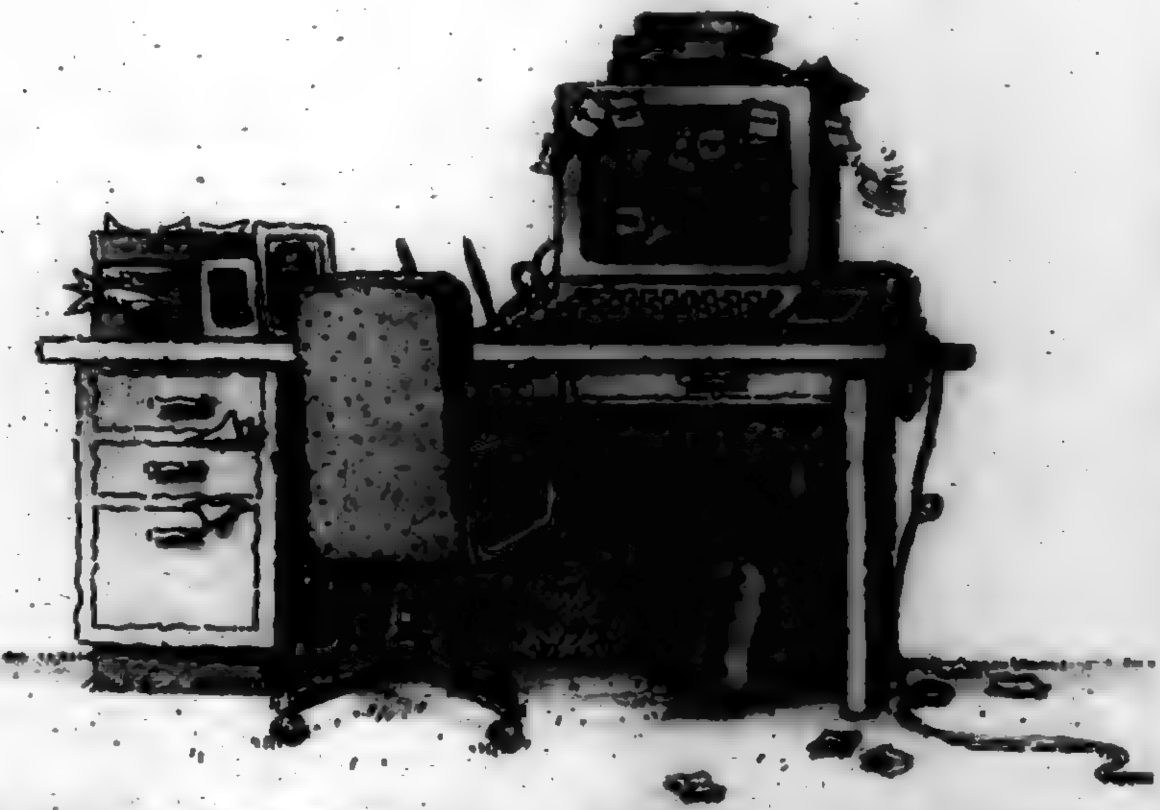
"On the higher management level, however," he says, "the benefit of the information center is even more significant. Managers are doing things that they couldn't before — or had never even thought of." Processing certificates of deposit (CD) is a perfect example, he says.

"We always seek ways to improve investment. To do this, the bank has to examine the profile of account holders. This was previously done with microfilm and a full profile took several days to complete.

"Now the CD people use the computer to get information that is essential to service that critical account base," he notes. "I would estimate that this department alone has saved over $100,000 in just two weeks.

"However, the real benefit is immeasurable," Katerson explains. "The ability to access and analyze data gives us the chance to react faster to the marketplace and make better decisions. This translates into a sharpening of the overall competitive edge of the bank."

The least reported of the benefits was the reduction of the DP backlog. Only a small percentage of both categories of respondents felt that their information centers had affected this problem positively. Only 16% of



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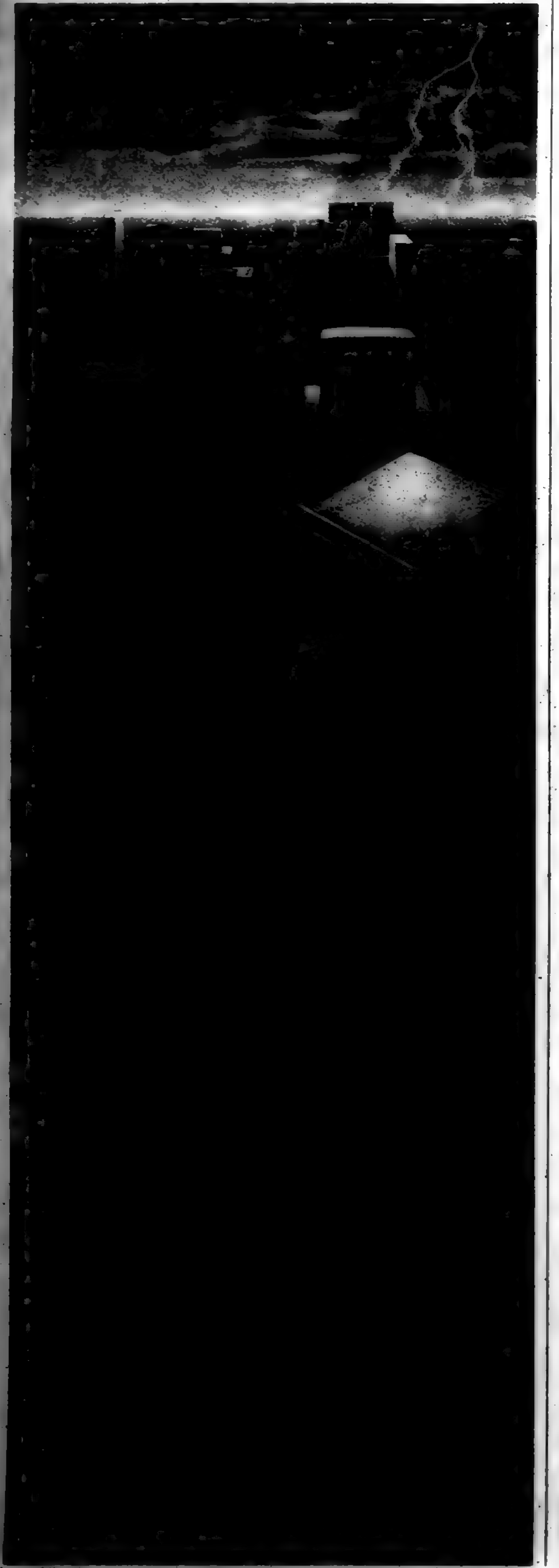


pilot centers and 33% of mature centers felt this was a benefit their users reaped.

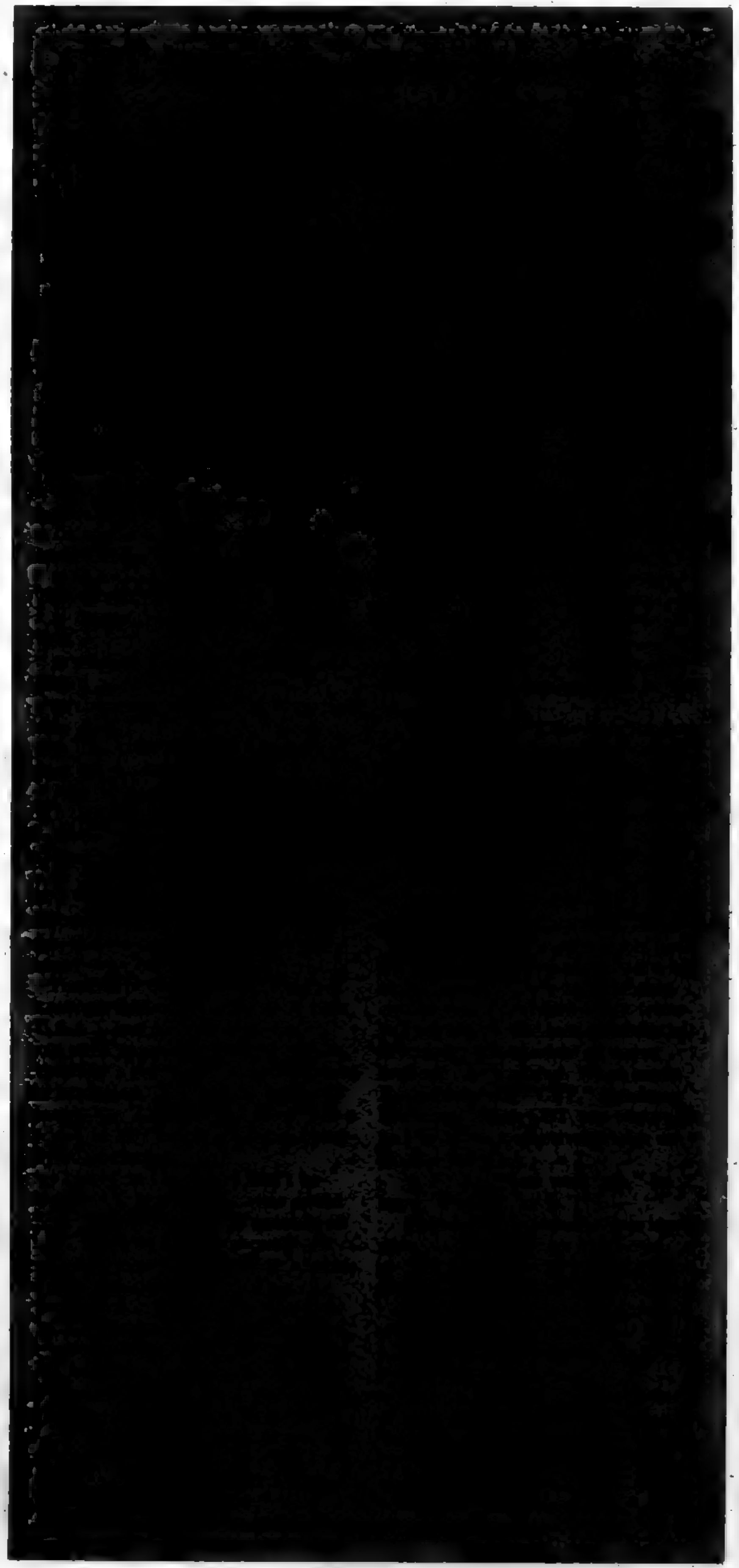
These figures do not include the so-called "invisible backlog" — those jobs that would have been valuable but that were never submitted to the DP department because of the delay, sometimes lasting years, that employees had grown to expect.

Marilyn Richardson, a consultant and partner in the Richardson and McMahon Information Center consulting firm in Denver, concludes that the major benefit of the information center is not the reduction of this invisible backlog, which is generally recognized. Rather, it is the "previously unthinkable" projects that are now possible — those that that are now possible — those that could never even have been considered — that are the major benefits of the information center's successful operations.

These responses indicate one overwhelming conclusion: As soon as the information center overcomes the initial hurdle of helping new users become comfortable with their machines and software, the benefits quickly multiply.

Obstacles to success

While the benefits of end-user computing are compelling, its realization is often jeopardized by several obstacles. Like the benefits, the obstacles change as the information center matures.



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Crwth's survey found the following obstacles:

- Lack of end-user awareness.
- Shortage of DP trainers.
- DP resistance.
- Management resistance.
- CPU shortage.
- Insufficient disk space.
- Lack of a chargeback system.

During the pilot stage information center management perceives the lack of end-user awareness to be the major implementation problem. The pilot information center targets a small, motivated user group. However, once it goes public with a larger target audience, its success is dependent upon a much wider base of end-user interest. Having invested more heavily in staff and equipment to expand, the center must be able to show that it serves a larger number of end users in order to justify the expansion. Information centers therefore turn to aggressive marketing programs to inform end users of training and support availability.

For mature information centers, the foremost obstacle is a lack of DP trainers. Only 50% of the centers responding employed a full-time trainer. During the pilot stage, the low teacher-to-student ratio tends to obscure this problem, but slightly over half (51%) of the more mature centers said it was a problem.

Paul McGee, information center manager at Union Pacific Systems in St. Louis, notes that part of the center staff's duty is simply to be available. "All these things we want to do are very difficult to do because we're so caught up in the demanding day-to-day business of answering the telephone and helping people who walk in."

Three-year itch

Resistance from top management was even more of a problem for mature information centers than pilot ones, a significant obstacle that needs further analysis. If the people who control the budgets and resource allocations cannot be convinced that the center is a worthwhile project, it cannot succeed. An alarming section (almost 40%) of the mature centers report that management resistance remained a problem.

Consultant Richardson says that she is not surprised. "When an information center is first set up, management is willing to see how things go," she explains. "But once a center is around three years old, management may begin to feel that it is not satisfying corporate goals." Often the center manager didn't take the time to find out top management's perceptions or expectations.

> *Once a center is around three years old, management may begin to feel that it is not satisfying corporate goals.*

"In order to get top management support," she continues, "the center staff has to think beyond just the number of end users trained. It has to illustrate to top management how it has sharpened the competitive edge and helped people make faster, better decisions."

Most information center managers report an ongoing problem of justifying not only budget increases but also the center's continued operation. Sheng reports: "Just because we got started with a lot of management support doesn't mean that we're not constantly having to justify our existence. It's a process that goes on every year, and every year it gets tougher."

Unlike many other company operations, the center's gains are not easily reduced to hard numbers. "We're having a real tough time quantifying the benefits," McGee admits. "That's something we're going to have to look at a lot more closely if we ever want to experience the kind of growth that we feel is justified."

Numbers resulting from a chargeback system sometimes help justify the information center's services. Some center managers see such a system as absolutely crucial to establishing credibility in the company and independence as a unit. By forcing end users to account for the costs of computer time, a chargeback system gives end users responsibility for the cost-effectiveness of end-user computing.

General Dynamics' center uses chargeback to assess a $15 per participant hour fee for training. "We're proud of accounting for training as a product line," Information Center Manager Page says. "We recover all our costs for operating the training function."

In that center, training resources flow according to what participants are, in effect, spending. "The chargeback system tells us something else," Page notes. "If there isn't a business base out there for it, we shouldn't be doing it."

Half of Crwth's correspondents are planning to implement a chargeback system soon. The most popular chargeback systems are based on CPU time (32%) and disk space (24%). Other chargeback systems are calculated according to connect time (16%), hourly rates (12%) and a flat rate (8%).

The key for information center managers is to keep the users' changing needs constantly in mind. Every center must take a marketing approach, addressing the end-users' needs as they come in, or lose its reason to continue.

Whether the company is large or small or the information center is "pilot" or "mature," the main reason IBM gave birth to the information center concept is still valid: End users need help to utilize the power of computers fully. The needs are so great that few centers ever stop growing. The benefits are so significant that they collectively add up to sharpening the competitive edge of the company.

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Hobbling Productivity

By Lois Zells

Why train employees if you don't give them the means to use their training and become more productive? Training dollars could be better spent if managers shed the handicaps of conflicting goals and middle management block.

Efforts to improve organizational output often fail unexpectedly. Managers are thrown for a loop because they concentrated on such items as new procedures, methods and equipment and expected to see real results — results that can only be realized if strategists focus instead on the people who have control over these items.

Meaningful increases in productivity depend on the organization's greatest asset — the employees and managers who work on the equipment. Effective training programs are linked with better performance and enhanced productivity. Specialists in operations management agree that vocational grooming of the staff is clearly one of the highest leverage functions in which an organization can invest.

Yet a good understanding and appreciation of employee training is still hard to find among DP professionals. It is difficult to grasp why, when there is such an overwhelming national concern about increasing output, companies fail to use the training process to achieve their objectives.

For example, surveys of managers often reveal that training in general is not considered important in their organizations. At the same time, however, these managers state they are unhappy because their employees cannot determine how new technologies and management concepts should be used to increase productivity within the organization.

In perspective the dilemma is obvious: How can the employees be expected to improve their skills when they were unable to ascertain what was expected of them? How can they improve when they are not given the opportunity to learn the skills to satisfy corporate requirements and when they are not given the learning periods necessary to refine their expertise.

Still, many organizational managers will staunchly defend their training functions and take offense when their programs are classified in the educational Dark Ages. These managers will point out the number of classes whose training objectives they believe were clearly satisfied. They will produce the rating statistics that "prove" that the classes were successful.

Managers will declare that the seminars their employees attend are meant to improve the skills of the students. They are not just a cover for vacations, a break in the monotony of routine or a way to substantiate that overall training requirements are being met. These managers will insist that training programs increase both individual skills and company productivity.

Similarly, most attendees at training seminars regard the opportunity as a genuine employment perquisite, not just a break. They recognize that continued education is one road to career advancement. Seminar students are usually eager and optimistic, and this attitude is frequently complemented by the enthusiasm of the instructor.

The effect of company culture

But then something goes awry. Disillusionment sets in — either during the learning session or on the job. Employees convey feelings of extreme frustation and exasperation: "Why are we learning these concepts when it is not likely that we will really implement them in our organization?" "Since we can't make any decisions about implementing these procedures, why aren't our managers here to hear this?" "Why is there never enough time to do it right, but there is always time to do it over?"

Proud of their awareness of state-of-the-art technologies, the directorate of Guzzle 'Em Up Vacuum Cleaner Co. developed an aggressive plan to teach its technical staff. As part of the program, a five-day seminar was presented to 25 prospective project managers, costing Guzzle 'Em Up over $100,000 in presentation expenses and attendees' salaries.

The students loved the class and gave it the highest ratings possible. However, at the same

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Lois Zells, principal of Lois Zells & Associates in Scottsdale, Ariz., is an author, lecturer and consultant specializing in systems management productivity. She presents workshops on project management and strategic systems planning.

time they were unwilling to believe they would get the organizational support to implement the management concepts they had just learned.

Further investigation showed that other employees who had been taught the analysis and design techniques were not being given the time on their projects to apply properly the skills they had learned. Surprised at these findings, the consulting company who presented the seminars arranged to interview several levels of management. The interviews revealed surprising attitudes:

- One manager believed that no one actually expected anyone to use the skills being taught — that the company was only interested in exposing its employees to what was going on in the outside world.
- Another first-line manager was very frustrated because there was always an inordinate push for quick and dirty solutions, with no regard for quality or future maintenance costs — in spite of protestations to the contrary from upper management.
- A high-ranking director was interested in maintaining the status quo and not introducing any controversial issues that would rock the boat.
- Executive management believed everything was under control and indicated it didn't want to hear otherwise.

To what end are we spending such large sums to educate our employees — especially when follow-up evaluations of training programs frequently show limited use and application of the techniques that were learned during the sessions? Why aren't we seeing tremendous improvements in employee output?

Conflicts

The shocking truth is that the training process as we know it now is simply not working in many organizations. As a matter of fact, many companies are unaware that they are not realizing the benefits they should expect from their training programs.

In most cases, failure to implement new approaches is not the fault of the training programs at all. Surprisingly, lack of success often occurs because the corporate value system is simply in direct conflict with the group's ability to achieve its goals. Companies that recognize the impact of these opposing forces also realize that marked improvements will be less dependent on mechanical procedures than on innovative changes in the personality of the organization.

Corporate personality — so-called "organizational culture" — is the result of subtly or directly programming people's behavior in given sets of circumstances. Long-term increases in productivity will necessitate the infusion of strong, positive cultures into organizational objectives.

But why are many organizations unable to capitalize on this concept and create an environment that does nurture higher yields in personnel investments? The cause is primarily due to serious flaws in their existing culture, such as inflated and unreasonable expectations, conflicting organizational objectives and priorities, insufficient executive management sponsorship and sparse middle management particiption.

Given each of these environmental inhibitors, it's a wonder we see gains of any kind. Before any turnaround can be affected, these contributors to failure must be understood.

Great expectations

The most successful programs are not always the ones with the biggest budgets or the highest visibility but instead are those that truly live up to their predictions. Deviations from what the organization perceives the program will deliver can therefore be the single most important cause of failure. It follows, then, that the highest productivity gains are achieved in endeavors where there have been a minimum number of surprises along the way.

Aspirations for training programs are not different. Expectations may be unrealistic and unreasonable, and they will rarely be in total agreement. Yet, traditionally we muddle through the process, hoping that everyone has identical perspectives and that no conflicting opinions exist.

If we encounter sensitive issues, we close our eyes, trudge on and pray that time and short-term successes will make them go away. To the contrary, it is necessary to meet these controversial subjects head-on, assess the impact to both the company and the programs, crystallize the differing views, resolve the conflicts and disseminate this information to the participants — before the program even starts.

Typically, a company's widespread commitment to its programs is not thorough, clearly defined or even understood. In general, this results simply from a lack of understanding of the organization by its managers. As a result, there is inadequate priority setting, as business needs shift like eddies of a stream.

First, the resolution of conflicting managerial and technical goals and objectives is not usually addressed or completed. Imagine, for example, a project that must be finished within six months, must deliver a particular technical solution and must incorporate a selected state-of-the-art product or process that has not been perfected and for which the company has few or no resources with the technical expertise. This program has irreconcilable conflicts that doom it to failure before it even starts.

Next, resource conflicts often dictate that the most competent participants are not appointed but are instead assigned to some other project

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or activity. Because of this limited resource availability, those actually assigned to the new project are often the most expendable individuals and frequently are not even wholly qualified. Yet there are often no plans to train these individuals formally or allow sufficient time for them to go through the required learning period.

Skyhigh Explosives Co. has more than 6,000 employees in three regional areas. Its distribution system is maintained in the largest region, East Strawberry, Ariz., but there is also some decentralized data processing in the two other regions.

In an effort to reduce systems maintenance by accumulating data on downtime and its causes, Skyhigh purchased Miracle Worker, a mainframe software package for maintaining historical information about problem determination and resolution. After the package's implementation, users from each of the three regions were to be required to enter data into the system.

The company's Garibaldi, Ore., operations staff was chartered to implement the new product and, accordingly, received intensive training in the use and features of the software. Unfortunately, several of the staff were new to their positions and were therefore only moderately qualified to operate the new system. Because they did not possess the necessary technical prerequisites, they were often unable to keep up with the learning experience.

Furthermore, the importance of the project and its relationship to other projects and existing business was not communicated to the Garibaldi users and programming staff, and neither of the other two regions was even informed of the existence of the project.

Not surprisingly, the other Garibaldi personnel were all up to their ears in their own high-priority enterprises. Similarly, each of the other regions was also busy trying to implement high-priority projects and was having difficulty getting support for its efforts.

Over $700,000 was spent before Miracle Worker was shelved. Both the project team and the vendor were dubbed as failures. There were no figures gathered on the other project results.

The conclusion we are forced to recognize is that many organizations simply spread themselves too thin in their project implementation and subsequent training efforts. The pity is that this is not usually a conscious business decision on their parts. It is rather a default process that results from lack of proper planning and prioritizing of organizational objectives.

Executive change agent

While the need for changes in culture may be identified at all levels of the organization, recognition frequently bubbles from the bottom up. Nevertheless, real change can be successfully implemented only with strong top-down support.

Upper management — as important components of the organization's culture — can be key in the success or failure to implement any new concept or philosophy. Because upper management's attitude determines cultural acceptance of the new program, success is directly proportional to the level of managerial participation and influence.

> ”
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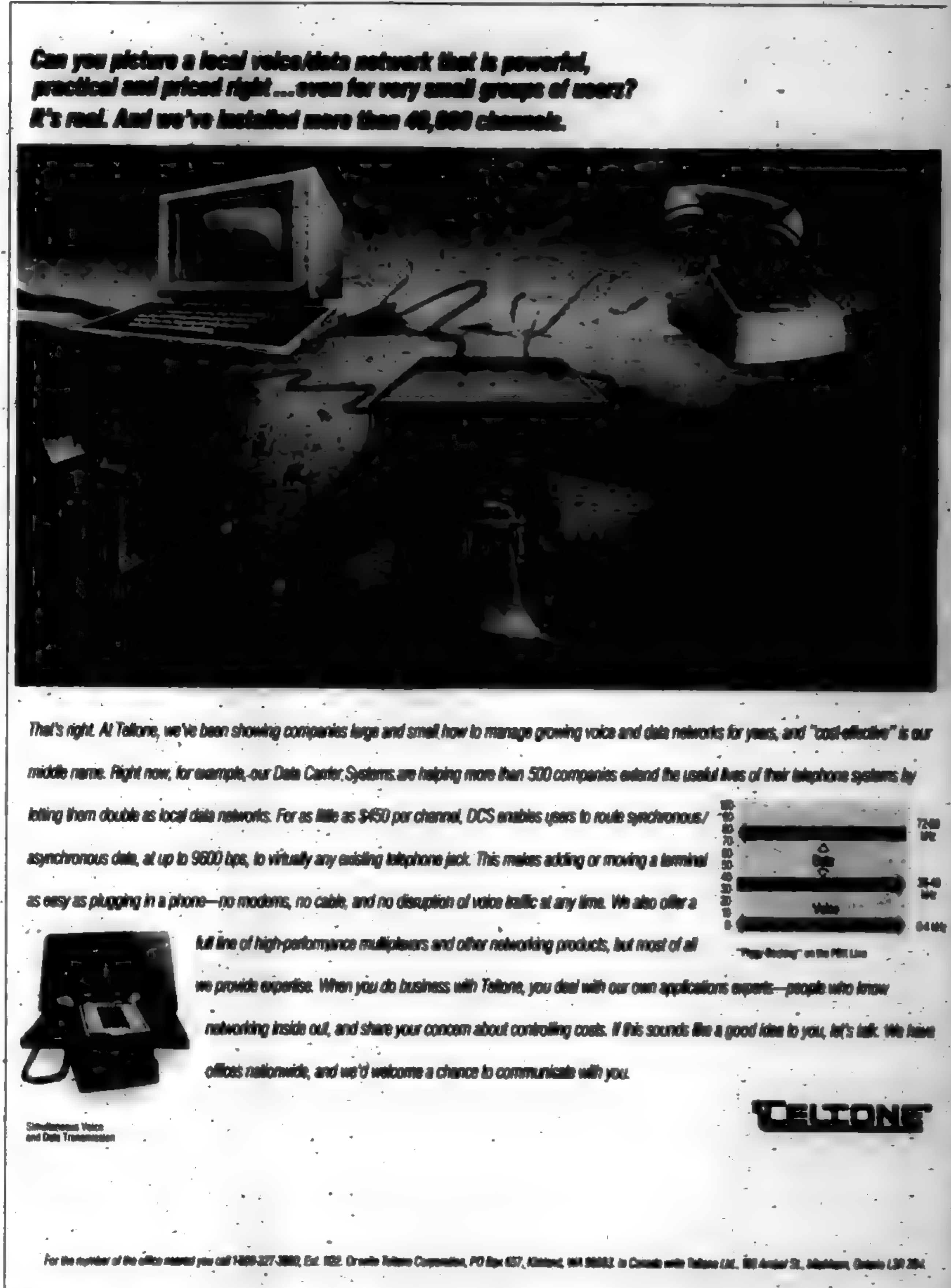
> *In most cases, failure to implement new approaches is not the fault of the training programs. . . . Lack of success often occurs because the corporate value system conflicts with the group's ability to achieve its goals.*

If senior managers lack a clear understanding of what it takes to implement the program, they may inadvertently fail to support success-oriented strategies. By the same token, strategies may be agreed upon, but when the teams attempt their implementation, organizational support may not be evident. Similarly, decisions that affect program success may be made without program representation, placing the entire effort in an untenable position and weakening subsequent implementation efforts within the company.

All management levels must first understand each program and how it fits into organizational priorities and then offer visible and sustained support for each effort. Otherwise, the program is likely to fail. If management is unable to provide this commitment, it may be necessary to rethink organizational objectives. As Barry Boehm says, "If managers do not genuinely want improved productivity, the organization will not get improved productivity."

Additionally, no matter how big the ballyhoo at the beginning, if the management does not demonstrate continued commitment to the effort, the entire endeavor will degrade into an exercise in futility. Therefore, before any educational strategies are developed, training programs planned or practitioners trained, top management must decide the following:

- What their organizational objectives are.
- What finite number of programs they want to implement.
- What kind of organizational culture they want to establish.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Then if the culture cannot be modified, the effect of existing company attitudes on the successful implementation of the new approaches must be assessed and made visible.

Ownership of the problems hampering the project's success needs to be accepted at all responsible levels. Conscious choices must be exercised: how to restructure the environment, restructure the programs or restructure organizational expectations.

Management block

Improvements to operating results and the corresponding increases in the bottom line are often limited only by the opportunities employees have for becoming involved. This involvement is in turn related to their superiors' willingness to let them participate actively. Thus, while the tone for a winning outcome is set by upper management, successful implementation is also directly influenced by the daily support practitioners get from their immediate supervisors.

A new corporate policy may dictate that an entire group learn modern concepts or skills, and the organization may establish elaborate training goals in these areas. Upper management may even subscribe to and actively endorse the implementation of this new approach and the practitioners trained.

However, the situation may arise in which circumstances prevent students from exercising the techniques they've learned, and implementation is again unsuccessful. Situations such as these frequently arise because of what is termed the "middle management block," a condition in which middle managers become obstacles to the process.

The cause of this block simply may be a natural reluctance to change or it can indicate an innate tendency to guard territorial rights. However, more often than not, the problem occurs because middle managers have not been given the opportunity to learn what is being taught to their employees.

Furthermore, middle managers may have been given little or no chance to understand the long-range goals of the organization. Consequently, these managers may be unable to evaluate whether the ideas being taught to their employees will meet current objectives or support long-range goals. They also may be unaware of how new technologies can best be exploited to serve organizational needs.

The middle managers may have little understanding of the foundations of the new approaches and the requirements for implementation. When they have no idea of what is being taught, only halfhearted support may be given to the new methods.

As a result, actual execution of the ideas and practices agreed to by upper management often is distorted or disappears entirely when passing through this barrier.

The bottom-line effect of the middle management block is that often there are no plans for implementing the concepts being taught. When students get back to work, they are not given the chance to apply what they've learned. This turns out to be a shameful waste of company resources.

Since productivity gains are maximized when students return to a working environment that encourages proper application of the concepts just learned, it is essential that middle managers prepare themselves in the subject matter being taught to their employees.

Last, often totally unaware that they are doing so, both upper and middle management may be sending out paradoxical messages that only serve to confuse and frustrate their employees. As an illustration, a manager's written directive to attend a program followed by the same manager's noticeable absence from the program may degrade the introduction into a meaningless exercise, leaving participants frustrated.

Recommendations

Practically speaking, training projects that support the fulfillment of organizational objectives can be implemented with classes that already exist in the marketplace. However, it is

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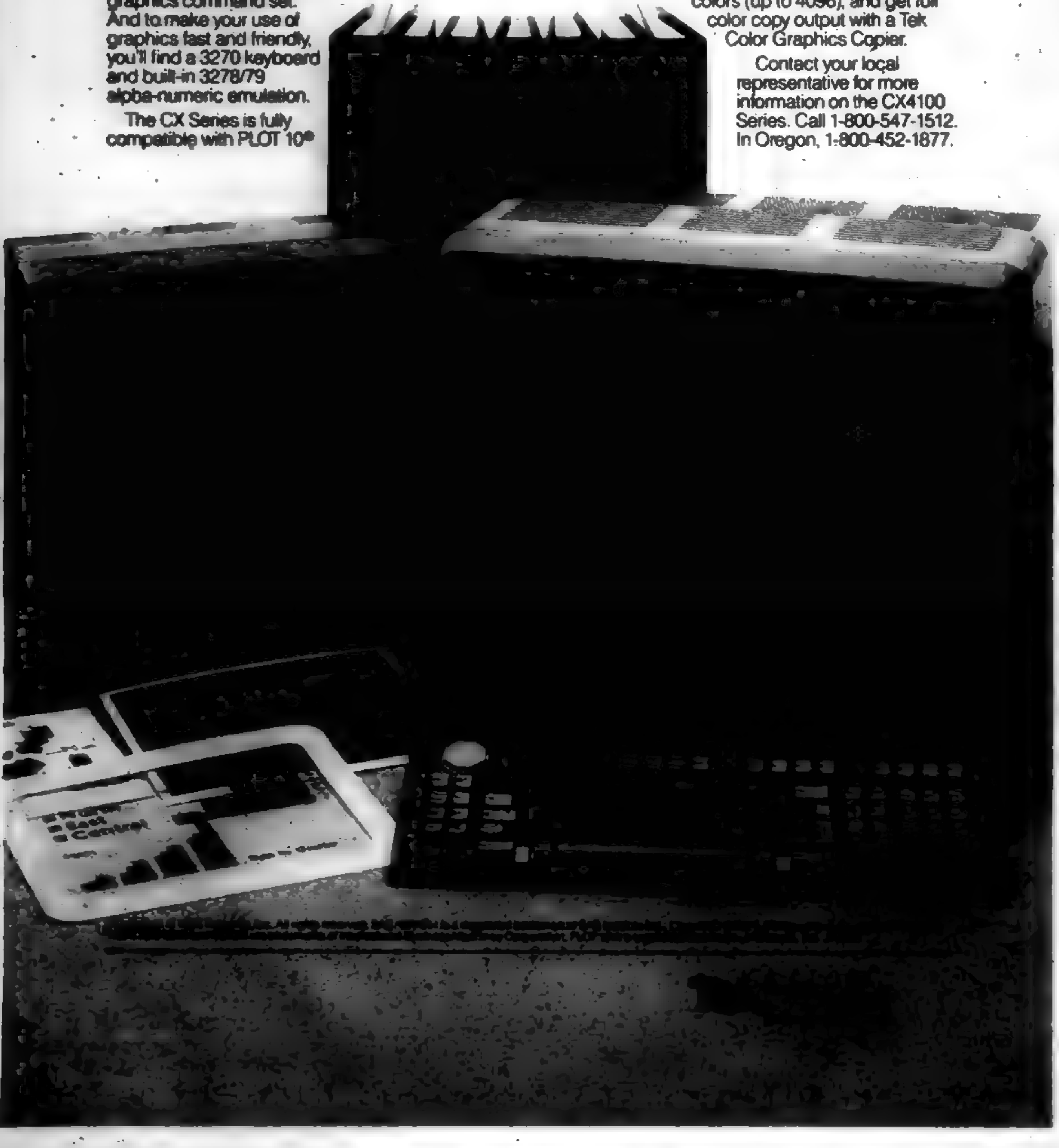

advisable before embarking on either the selection of these products or any customization work, to first assess the company's program requirements and define its cultural environment.

Assessment

This is best determined through a needs assessment and evaluation, conducted by gathering input from all levels of the organization. After scrupulously defining the required features of the proposed curriculum, a study should be made of marketplace training offerings.

The next step is a careful screening process during which one to three programs are evaluated against the curriculum requirements. One program is then selected.

A representative group of qualified individuals should be chosen to view the proposed curriculum. The purpose of these presentations will be to do the following:

- Consolidate the participants' concepts regarding the basic tenets of the subject matters.
- Familiarize the participants with the current course materials.
- Ensure that the subject matter supports the corporate philosophy.
- Assess the need for modifications either in the curriculum or in the company environment.

Ideally, there should be at least one presentation to each of three key groups, each representing a unique level of the company. For example, the three groups could consist of representatives from the directorate, middle management and practitioners, respectively. The number of attendees at each presentation should be limited to 12 or less.

Alternatively, in smaller programs or organizations, there can be one presentation to an audience composed of representatives from each of the three groups.

Presenting the course at one time to selected groups expedites the subsequent analysis phase by allowing the participants to start with a common framework of understanding.

During every presentation, the attendees usually spontaneously brainstorm about the material being presented. Furthermore, it is not unusual at this time to identify conflicts between the course content and the organizational culture.

As an extended part of the presentation package, a detailed report is prepared, describing the class interchange. This summary is written by the instructor after each presentation is concluded. For honesty and objectivity in the responses, it is essential to ensure that at no time will the names of the contributors be disclosed.

The internal conflicts that have been identified should then be resolved by a group of designated representatives. As described previously, this step may require changes in the organizational culture.

It is also necessary to determine what training modules will be acceptable in the company environment, what should be added or modified and what pieces of the curriculum should be eliminated.

Concepts become rules

Following resolution and acceptance of either course or cultural modifications, the approved concepts become the rules for doing business in the particular program area. Presentation of the classes becomes not only the instrument for building the skills in the respective subject area but also a medium through which information is disseminated companywide.

A continuous, voluntary and tailored training program that is flexible enough to meet both the technical and managerial needs of the organization should be developed. A finite and manageable number of programs — ones that support organizational objectives — should be selected. It is better to introduce five new programs effectively than 15 poorly.

Each new approach should be introduced with a three-tier training program that includes the following:

- A high-level overview for senior management.
- A more detailed introduction for middle managers.
- An intensive skills-building workshop for practitioners.

While these seminars are certainly an essential part of the process, training classes by themselves are not enough.

The ideal implementation package should be completed by instituting a follow-up program presented by the same group, a program that teaches the classes and is directed to the teams who are using the new methods. This program should include review workshops and clinics, drop-in consulting and teleconferencing.

Considerations

Before committing to this project, the organization should be aware of six factors critical to success.

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Organizations that choose to restructure their environment should do so only if they acknowledge that change takes time, people and money. There is no free lunch. The only question to be asked is, Do you pay now or later?

Pick objective leaders. The process should be managed by a group that has no vested interest in the outcome — one that will not whitewash the results and report only what they perceive the company wants to hear. This group should have a thorough understanding of the subject matter being examined and should also be qualified in facilitating group dynamics.

Similarly, the fact-finding activities should be conducted in an unbiased manner and in an environment that is nonthreatening, confidential and conducive to honesty. The contributors must feel confident that they can trust the facilitators.

In terms of time and effort as well as for the ultimate achievement of desired results and objectivity, it follows that this fact-finding process may preferably be handled by an outside group.

Protect confidences. In addition to being assured of confidentiality, the interviewees must feel confident that they will be given the opportunity to verify and, if necessary, correct their summaries before they become public record; albeit, no names are ever disclosed.

When the information is collated, it may be summarized according to agreements and conflicts. It is extremely important at this point to uncover the red-flag issues present in every organization. Agreements and conflicts should be crystallized, problems should be resolved, and an action plan should be developed. This plan is to be disseminated to the whole organization.

Get executive support. Assuming senior management recognizes that there is a problem, the project should be chartered and directed from an executive status and should involve all levels of the organization. Executives and middle management must carefully weigh and consciously choose to retain or change each idea.

Sometimes a business decision dictates that the company retain a less-than-desirable approach. Though this is certainly legitimate, the organization should do so only when it fully understands the trade-offs and when it has been entirely honest with itself and its employees. Espousing one philosophy and then demonstrating contradictory behavior only serves to confuse employees and weaken subsequent efforts within the organization.

Managers must, therefore, set priorities about the kind of work environment they want to create and then translate these priorities into effective management and technical principles. The outcome of this exercise should be a new or updated business policy for the selected program.

Be patient. The company must be able to regard the implementation of new technologies or management concepts as projects unto themselves, ones that may only be carried out over an adequate period of time. As talented as many instructors are, they do not carry magic dust that they can sprinkle on attendees, transforming pupils into instant experts.

> **"**
>
> *Much as we would like to pretend otherwise, the need for employee education cannot be denied. The costs of poorly trained workers are lost opportunities, low morale, reduced quality, inefficiencies, customer dissatisfaction, tarnished reputations . . . all of which can blow profits and productivity right out the window.*

As a result, during the learning period, practitioners will make mistakes and have false starts. The environment must be forgiving, and an employee error must be viewed as an opportunity for learning, not punishment. The company must be comfortable with accepting these realities and must allot enough time and enough people today to achieve tomorrow's objectives.

State your objectives. Finally, the expectations about drop-in consulting must be clarified. This activity, whereby a subject-matter expert periodically examines the work of team members, is the best strategy for developing in-house expertise.

Workers learn by doing and by making mistakes. However, this technique also has the elements of becoming an emotion-packed situation unless the ground rules are carefully spelled out in advance.

Drop-in consulting implies that the consultant bears no responsibility for the results of the work produced by the team between visits. It also means that a lot of catching up needs to be done when the consultant returns and that he or she may not be immediately productive.

When team members have been working steadily on a product for weeks, they then have a vested interest in its outcome as well as a certain amount of pride of authorship. Unless drop-in consultants approve the teams' output, the consultants may find themselves in automatic adversarial positions. Although the team thought it was doing a good job, the review may disclose errors, omissions and ambiguities, such as the following:

- How will discarding or radically changing their prized creation affect the workers?
- How does the time required for the rework and the subsequently missed target date affect the organization?
- Will these situations create pressures to do a less-than-quality job?
- When faced with these pressures, will the consultant be able to encourage the company toward proper implementation of the methods?
- If the group chooses to take shortcuts and then the results are unsatisfactory, will they acknowledge that the results are not attributable to the consultant?

Budget matters

In these uncertain and troubled economic times, we may once again be faced with optimizing our budgets. To make matters worse, when asked to reduce expenditures, many organizations might completely forget the benefits of training and view it as one of the superfluous functions that should get cut when times are tough.

Later, they may be surprised and disgruntled at the inefficiencies, errors, reduced quality and false starts they observe in the work completed by untrained or poorly trained workers. When companies reduce training expenditures, justifying the cutback as a "necessary business decision," it is not so unusual for them to be jolted later on by the unanticipated effects.

By the time they are feeling the impact of limited or nonexistent training programs, these organizations may have forgotten the advantages of strong educational strategies. They may be completely unaware that their problems may be the result of earlier business decisions, perhaps poorly made, regarding training.

Avoiding pitfalls

Managers interested in avoiding these pitfalls should ask themselves the following: Has the organization truly crystallized its objectives and selected a finite number of programs that can be implemented successfully? Does the company really know what it wants from the training experience? Have the training strategies been evaluated against the corporate objectives? Have these objectives been clearly presented to all of the players? Does the training function have the visibility and recognition necessary to support fulfillment of its aims?

Naturally, there are no answers that will work for all companies all of the time. Each organization must choose its own correct philosophy; this information should then be disseminated and continuously reinforced to all the appropriate individuals.

Much as we would like to pretend otherwise, the need for employee education cannot be denied. The costs to the firm of poorly trained workers are lost opportunities, low morale, reduced quality of merchandise, inefficiencies, customer dissatisfaction, tarnished reputations and sometimes even endangered workers or consumers — all of which can blow profits and productivity right out the window.

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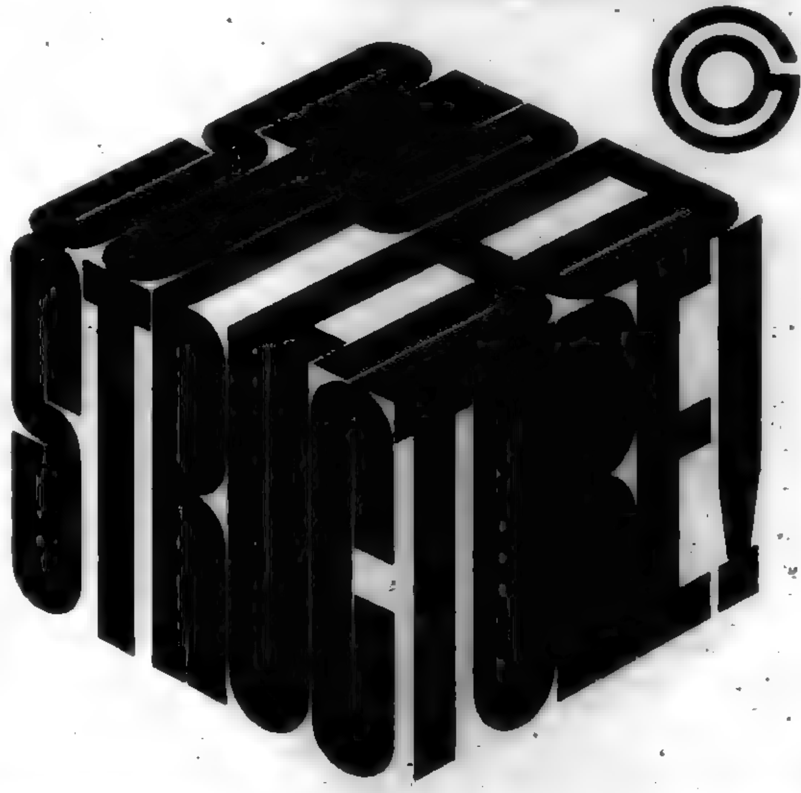
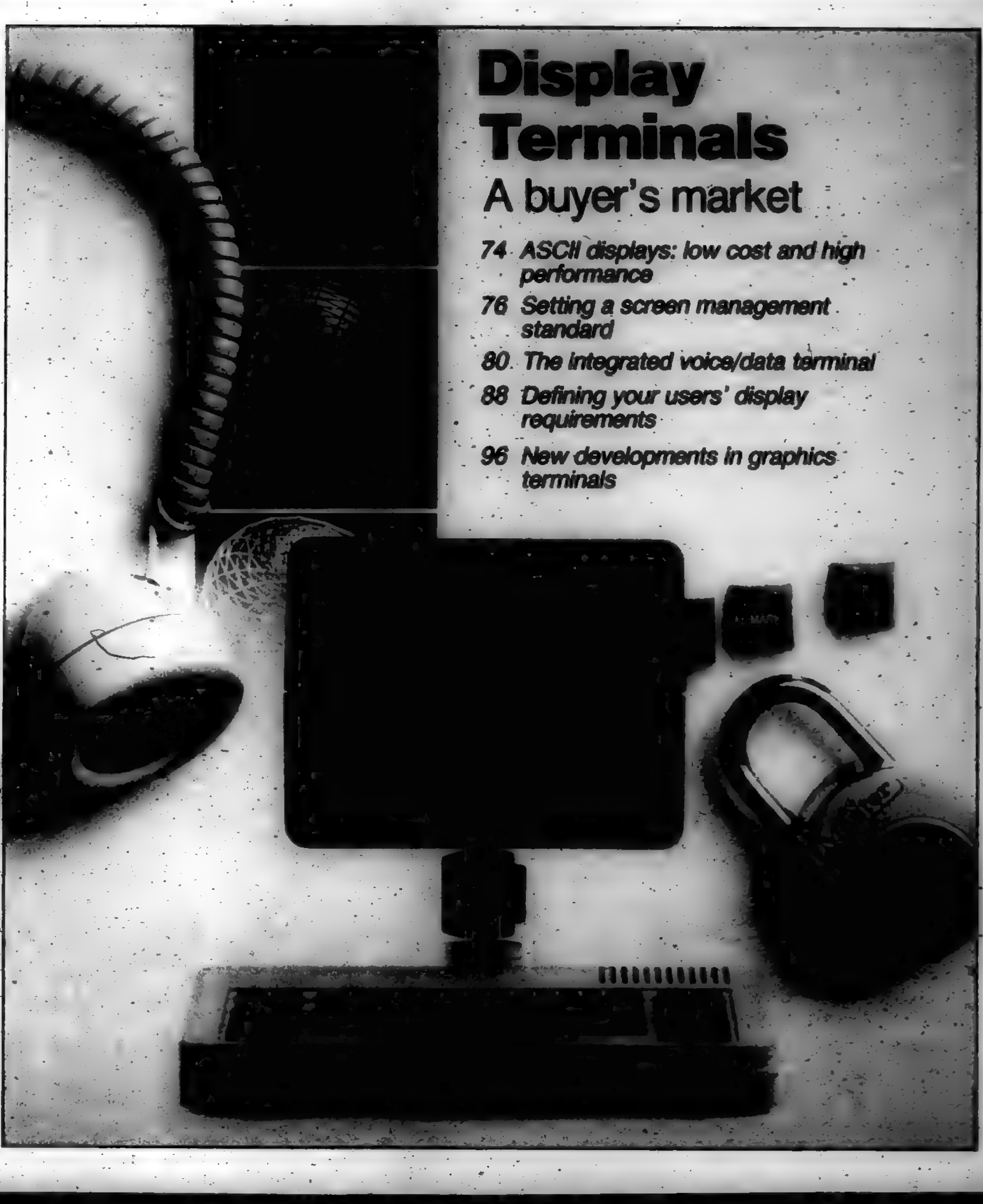


Special Report

Computerworld
October 28, 1985



Display Terminals

A buyer's market

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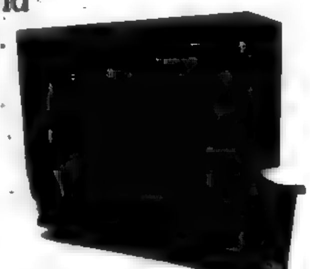

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Special Report

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Display arena a buyer's market

Advanced technology, increased popularity providing low prices

By Joseph Kelly
Special to CW

Display terminals are still the most popular means of accessing the corporate data base residing on a mainframe or minicomputer. Multiuser minicomputer and microcomputer systems, as alternatives to local-area networks, are gaining popularity and opening up other channels for displays. Currently, there is no doubt that falling prices have made this a buyer's market.

For the past five years, prices at the low end of the display terminal market have fallen at a drastic rate. In 1976, for example, Anaheim, Calif.-based Lear Siegler, Inc.'s ADM 3 (the classic dumb terminal) carried a single-unit purchase price of $1,095. At that time, this represented the rock-bottom price for displays. As prices fell over the next few years, dumb terminals remained nearly alone at the sub-$1,000 price range. However, in 1981, Applied Digital Data Systems, Inc., headquartered in Hauppage, N.Y., unveiled Viewpoint, a terminal with a price tag of $650.

Viewpoint's price was considerably lower than that of other comparable terminals on the market then. The introduction of Viewpoint triggered a flurry of activity in the display terminal market; prices went down even lower. The low end of the ASCII display terminal market became increasingly price driven.

Eventually, fully featured smart terminals were selling in the $600 to $700 range, while units with a lesser degree of functionality hovered around the $500 mark.

Advances in microprocessor technology made the dumb terminal a thing of the past, so that even the low-end terminals contained smart terminal features. Today, many feel that it is price, not functionality, that matters most in this market. Whatever the case, it is apparent that distinguishing one vendor's terminal from another is becoming a difficult task.

During the summer, San Jose, Calif.-based Qume Corp., a subsidiary of communications giant ITT, broke the $400 barrier with the introduction of the QVT-101, a smart terminal with a single-unit price tag of $395. The move surprised many industry observers who said they felt that prices at the low end of the market had already fallen as far as they could. Increasingly, many vendors had complained that they could make little profit on these low-price units.

Distributors, a primary outlet for terminals, also felt their margins being squeezed by the low price tags. To remain competitive, however, vendors have been forced to match these low prices. So the move by Qume was greeted in the industry with something less than enthusiasm.

Jim Blakeley, product marketing manager for Lear Siegler's Data Products Division, said he feels that the terminal industry already was heading in the direction of sub-$400 prices at the low end. "Qume might have jumped the gun by six months or so," he said, "but the industry would have gotten to that point sooner or later." Blakeley feels that the major problem with these low-priced terminals will be finding a distribution method, given the slim margin that distributors can earn on these units.

"We'll have to rethink how to get it to market," he said of the ADM 3E, Lear Siegler's enhanced version of the ADM 3. Blakeley added that lower prices were good for the end user but that the inevitable erosion of prices for high-end, fully featured terminals, on which most terminal vendors make their money, may lead to an industry shakeout of some smaller vendors.

Shortly after the unveiling of QVT-101, other vendors responded by breaking the $400 barrier themselves. Lear Siegler introduced the ADM 3E with a selling price of $399. Esprit Systems, Inc., located in Melville, N.Y., reduced the price of its low-end model, the ESP 6110, by $100 to $395. Wyse Technology, Inc. of San Jose, Calif., the current leader in shipments among the ASCII terminal vendors, introduced the WY-30, priced at $399. Other vendors, like Televideo Systems, Inc. of San Jose, Liberty Electronics Co. of San Francisco and Applied Digital Data Systems must decide whether or not they want to compete at that price level.

Complicating the situation at the low end of the market are the financial problems currently plaguing many of these vendors, just one part of the slump that has hurt the computer industry as a whole. Layoffs and consolidations have hit many previously successful firms such as Televideo, Lear Siegler, Applied Digital Data Systems, Visual Technology, Inc. of Tewksbury, Mass., and Falco Data Products, Inc. of Sunnyvale, Calif. Many in the industry said they are fearful of a shakeout, given the recent events that have thinned the ranks of the microcomputer industry. The new price level established by Qume may go a long way toward triggering such a shakeout.

Additionally, the vendors in this market may now be seeing the long shadow cast by IBM. IBM's first ASCII terminal, the 3101, was brought to market in 1979. At the time, many of the vendors competing in that market felt that, given IBM's track record in the computer industry, it would soon dominate the ASCII terminal market just as it did the 3270 terminal market. This did not happen, chiefly because the 3101 was a high-priced unit with somewhat limited functionality.

In June, however, IBM made another foray into the ASCII world with the introduction of the 3161 and 3163 display stations. These models combine a higher level of functionality with prices that are more in line with the trend in the industry. The 3161 is priced at $699,

Continued on page 77

Sub-$400 display terminals

Vendor	Qume Corp.	Lear Siegler, Inc.	Wyse Technology, Inc.	Esprit Systems, Inc.
Model	QVT-101	ADM 3E	WY-30	ESP 6110
Screen Size	14-in.	14-in.	14-in.	14-in.
Display Capacity	80-col.	80-col.	80-col.	80-col.
Function Keys	4	4	4	—
Price	$395	$399	$399	$395

Source: Datapro Research Corp.

The $400 price barrier for low-end ASCII terminals was broken this summer.

Kelly, who specializes in the terminal/workstation area, is a senior associate editor for Datapro Research Corp. in Delran, N.J.

Specialized unit affordable

The drastic change in the low-cost display market is good news to the terminal buyer.

Each year, ASCII display terminals are becoming more and more affordable. Now, even an IBM display may be purchased for less than $1,000. Drops in component pricing and savings resulting from offshore manufacturing have meant that the quality and range of functionality of the terminals being produced are better than ever, despite the plunging prices. And design improvements have resulted in easier to use and more aesthetically pleasing displays.

Features that were once found only on high-priced units or available as expensive options are now standard on virtually every display model being produced. These include the following:

- Tilt/swivel displays.
- Green or amber screens.
- Display capacities of 80/132 columns.
- Advanced editing features.
- Split screens or windows.
- Low-profile keyboards with multiple function keys.

The prospective user is in an excellent position to obtain all of the terminal features desired at a price that only a few years ago was unthinkable.

French videotex network reaches one million homes

By Marie Monique Steckel
Special to CW

France reached a milestone in bringing videotex service to people's homes last month, when the country's telecommunications organization installed the millionth home-based terminal on its national videotex network.

The organization, the Directione Generale des Telecommunications (DGT), offers Minitel I terminals — monochromatic tubes with basic keyboards — free to residential customers in major regions of France. Customers who want a terminal accept it as a replacement for the printed telephone directory they would otherwise receive.

About 40% of the nation's phone subscribers are currently eligible to receive free terminals. By the end of this year, half of all of France's subscribers should be eligible.

Subscribers who choose terminals over phone books have easy access to an electronic directory that includes 23 million white- and yellow-page listings; they pay no monthly fees for this access.

Users log about four million directory requests each month. The network has responded well: In 95% of all inquiries, response time is less than 2 seconds.

The network that supports the directory is one of four nets, each with its own access scheme, that the telecommunications organization has set up as components of its nationwide Teletel videotex configuration.

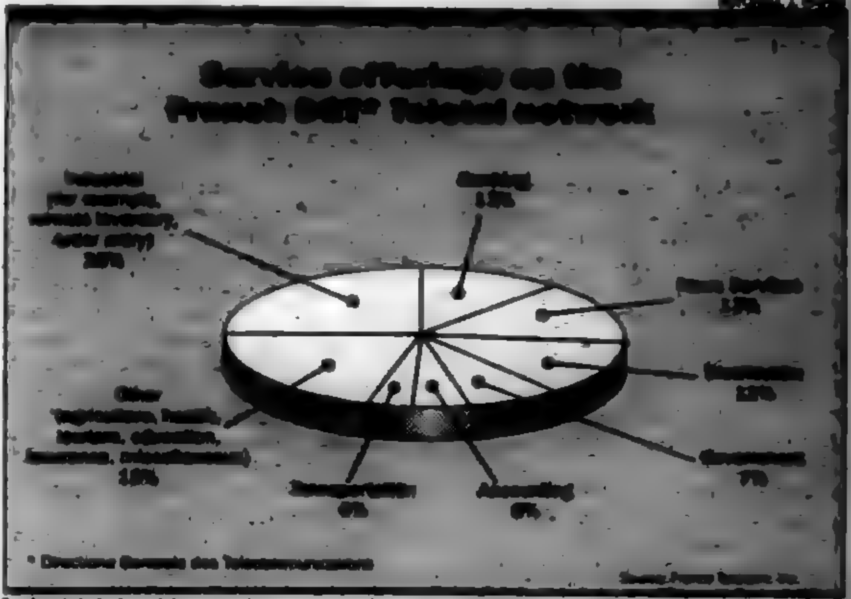
The directory itself is the only network service the group offers directly to consumers. The other three nets support about 1,500 information services that businesses offer to consumers and to each other (see chart).

From their homes, consumers can use the three networks to participate in dating services, make transactions with their banks, submit orders for mail-order goods, arrange for travel and hotel reservations and purchase insurance policies. Residential requests for Teletel services constitute about 70% of total network usage; business users make the remaining 30% of all requests.

Within the next few months, Teletel transactions will begin to take place in conjunction with the use of Bull Group CP-8 smart cards, credit cards that contain imbedded microprocessors. Residential users will have their smart cards programmed as passes to electronic checking, as credit/debit cards or as means of direct telepayment for goods and services they order on their Minitels.

To take advantage of these services, users will have to purchase card readers and connect them to their terminals. For access to telepayment and similar offerings, these users will insert their cards into the reading device and key in a predetermined password on their terminal keyboards. The smart card and identification number will validate each other and allow the requested transaction to begin.

MITCHELL J. HAYES



Industrial, banking and news services constitute *more* than half of the 1,500 Teletel offerings.

The nation's banking community has a $102.4 million order with Bull for 12.4 million cards and associated equipment. The DGT expects more than three million cards to be in use by the end of 1986.

The organization's policy of offering free terminals for the Teletel network has been both popular and cost-efficient. The DGT is making up for its hardware investment by saving money it would have spent printing phone books and by taking in new revenue from increased line usage. In areas where Teletel is operational, line usage has increased 20%.

The organization bills subscribers for Teletel line usage in much the same way as it bills for basic telephone calls. Use during peak hours costs about 10 cents for 2 minutes. The DGT offers discounts of 30%, 50% and 65% for use during specific off-peak hours.

Providers of commercial videotex services bill customers according to a number of cost structures. Their bills can be bundled into a customer's phone bill or charged separately, depending on the provider's arrangement with the DGT.

Residential videotex use has encouraged business growth in related market sectors. Terminal manufacturers, for example, have begun to serve as suppliers to Teletel users.

Three vendors — Matra Informatique, La Radiotechnique and Telic-Alcatel — manufacture monochrome Minitel I terminals. La Radiotechnique has also proposed a color model for use with the network; if the DGT approves it, users who want the color terminals will pay about $20 per month to rent them.

Steckel is president of France Telecom, Inc., the New York-based U.S. representative of the French Directione Generale des Telecommunications.

Buyers getting more for their money

By [illegible] Goldman
Special to CW

From a vendor's viewpoint, the 1985 CRT-based terminal market is one fraught with falling profit margins and tough competition.

It has become a commodity market. This market includes ASCII, 3270-type, non-IBM mainframe, ANSI-standard Digital Equipment Corp. and IBM System/34, 36 and 38 terminals. Although vendors scramble to reduce their costs and maintain profit margins, buyers continue to get more for their money.

As pricing for terminal technology and components drops, improvements in CRT design and functional capability such as editing, highlighting, protected fields, split-screen functions, color screens and ergonomic architecture continue to rise.

This has resulted in the blurring of the lines of distinction between various types of terminals. In the past, a terminal's price was set in proportion to its capability; dumb terminals carried the lowest price while full-featured, smart editing terminals carried the highest. Although this is still basically true, advances in technology have caused the divisions between categories to blur.

Today, the various terminal markets can be divided by the protocol and communications interface that the terminal supports.

The terminal marketplace is not, however, homogeneous in nature. This is true even though certain features have become generic to all terminal lines, including editing capabilities, visual attributes and ergonomic housing. The amount of memory, the number of programmable function keys, screen size, monochrome vs. color and so on are merely options.

It appears, however, that options have taken on importance in the terminal marketplace. By bundling features as options, a vendor can maintain, if not increase, its bottom-line prices and gross profits. Stabilizing profit margins has become a top priority in this erratic marketplace.

To maintain profits, today's terminal manufacturers offer a broad range of products and participate in as many market niches as possible. This diversity is possible because of off-shore manufacturing, the availability of inexpensive parts, refinements in the final assembly process and changes in distribution channels.

The diversity in product lines is necessary because of the growing number of sophisticated users, the gradual penetration of the personal computer, developments in advanced networking and the maturation of many of the terminal markets.

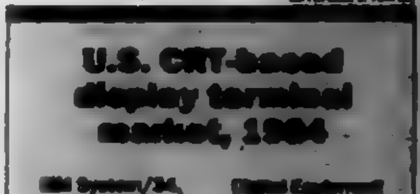
A historical perspective

In general, during 1984 the CRT-based terminal market experienced more than 28% growth in shipments, with new units totaling 2.1 million. The installed base of terminals reached 8.8 million. The dollar value of shipments for this marketplace grew 21% with a market value totaling $3.2 billion.

The growth of shipments for 1984's terminal market was stimulated by a variety of economic conditions, particularly in the first half of 1984, as well as an upswing in computer sales. At the same time, however, sales were strong for this marketplace and an undercurrent of fierce price wars were beginning to stir.

Over the past several years, major realignments in production costs, component pricing and improvements in quality testing have changed the market's cost structure. Vendors expected that price cutting would stimulate sales. Unfortunately, the marketplace is not enlarging because of falling prices. Although 1984's terminal market grew more than 28%, International Data Corp. (IDC) estimates that by 1990, growth will fall off to the 10% mark.

MITCHELL J. HAYES



The CRT-based display market in the U.S is broken into five categories.

Goldman is a research analyst for International Data Corp., a market research firm based in Framingham, Mass.

Continued on page 94

Special Report

Group proposes screen management system standard

By Daniel R. Frantz
and Tom Povey
Special to CW

Our industry spends a lot of money building good human-computer interfaces for terminals and then wastes a great deal of that money reprogramming these interfaces for new types of terminals.

An international group of interactive software specialists, the Screen Management Task Group (SMTG), recently took the first step toward a standard for forms-oriented use of terminals.

The standard should ease initial programming efforts and reduce reprogramming for new terminals. This work covers the full range of terminal devices, from simple character-cell devices to bit-map graphics workstations, including read-only devices, such as badge readers, and write-only devices, such as printers.

The problem

A vast variety of terminals is now available. Along with the proliferation in sizes and types of terminals, manufacturers and software houses have produced a number of different methods for controlling them. Often the only way a program can control the interaction with the operator is to access the hardware features directly, as in many personal computers.

Increasingly, however, vendors have provided more convenient ways to control the interaction between operator and program. These range from new or modified statements in various programming languages to screen-handling software packages that ease the creation of forms and separate the details of the terminal from the program. Examples of statements in programming languages are extensions to ACCEPT/DISPLAY in many Cobol dialects and POSITION in some Basic dialects.

A typical feature of screen-handling packages is a screen painter or form editor, an interactive program that uses the philosophy that "what you see is what you get." A designer sits in front of the VDT and interactively creates what the operator will see.

The screen painter/editor then stores the work of the screen designer according to the particular implementation — either as a separate entity or as a piece of a program to be embedded in a host programming language.

System software designers face a major problem in the lack of standards for screen handling. One vendor's package is usually quite different from another's, unlike the situation with file access in which, for example, the same concepts of indexed sequential files are built into the definitions of many languages and operating systems.

The variety of terminals only serves to compound this difficulty. A vendor's package often handles only terminals from that vendor or terminals in a restricted class. With new technology creating new terminals with new features at an increasing rate, programmers continually have to change their programs.

The new bit-map terminals and windowing features offer opportunities that many departments would like to use in improving the human-computer interface, but the need for extensive reprogramming is slowing the migration to such terminals.

Such reprogramming is expensive and time consuming, but it is a problem with which one can deal. A complete solution to the problem requires work by more than just a single application shop to be truly effective.

Why a standard?

A screen management standard would have many benefits. Most obviously, applications that use the standard would be more portable across different vendors' equipment. Software houses adapting their packages and individual installations moving to another machine would have less of a software conversion barrier.

Programmers learning a standard method of handling screens would realize an advantage similar to that of learning the standard method of handling files. They wouldn't have to retrain in every new environment; they could concentrate on the unique demands of the data processing task rather than on the quirks of the vendor's software. Training costs would go down, and productivity would go up.

Finally, in complex systems, there are advantages to a standard related to complexity itself. Since the proposed standard is not tied to any one language, designers could choose any language for their DP and computational needs, even a mixture of languages, knowing that their screen management needs can be satisfied

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Frantz is a consultant software engineer and Povey is a principal software engineer for Digital Equipment Corp. Both served on the Screen Management Task Group to develop the proposal for the Screen Management System standard.

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independently of that language.

In addition, the standard is designed explicitly to make distribution in a network both possible and efficient; multivendor configurations then become easier to handle.

What's been done?

SMTG has been studying screen management problems for the past five years. This group has produced a proposal for a standard for screen management that is now ready to be considered by the rest of the industry. The proposal is known as the Screen Management System.

The wider aspects of terminal management also are being debated by the International Standards Organization (ISO) in its work on the Open Systems Interconnect (OSI) model. OSI is considering windowing services and will discuss the Screen Management System as a possible application layer service.

The ANSI X3H3 committee on graphics is also considering windowing standards. The Screen Management System contains features that allow it to be used in a windowing environment and to coexist with the OSI and graphics work.

Proposal status

The SMTG was originally chartered by the CODASYL Cobol committee to develop a screen management facility for Cobol. In spite of this initial concentration, note that the SMTG, the companies that served on the SMTG and the Cobol committee itself all had the goal of language independence for the Screen Management System — it was to have no special ties to any language but was to serve all languages.

From 1979 to 1984, representatives from more than 15 organizations attended SMTG meetings. Although the Screen Management System is not complete at this time, it has been accepted by the Cobol committee as the basis for a further standardization effort. CODASYL and ANSI are now discussing what should constitute the proper makeup and home for such a committee.

Copies of the Screen Management System proposal are available as a CODASYL publication titled "Proposed CODASYL Screen Management Committee Journal of Development," from Canadian Government Publishing Center, National Printing Bureau, 45 Sacre Coeur Blvd., Hull, Que. K1A 0S7.

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From page 74

Display arena a buyer's market

significantly lower than the $1,650 price tag of the 3101 Model 23, which it replaced. The 3161 offers emulation of several popular display models from Applied Digital Data Systems, Lear Siegler, Esprit Systems and Televideo; this marks the first time that an IBM terminal is provided with emulation of independent vendors' units. The 3163, which is priced at $1,095, placed IBM for the first time in the Digital Equipment Corp. VT100-compatible terminal arena.

The price and functionality of these new terminals suggest that IBM may be more successful this time around in its attempt to capture market share. If the company succeeds, it will most likely be at the expense of some of the independent, smaller companies lacking the resources of IBM or other computer giants.

Whatever happens, it seems to be a fact of life in the computer industry that when a market is in a state of upheaval, buyers tend to stick with the more stable vendors. No one is more stable than IBM. On the other hand, at these prices, does vendor loyalty and stability even enter into it? Possibly not.

The market remains, however, an important one for data processing department and MIS department managers who require a large number of terminals to satisfy their department's data entry and data retrieval needs.

Telecommuting stretches nets beyond office setting

Employers, workers reap benefits from astute terminal use

Gil E. Gordon
Special to CW

At regional sales offices, airline ticket booths and department store candy counters, the terminal stands as a symbol that MIS departments have delivered remote access, data entry and computing power to workers in far-flung locations.

If MIS managers want to extend resources further, terminals can play a role in yet another group of remote locations — alternate work sites, such as workers' homes, that lie beyond the four walls of the traditional office. With telecommuting, employers can electronically bring work to their employees instead of physically bringing the employees to a central work location.

The idea of telecommuting is simple: Employers allow some of their work force to spend part of the work week at one or more kinds of remote work locations. These remote locations have payoffs for both the employer and the employee.

Employers benefit because they stretch available office space by shifting some work and workers to remote sites; they also improve their recruiting efforts and their ability to retain key staff members. Employees come out ahead because they spend less money for commuting, meals and office "uniforms" and can work on a flexible schedule.

When work hours shift, employers also garner payoffs in terms of mainframe capacity management. Firms that let people work from home can delay mainframe capacity additions by balancing work loads around the clock.

Only tradition demands that everyone arrive at work by 8:15 a.m.; the night owls of the business world (and there are many) are more than pleased to punch in around noon and work until the wee hours. If enough terminal users make such a time shift, or even a less dramatic one, the MIS manager has a better chance of putting off capital appropriations for more mainframe power.

The popular image of telecommuting includes a personal computer tied to an office, but this view ignores the important role of terminals attached to a network. In this age of micro mania, managers must remember that the terminal is still a perfectly adequate tool for many people. A few reminders should make that point clear:

- Despite a slow but sure evolution in personal computer size — from desktop to luggable to portable to laptop — terminals are still often easier to move around.
- Many tasks that have had special-purpose terminals designed for them are well suited, by their nature, to telecommuting. Airline and hotel reservations, data entry and word processing are good examples; these tasks have easy-to-measure beginning and ending points and often do not require the person doing them to have frequent contact with other people in an office.
- Growth in personal computer use notwithstanding, a lot of plain vanilla time-sharing still goes on, and terminals work very nicely for time-sharing. A good example is a processing-intensive scientific application. In performing such a task, a remote worker spends little time online with the host, needs little or no local computing power and can work as effectively in his den as in costly office space.

> ”
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> ***The popular image of telecommuting includes a personal computer tied to an office, but this view ignores the important role of terminals attached to a network.***

The technical issues involved with the use of terminals for telecommuting generally pose no problem. MIS and telecommunications managers, in fact, have a lot more experience in setting up and fine-tuning terminal-based networks than they do in coping successfully with the thorny problems of micro-mainframe links.

The real challenge in making telecommuting successful is avoiding potential human resource and supervisory problems. To do so, managers must pick the right employees and managers to be involved and must

Continued on page 100

Gordon is president of Gil Gordon Associates in Monmouth Junction, N.J. He specializes in implementing telecommuting programs and is editor of the monthly newsletter "Telecommuting Review."

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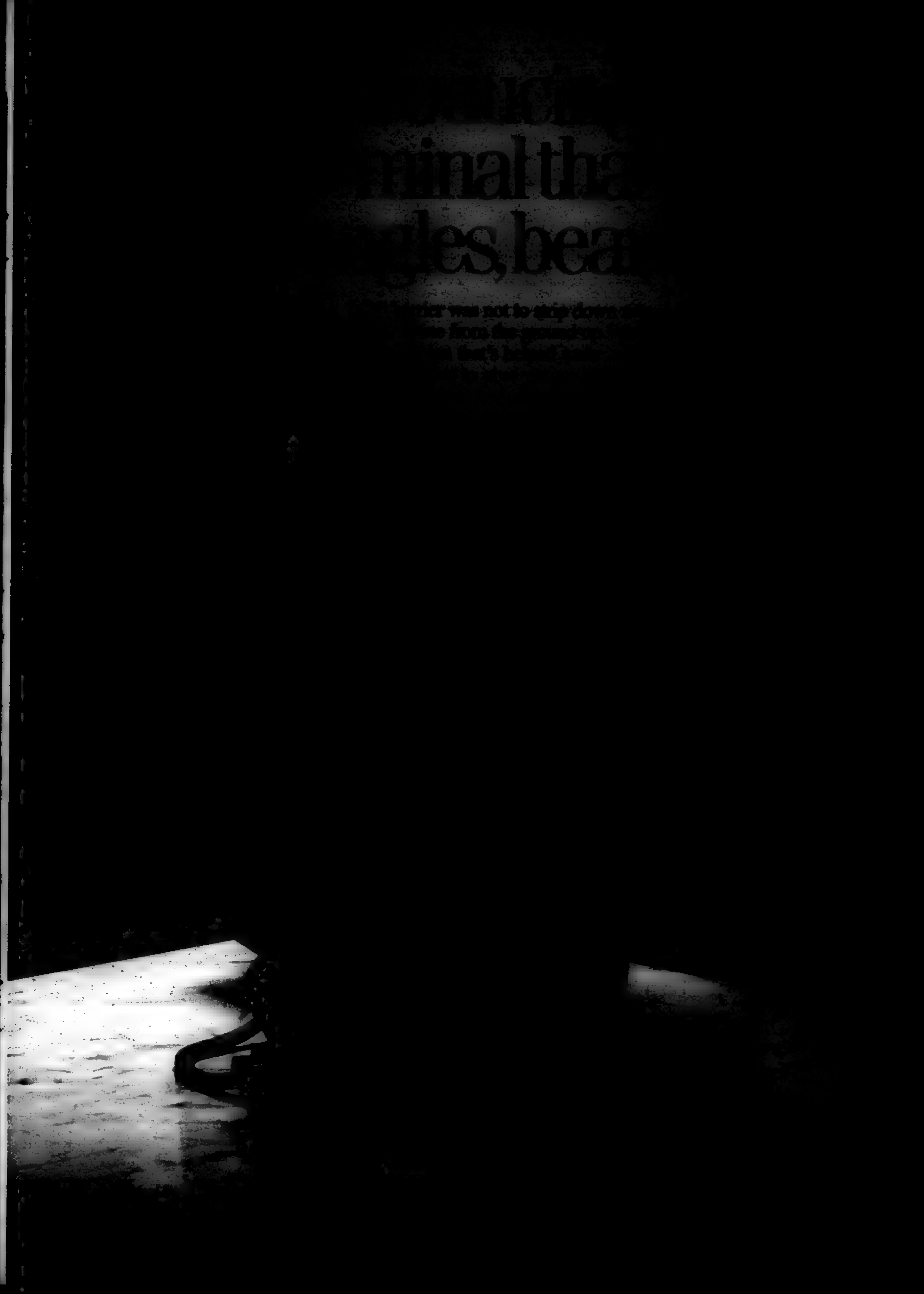
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Integrated terminals fulfill communications, data needs

By David D. Schindele
Special to CW

Most office workers and managers and, especially, most executives do not need or want general-purpose computers on their desks.

Generally, they want something unobtrusive that gives them access when they need it to information residing somewhere else. Once in a while, these users also want access to computing power.

These realities require that office workers have small-profile terminals that primarily serve communications needs and occasionally serve data needs. This is where integrated voice/data terminals come into their own and begin to make sense.

Integrated terminals can be less expensive than personal computers that have been upgraded with voice capabilities. With hideaway keyboards, they can take up little desk space; with soft keys, icons or mice, they can be easy to use.

Because voice/data terminals are so useful, corporate planners and anyone involved with end-user computing should strive to achieve a proper awareness of the devices' status and capabilities.

Most systems on the market have some of the following capabilities:

- Advanced telephone functions, such as autodialing.
- Desktop computing, with advanced office automation functions.
- Store and forward capabilities for voice messaging.
- Use of existing telephone wiring for both voice and data.
- Simultaneous access to multiple applications, with windowing and interruption capabilities.
- Soft key functions, icons and mice.
- Data communications, with access to remote computing power.

Once managers understand these capabilities, they quickly realize the importance of integrated devices for information access and decision support. Integrated voice/data terminals essentially replace the telephone and the personal computer by providing sophisticated functions for both voice and data, with combined communications connectivity.

Organizations are beginning to understand this potential. In turn, they are installing systems in increasing numbers.

Still, many business organizations are showing some hesitation. Some, for example, are testing voice/data capabilities under trial agreements before they make commitments to vendors. These firms are targeting middle and upper level managers, who have generally been left out of office mechanization.

Other managers are even more reluctant. Before they act, they want to know what the future holds. For the most part, their organizations fall into one of two camps: those waiting for advances in private branch exchange technology and those waiting for integrated-terminal vendors to establish themselves.

PBX technology. Some organizations are waiting until PBXs with well-integrated switches come to market. Such systems should be able to handle the volume of data calls that are inherent in integrated terminal use better than current PBXs do.

By digitizing voice communications, advanced PBXs can multiplex voice and data signals along the same wire. This coupling can reduce the extensive cabling system that is necessary to support many current integrated terminal offerings.

Such PBX products will let organizations use existing telephone wiring instead of recabling buildings for data communications needs. They will also enable workstations to be moved easily from one location to another, wherever telephone access is available.

Vendor establishment. Other companies are taking the wait-and-see approach to integrated voice/data terminals because of the embryonic nature of the industry. They do not want to risk dealing with vendors that may not be here tomorrow.

Although major computer and PBX vendors have entered the market, smaller vendors are leading the way. These small companies offer the best integrated systems currently available, those that integrate voice and data by way of a digital minicomputer.

Several of the companies are supported by venture capital or corporate investors. Most, however, are relatively unknown. All have difficulty marketing their products, and all present some risk to potential customers.

Within the next year, these companies will have to prove themselves in competition with major vendors, which will begin to push personal computers and departmental systems with integrated voice capabilities. Only those firms that have a strong end-user sales force or substantial third-party backing will have any success in moving their products.

Schindele is manager for the development and implementation of advanced office systems for Pacific Northwest Bell Telephone Co. in Seattle.

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RENO, Nev. — In the interests of performance, price and aesthetics, a bank here has chosen integrated voice/data terminals rather than personal computers or data terminals as the devices of choice for managers' desks.

First Interstate Bank of Nevada, a $2.5 billion banking system with 68 branches throughout the state, has installed approximately 80 of the integrated terminals — Displayphones from Northern Telecom, Inc. — in the past year. It plans to double that number within the next year, according to Dave Dutton, vice-president and manager of bank systems.

"Banking is not just opening accounts and cashing checks anymore," he said. Rather, it entails providing products and services to customers within a competitive marketplace. To prosper in that marketplace, First Interstate of Nevada is automating back-office tasks for its end users so they can concentrate their energies toward meeting customers' needs.

The voice/data terminals are one step in that direction, Dutton said. "[They offer] rapid display of predefined information . . . to officers of the bank who require immediate access to information necessary for their daily business decisions."

Each terminal has an internal 1.2K bit/sec. modem, and each is attached to a protocol converter that enables communications with the bank's host, a 16M-byte IBM 3083.

USER REPORT

FIRST INTERSTATE BANK OF NEVADA

Problem:
Managers have insufficient access to computing resources.

Solution:
Integrated voice/data terminals.

Benefits:
Increased use of applications software, for a relatively low price.

past year. It plans to double that number within the next year, according to Dave Dutton, vice-president and manager of bank systems.

Dutton said First Interstate of Nevada began installing the voice/data terminals as part of an effort to dis-

First Interstate Bank of Nevada managers, including Vice-President Dave Dutton (above), use integrated voice/data terminals for access to information.

The terminals can dial into any one of 11 ports that they share on the mainframe's controller. Each Displayphone also supports a small printer.

Dutton said First Interstate of Nevada tested a range of different devices and decided to install the integrated voice/data terminals because they met most of the bank's critical needs better than other options did.

Performance. The terminals offered telephone features like conference calling and speed dialing along with IBM 3270 terminal emulation suited to the needs of managers and officers. Dutton said managers need full on-line access capabilities but do not use them often enough to justify the installation of dedicated mainframe terminals.

With the Displayphones, he said, managers can access both CICS and TSO. They tap into CICS for simple data inquiry and use Information Builders, Inc.'s Focus data base management system under TSO to massage and analyze data and to enter specialized information. Dutton said the bank protects its production data by giving managers access to strip files rather than masters.

Price. The terminals were cost-effective, Dutton said, both because of the initial price, which was lower than the combined price of a 3270 look-alike and a telephone, and because of the operating costs, which are lower than those of terminals that require dedicated ports on the mainframe controller. The bank ties about 10 Displayphones into each of the 11 assigned controller ports.

Continued on page 87

NORWOOD, Mass. — A beverage distributor made its order entry faster and more precise, evened out peak demands on its staff and gained an edge over its competitors by letting its salesmen use telephones as order entry terminals.

Whitehall Co., a distributor that sells about $10 million worth of wine, spirits and beer annually from three warehouses in Massachusetts, began reaping these benefits in 1981 after it installed a voice-response order entry system. According to George B. Bailey, the firm's MIS director, "It's a highly successful installation."

USER REPORT

WHITEHALL CO.

Problem:
Batch order entry stalls delivery operations.

Solution:
Voice-response system, using phones as terminals.

Benefits:
Smooth delivery cycle; edge over competition.

The system, known as Pavlof to Whitehall's staff members and salesmen, is based on two minicomputers that allow telephones to act as terminals to Whitehall's host — a 4M-byte Prime Computer, Inc. 850. The minis, Perception Technology Corp. BT-IIs, run software that accepts telephone calls, alerts the host to incoming messages and decodes the host's replies into digitized voice messages that help callers place their orders.

Each mini supports eight incoming phone lines. Bailey said the configuration supports an average of 500 orders a day and can handle more than 1,000 orders on days that fall during peak buying seasons.

The voice-recognition minis tie into inventory and credit files maintained under Prime's Midas data base management system on the host. Through the link to the data base management system, Pavlof tells salesmen immediately whether an item they want to order is in stock and whether or not a customer's credit is in good standing. As such, Bailey said, the system overcomes two problems that once stalled Whitehall's ordering and shipping.

Before the firm installed the voice system, salesmen either dropped off hand-written order forms at one of the firm's warehouses or called in their orders to clerks. From the order forms or the phone calls, the clerks entered orders on intelligent keypunch terminals and submitted the data to the host in batch mode.

Whitehall's staff waited until business closed at 5 p.m. to initiate its computer runs, which assigned inventory to customers' orders for shipment the next day. Because of the schedule, some stock shortages did not surface until after working hours, Bailey said, and parts of customers' deliveries got delayed.

Credit problems that showed up during the computer runs also delayed deliveries. Whitehall's credit manager could not straighten out the problems until the following business day and had to cancel shipments until then.

Batch processing further hindered Whitehall's operations because it gave salesmen no incentive to place their orders early, Bailey said. The

Continued on page 82

A conversation with Pavlof

When a salesman calls in to the voice-response order entry system at Norwood, Mass.-based liquor distributor Whitehall Co., a digitized female voice greets him. "Hello. This is *Pavlof*," the voice says. "Please enter your ID number and password."

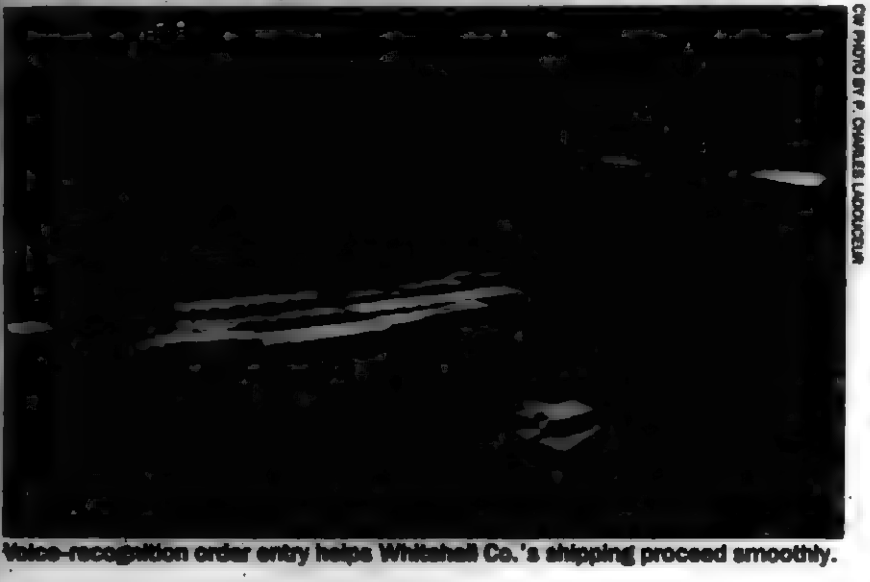
The salesman keys in his identification number, presses the star button on his telephone keypad, keys in his password and presses the phone's pound button to send the information to Whitehall's host.

Pavlof checks the ID number and password, both for validity and to determine its next response to the salesman. Salesmen for different companies use the system to place orders, and Pavlof's next message acknowledges which firm the salesman represents.

The salesman then keys in a two-

Continued on page 82

Special Report



CW PHOTO BY P. CHARLES LAOCOEUR

Voice-recognition order entry helps Whitehall Co.'s shipping proceed smoothly.

From page 81

User report: Whitehall Co.

system assigned inventory according to the size of a shipment rather than the time the order was submitted.

"There was no particular benefit of getting orders in early," Bailey said, and salesmen tended to submit their requests late in the day. Whitehall received 80% of its orders during afternoons and had to bring in clerks to work during that time only.

With the voice-response system, assignment of stock for shipment to customers takes place as soon as a salesman completes his phone order. This timely response has encouraged salesmen to place customers' orders as soon as they receive them, throughout the day, Bailey said.

Credit denials no longer delay shipments as often as they did under Whitehall's old system because they are made during the working day, when salesmen still have time to iron out problems with their customers and Whitehall's credit manager. Bailey said the chance to smooth over problems "before they become a cause celebre" has helped the firm maintain good customer relations.

Similarly, stock shortages do not hold up shipments because salesmen can request substitutions for any item that is out of stock. Although requesting substitutions can be tiresome, Bailey said, it is better than having an order postponed.

The voice-response system has also helped Whitehall speed up the ordering process. Bailey did not know exactly how much time was saved by using telephones as data entry terminals, but he said the system's speed in accepting orders was obvious. "We know that it's faster then dictating them over the phone."

He said the best indicator of the system's efficiency was the firm's lean order entry staff. Wholesale operations similar in size to Whitehall typically need between 14 and 16 clerks to handle peak volumes, according to Bailey. Because most orders come in via Pavlof, Whitehall generally keeps only five or six clerks on hand.

The system has also reduced data entry errors, mainly because it eliminates the transcription of written or telephoned information to keypunched data, Bailey said.

Bailey said he was positive the system gives Whitehall an advantage over its competitors because many people have told him so. "Our customers tell us, our salesmen tell us, and our competitors tell us," he said.

From page 81

A conversation with Pavlof

part account identification and presses his pound button to enter the information to the system. After Pavlof receives the account identifier, it issues a voice message that tells the salesman how to proceed with his first item order.

The salesman follows the directions and enters an order for one type of liquor. If the liquor is in stock, the item order is complete, and Pavlof asks for a second item order.

As long as each item a salesman orders is in stock, Pavlof continues logging item orders and requesting orders for more items. It helps salesmen keep track of their line orders by saying, "Item 10, please," for example, after it logs item nine.

To signal the end of an order, a salesman keys in the word "end" (3-6-3) and presses the phone's pound button. When Pavlof receives this message, it tells the salesman how many bottles and cases he has ordered. If the total is incorrect, the salesman enters "no" (6-6) and must reenter his entire order. If the total is correct, the salesmen enters "OK" (6-5), which initiates a credit check.

If credit is approved, Pavlof indicates that the order has been placed and asks the salesman if he has another order to enter. If he does, he proceeds with the next order. If he is done, the salesman enters "end." Pavlof then replies, "Thank you for calling" and hangs up.

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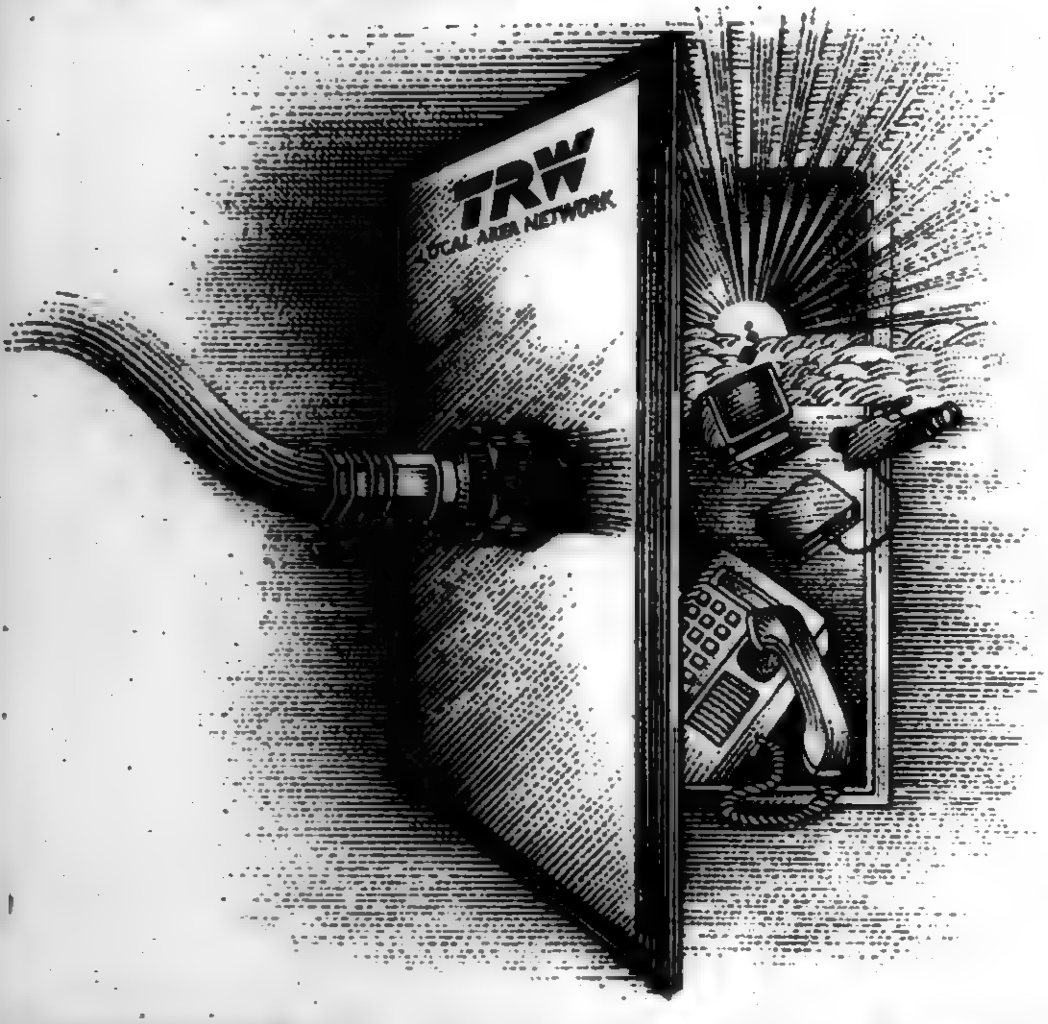

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Special Report

Screen compression aids bank's remote, local users

SEATTLE — A bank increased the efficiency of data transmissions among its branch offices after it installed a screen-compression module for its IBM 3270-type terminals that more than halved the amount of data in transmission.

Washington Mutual Savings Bank, an institution with more than 50 branch offices in Washington and $3.5 billion in assets, installed the screen-compression module on its 24M-byte IBM 3083 mainframe early this year. Since then, it has cut its average daily transmissions by 54%, according to Shawn M. Shawhan, a senior software analyst in Washington Mutual's technical support group.

The bank's acquisition of the software module, BMC Software's, Inc.'s 3270 Superoptimizer, was the most recent in a series of moves toward improving response times on Washington Mutual's CICS network of IBM 3270 and look-alike terminals. The network includes about 90 local terminals and about 450 remote terminals that communicate via leased lines with an IBM 3705 controller on the bank's mainframe.

Washington Mutual's first move toward reducing data transmissions, made early in 1984 to quell user complaints of poor response times, was to develop and install a homegrown screen-compression module. The product worked well; it reduced CICS data streams by about 24% and produced noticeable improvements in response time, Shawhan said.

He soon questioned, however, whether the homegrown version was performing as well as a commercial screen-compression module might. He compared the bank's module with a number of offerings, including BMC Software's 3270 Optimizer, an early version of the software Washington Mutual uses now.

"Our evaluation showed that there was no comparison," he said. "With the BMC product we immediately saw a 29% reduction in the [size of the] data stream." In addition, Shawhan said, the commercial product came with better documentation than the homegrown module, produced better network utilization statistics and had a better facility for tracing problems.

"Probably the only advantages our own version of the optimizer had were that it was already in place and it was free," Shawhan said. These advantages were sufficient, however, for the technical support group to recommend retaining the homegrown module.

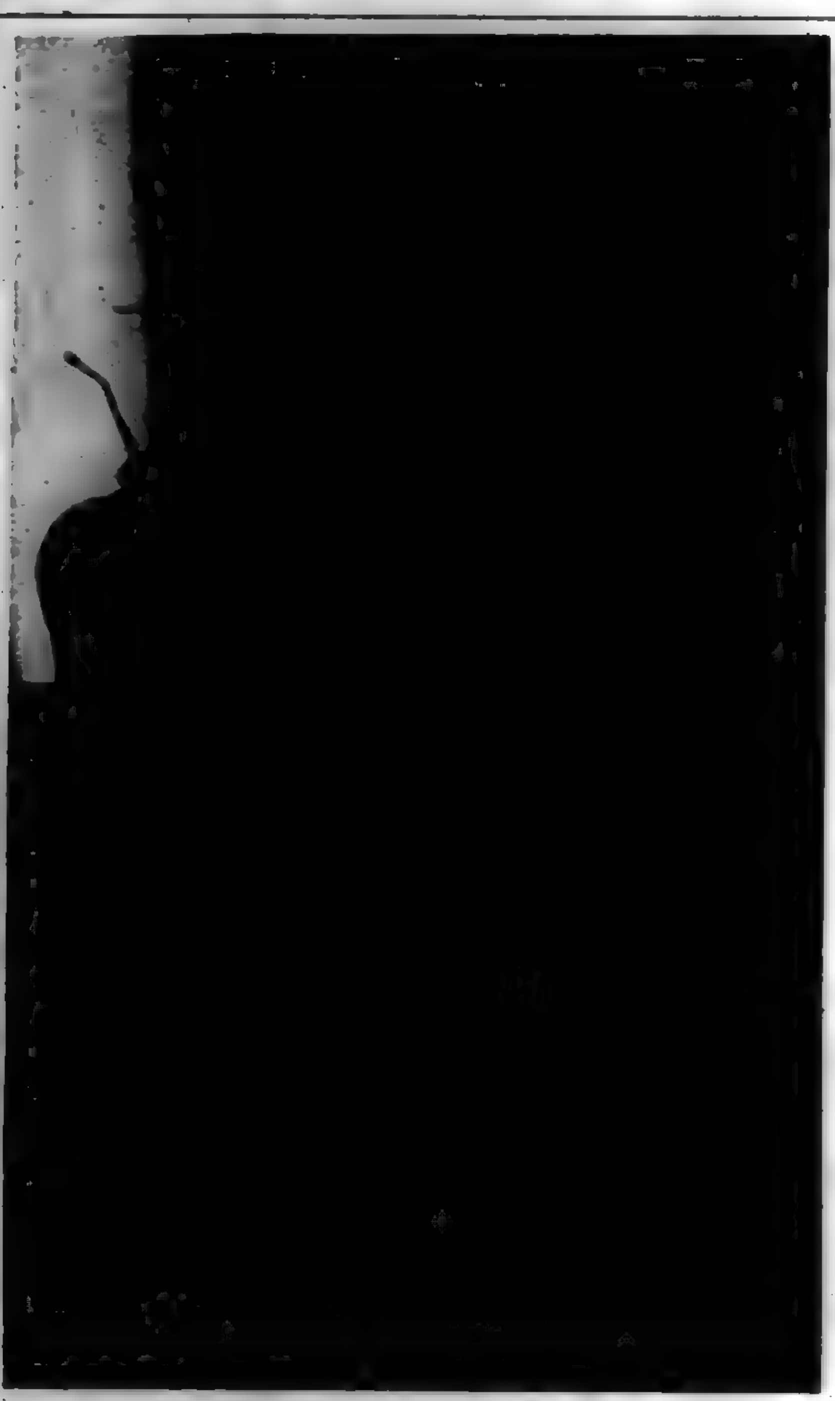
Second move

The bank was forced into its second move in July 1984 when it began running a new release of CICS on its mainframe and the homegrown module stopped working. "Our department was going through such an expansion that we couldn't spare the people or the time to write new code," Shawhan said. "So I contacted BMC, and we purchased . . . the 3270 Optimizer."

Washington Mutual ran the software from August 1984 to February 1985. Its installation resulted in an actual data reduction of about 29%.

In February 1985, the bank made its third move toward greater reductions in the amount of transmitted data. BMC offered to let Washington Mutual serve as a beta test site for its enhanced product, the 3270 Superoptimizer, and the bank agreed to try the product. After two weeks of debugging the software against test data, the technical support group put the screen-compression module into production. The results were impressive, according to Shawhan.

"Once we installed Superoptimizer, even our local terminals showed some im-



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proved response times," he said. "People in our remote sites, of course, reported even more excellent response times."

He said the bank normally would not compress data for local terminals because the overhead outweighed the advantage of doing it. "However, with the Superoptimizer we saw enough of a difference in response time that we decided to use the product for all of our terminals."

On average, local terminals logged reductions of 50% in the amount of data they transmitted, and remote terminal transmissions dropped between 60% and 65%. "To put it in perspective," Shawhan said, "on a normal day employees throughout the network collectively produce 100 million characters. With the Superoptimizer, less than 60 million of those characters are actually being sent out."

Modified data screens

The bank soon discovered that the screen-compression module lent itself especially well to applications that required the repeated transmission of modified data screens. The software compressed the data so that only the modifications got retransmitted, rather than the entire screens. On such applications, Washington Mutual logged reductions of as much as 99% in the amount of data it transmitted.

Shawhan said he has not calculated corresponding reductions in response times, but he said users' reactions and the results from some sample applications indicate that response times have improved significantly.

For a transaction in which bank representatives call up reports of checks cashed against insufficient funds, for example, response times have become, on average, between 50% and 60% faster. Some inquiries that had required between 5 and 7 seconds to process now take about 1 second.

When the screen-compression module first went into use for this application, users let the technical support group know of their appreciation, Shawhan said. "Never having experienced such excellent response times, some of them even called us, thinking there was a problem with the computer."

Washington Mutual currently is redesigning its communications network to include multiplexers in key cities. The efficiencies of the redesign, coupled with line savings from compressed data transmission, should cut the bank's annual network costs by 29%, Shawhan said. By the end of 1986, the bank plans to upgrade its modems from 4.8K to 9.6K bit/sec. for further efficiency on the network.

From page 81

User report: First Interstate

The port sharing has not been a problem, according to Dutton, because Displayphone users do not generate a high volume of data requests. In addition, the ports are linked in a chain to prevent tie-ups; if one is busy, it passes on incoming requests to the next.

Aesthetics. The Displayphone's footprint is smaller and sleeker than that of a traditional terminal or a personal computer, according to Dutton, making the device attractive for placement on an executive's desk.

Although the terminals fell short in some respects, such as modem speed, they met the bank's critical criteria relatively well. "While we're not 100% satisfied," Dutton said, "our level of satisfaction with Displayphone is very, very high."

Different groups of users apply the terminals' capabilities to different types of tasks. Bank officers who have responsibility for account relationships, for example, tap into the data base to determine the makeup of customer groups; they also insert comments into customer data files. Service representatives in branch offices use their Displayphones to establish new accounts and make changes to old ones.

The integrated voice/data terminals have helped the bank move toward its goal of distributing computing power to end users, Dutton said. "Because Displayphone provides easy access for nontechnical staff, our managers have successfully accessed our IBM computer programs, which, of course, greatly increases the utility of our computer's application programs."

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Categories of IBM 3270-type terminal use

Category	Applications	Usage Pattern	Screen Requirements
High-Volume Data Entry	Order entry, claims processing	Intensive	14-in. color or 15-in. monochrome
Engineering/ Scientific	Design, modeling/ simulation	Casual	12-in., monochrome or color
Office/Text	Document inquiry and manipulation	Casual	12-in., monochrome or color
Business	Electronic mail, public data base access, financial analysis	Casual	12-in., monochrome or color
Programming	Development, maintenance	Intensive	14-in. color or 15-in. monochrome

Source: Memorex Corp.

Applications requirements determine usage patterns, which in turn determine what type of display screen best suits an individual user.

Rule guides 3270 buyers

Match hardware to individual needs

By Marti Spieller
Special to CW

A manager who chooses among IBM 3270-type display stations for his organization's users cannot limit himself to a clinical hardware evaluation. A study of user requirements is a more important element of the selection.

Because users and their requirements are tremendously diverse, the manager must understand individual user groups' needs before he can advance in his selection of terminals. The most common 3270 display station applications fall into one of the following categories:

Data entry. High-volume data entry applications include batch data transcription functions typically associated with order entry, insurance claims processing and similar business activities. Users of these applications spend the major portion of the working day in front of their displays dealing with voluminous amounts of information. They represent about half of all 3270 users.

Engineering and science. Applications in these two fields include design, modeling, simulation and other interactive, problem-solving programs. Engineers and scientists spend less time at the terminal than do high-volume data entry operators and are best identified as casual users. They constitute about 15% of all 3270 users.

Office and text. The most common applications in these two areas are those that help users retrieve and manipulate documents. Secretaries, writers and managers who produce documents — the main users in this category — rely on their terminals daily, but they do not spend as much time at their screens as data entry clerks. For the most part, they are casual users. Together, office and text professionals account for about 10% of the 3270 user base.

Business. Electronic mail, public data base access and financial analysis are the foremost applications in the business category. Executives, managers and the other professionals that use these applications realize the benefits of information access, but they are casual users at best. They make up about 20% of the 3270 user population.

Programming. Development and maintenance applications account for most terminal use in this category. To perform these tasks, programming professionals use their display screens intensively. Only about 5% of 3270 users are programmers, yet the programming category is an extremely important one for the manager to consider. Programmers often serve as consultants to other user groups, and they are a valuable resource in the selection of appropriate terminals for various applications.

Because they determine usage patterns, these requirements provide the framework within which the manager can make his display station decisions.

Casual users often use the display station as a tool to increase their productivity, even though there are alternative means to complete their assignments. They want a small unit that requires minimal desk space. A 12-in. monochrome or color display is usually sufficient for casual applications such as data base inquiry and electronic mail.

People with terminal-intensive tasks such as data entry will be more comfortable with a 14-in. color display or a 15-in. monochrome screen.

Spieller is a product planner for Memorex Corp., a Santa Clara, Calif.-based firm that manufactures peripherals that are plug compatible with the IBM 3270.

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Choices abound in marketplace for 3270-type devices

Evolution has opened a multitude of choices in the marketplace for IBM 3270-type terminals. Managers who enter the market to select terminals for their organizations' users will be confronted by the following features, all of which can foster user productivity:

Color displays. Color is most frequently used in graphics applications, but it lends itself to alphanumeric tasks as well. In alphanumeric applications, color facilitates instant recognition of information. It separates data visually, differentiating types and sources of information and making the data easier to understand. If users understand what they view, they make fewer mistakes and are more productive.

Some 3270 monochrome displays also offer differentiation through extended highlighting features such as blinking and underscoring. Like color, these features help users make sense of what they see.

Graphics displays. The price of graphics displays continues to decrease. As price drops and selection broadens, 3270 users will find no end to the number of applications that benefit from the inclusion of color graphics.

Graphics is not limited to the production of charts and diagrams. It can be used to produce characters of different sizes, special fonts, mathematical signs and symbols and characters from foreign language alphabets.

Scrolling capabilities. Scrolling allows terminal users to access more than the familiar 80 columns by 24 rows of data. Users can now scroll backward and forward vertically through a 7,640-char. buffer. This feature is especially beneficial for inquiry and update transactions.

Keyboards. Even the keyboard continues to be improved as part of the 3270 evolution. The introduction of the 122-key keyboard, which brings increased productivity to the users' fingertips, is especially noteworthy.

Many functions that required two or more keystrokes on an 87-key keyboard are reduced to a single stroke on the expanded versions. If the keyboard supports a record/playback feature, users can assign sequences of frequently used keystrokes, such as those in a logon, to programmable function keys. An operator can then play back the sequence by initiating a single keystroke.

Input devices. A number of auxiliary input devices are available to make 3270 users' tasks easier. Pointing devices (the light pen, the mouse and the touch screen, for example) facilitate menu-driven applications. Input devices such as bar-code wands and magnetic card readers facilitate data entry tasks.

Each of these devices is more efficient than the keyboard for specialized applications.

Screen printers. The role of printers is also changing with the 3270 display evolution. Traditionally, printers have been shared among users within a controller cluster, but this configuration is impractical in situations where multiple users call frequently for printed copy.

Printers attached directly to the display screen eliminate the queuing problems associated with shared printers. Screen printers are also more practical than shared printers for users who frequently print on special forms. Users can keep their special forms on their own printers; they need not change forms repeatedly on a shared printer.

Finally, screen printers do not require a port on the controller. If enough users require printed copy, the elimination of controller ports can result in substantial cost savings.

— **Marti Spieller**

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DEC vs.
The Contender is a

In this corner: DEC, with the VT 100/220*–real heavyweights, listing at more than $1500 and $1095. Over there, the contender: Ampex, with its fully protocol compatible 219 and 220, both weighing in under $750.

How does the competition measure up?

DEC's 12" green screens are 33% smaller so visibility's limited. (Ampex offers 14" amber or green screens at no extra cost.) Ampex's moves include tilt and swivel, while DEC only tilts.

Ampex's low-profile keyboards adjust for slope; DEC's cannot.

DEC's VT-100 keyboard layout is similar to Ampex's 219, but handicapped by its function keys: the VT-100 has none, our 219 has 16.

Instead of the VT-100's two resident character sets, Ampex's 219 has nine–so it can adjust easily to performing in foreign arenas.

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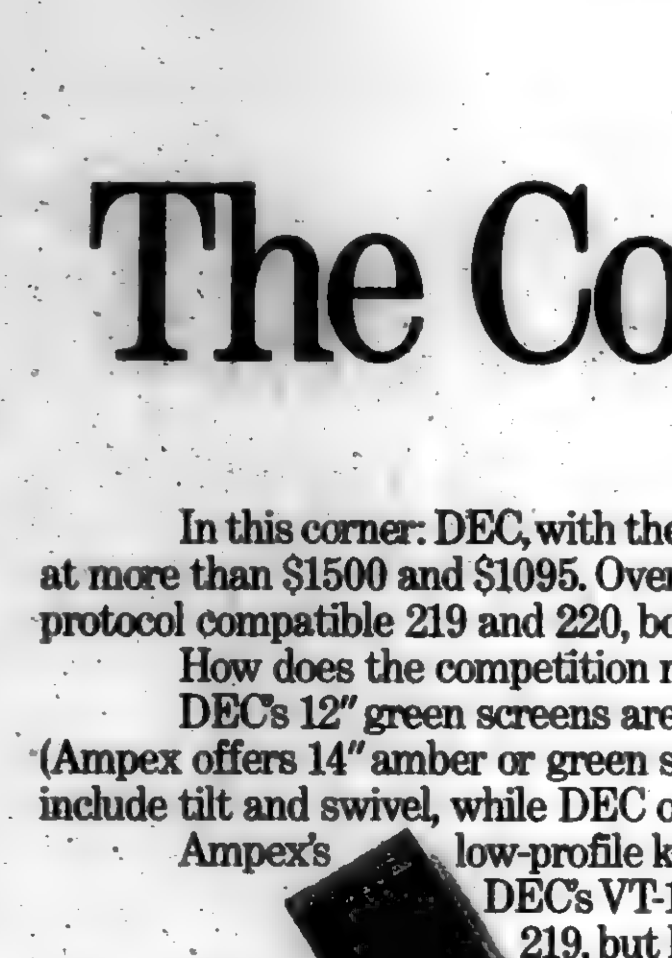

DEC's VT 220.

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The Ampex 220. (219 similar, not shown.)

The Ampex 220's keyboard layout is similar to DEC's VT-220. But instead of 256 bytes of volatile memory for its function keys, Ampex has 400 bytes of nonvolatile memory.

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From page 75

Buyers getting more for money

The year 1984 will be remembered as the year the terminal market went commodity, with all players scrambling for market share.

Therefore, to suggest the terminal market is a highly profitable industry for many is inaccurate.

However, as tough as times are, the companies have not stopped introducing new products.

The ASCII market

The ASCII side of the terminal market has been shaken by drastic price reductions. This was the first market segment to go commodity. Qume Corp.'s introduction of the $395 QVT 101 in March put a great deal of pressure on all ASCII terminal vendors.

It was not until Wyse Technology, Inc. announced the WY30 in August that any hope appeared for vendors to pull in respectable profits from such a low-cost device. Wyse cut its overhead costs dramatically by placing all circuitry on one board.

While the ASCII market was repositioning itself in terms of price and performance, IBM appeared on the scene with two new products, the 3161 — selling for $695 — and the 3163 — priced at $1,095. Up until this point, IBM had only supported one ASCII terminal, the 3101. With the introduction of the 3161 and the 3163 and the withdrawal of the 3101, IBM's strategy became volume driven.

It is unknown what effect these products will have on the market. Although they are lacking in features and price, the power of the IBM logo cannot be undersold.

IBM will go after market share in the ASCII arena for a number of reasons:

- The company works best in commodity markets.
- It is actively pursuing the multiuser market as demonstrated by its Personal Computer AT and the recently announced System 36/PC.
- It is attempting to broaden its reach beyond the Systems Network Architecture environment and into non-IBM territory.

IBM's other successes

IBM's recent activity in the ASCII terminal market has not drawn it away from its other successful terminal lines. In 1984, IDC estimated IBM's shipment market share in the 3270 market at 61% and 88% for the System 34, 36 and 38 families of terminals. IBM's momentum continues to be strong in 1985.

Plug-compatible vendors, particularly in the 3270 market, are finding it more difficult to stay afloat as IBM's product line surges forward. Telex Computer Products, Inc., ITT Courier Terminal Systems, Inc., AT&T, Lee Data Corp. and Memorex Corp. are the significant 3270-compatible makers left.

> *The personal computer, a one-time major threat to the CRT-based terminal market, has yet to prove itself as a viable, price-competitive alternative.*

Telex gained stature in June 1984 when Raytheon Co. purchased it. It now ranks second to IBM in market share. AT&T — Teletype was folded into AT&T on Jan. 1 — is aggressively going after the 3270 market. In November they will introduce a new 3270-type line.

The personal computer threat

The personal computer, a one-time major threat to the overall CRT-based terminal market, has yet to prove itself as a viable, price-competitive alternative.

Market share has definitely been lost to the micro but not to the degree the industry had at one time predicted. IDC estimated that in 1984 the personal computer averaged 15% of the total 3270 and System/34, 36 and 38 environment base.

This is not to suggest the personal computer is not to be taken seriously as a contender in the terminal market. It cannot be overlooked, but neither can advancements in networking and software development.

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Special Report

Windowing units speed up service for insurance firm

HARTFORD, Conn. — An insurance firm started offering its field agents and their customers faster service after its underwriters began using windowing terminals in place of single-function VDTs.

The terminals, which allow users to execute up to four simultaneous host sessions, have helped Connecticut Mutual Life Insurance Co. make strides toward meeting an important corporate goal, according to Jim Dawson, director of network support services. "Connecticut Mutual wants to become more customer oriented," Dawson said, "and this equipment has helped us improve our responsiveness."

Until recently, the firm's underwriters used single-function terminals to process prospective clients' policies. The terminals were a problem, Dawson said, because they did not allow for the exchange of information between the two policy software systems that Mutual Life uses.

Two single-function systems

The company has one system for information on pending policies, which is used primarily by underwriters. It has another system for sales statistics, electronic messaging and current policies, which is used mostly by field agency personnel. The two run independently on a set of IBM 3081 mainframes, each with 24M bytes of memory.

To process a policy with a single-function terminal, an underwriter had to log on to the pending policy system and check to see whether policy information was complete. If it was not, the underwriter had to make a manual note of the deficiency and log off the pending policy system. He then had to log on to the sales system, type in a request for additional information and send the request electronically to the field agency that had submitted the policy.

Last spring, Connecticut Mutual began installing Lee Data Corp. Model 1221 windowing terminals to help overcome these burdens. Only one of the firm's four regional underwriting groups currently uses the windowing terminals; Dawson said the other three groups will get them soon.

The underwriters who have the windowing terminals can do all their work without logging on and off the two software systems and without jotting down notes as they go along. Dawson said an underwriter can log on to both systems concurrently, keeping either in a separate window. Underwriters can also copy information from one window and move it to another.

Dawson said Connecticut Mutual had not yet calculated its underwriters' exact time savings and chose not to release preliminary findings. He said the firm felt confident, however, that the windowing terminals offered a significant advantage over the single-function VDTs.

As an indication of that confidence, he pointed out the firm's commitment to the windowing machines. Connecticut Mutual has installed about 190 Lee Data Model 1221s to date. Dawson expects to bring in about 400 more before the end of next year unless terminal technology or micro pricing changes drastically. "Right now," he said, "the windowing terminal is the most cost-effective way to do the job."

In addition, he said, field agency personnel and users in the home office have commented favorably on the terminals' usefulness. In-house users have reported an average increase of 25% in the amount of work they can accomplish with the windowing terminals as opposed to the single-function ones. A manager in the underwriting group, for example, reported to Dawson that he now needs only three data entry clerks to perform the work formerly done by four.

No sacrifices with raster graphics display

Allows high resolution, no flicker at low cost

Karen Davis
Special to CW

High-performance graphics applications — those in which high resolution cannot be traded for other benefits like low cost — have historically confined users to either storage tube or vector refresh display terminal technology.

But interactive, bit-mapped raster graphics display technology has changed all that by dramatically improving the price/performance balance. It allows users of high-end applications such as simulation and graphics design to get the high resolution they need without sacrificing flicker-free display, area-fill capabilities, low cost and other desirable features.

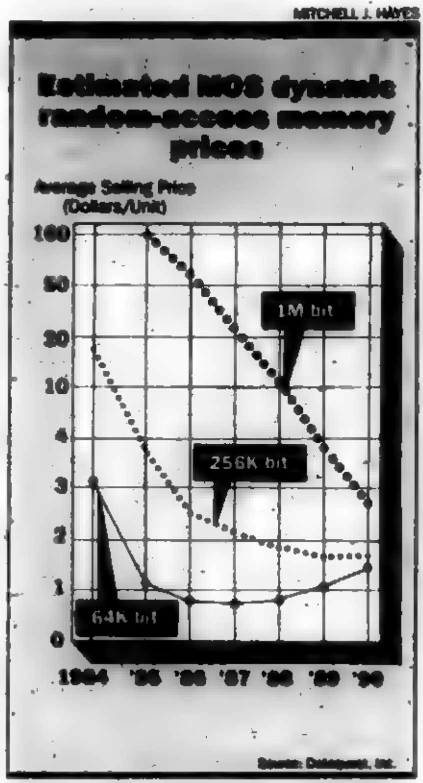
As such, raster graphics display overcomes disadvantages of both storage tube and vector refresh technology.

Storage tubes are relatively inexpensive, and they have very high pixel resolution — typically 4K by 3K. But they offer only limited interactive and area-fill capabilities. In addition, they flash when the screen is erased and have no color- or solids-fill capabilities.

Vector refresh technology also offers very high pixel resolution — typically between 2K by 2K and 4K by 3K. It surpasses storage tube technology in that it provides interactive capabilities and limited color and area filling. But vector refresh displays flicker, and they are expensive.

Raster display terminals, which are relatively inexpensive, typically offer pixel resolutions slightly above 1K by 1K; some, however, approach the 3K by 2K mark. In addition, these terminals offer superb color capability and shading features that allow for solids modeling; they are also virtually flicker free.

MITCHELL J. HAYES



Source: Dataquest, Inc.

Figure 1. Chip prices help decide what features users get for their money.

By offering these capabilities at a relatively low price, raster display technology has prompted some important trends in the display marketplace.

A movement toward more graphics terminals with better features. Recent research into graphics terminal manufacturing shows that the overwhelming majority of today's high-end products are raster terminals.

Most have pixel resolutions of either 1,024 by 1,024 or 1,280 by 1,280. A small concentration of products is available with 1.5K- by 1K-pixel resolution, and a few products are available with other pixel resolutions above 1K by 1K.

The majority of these terminals use 19-in. screens, and most display

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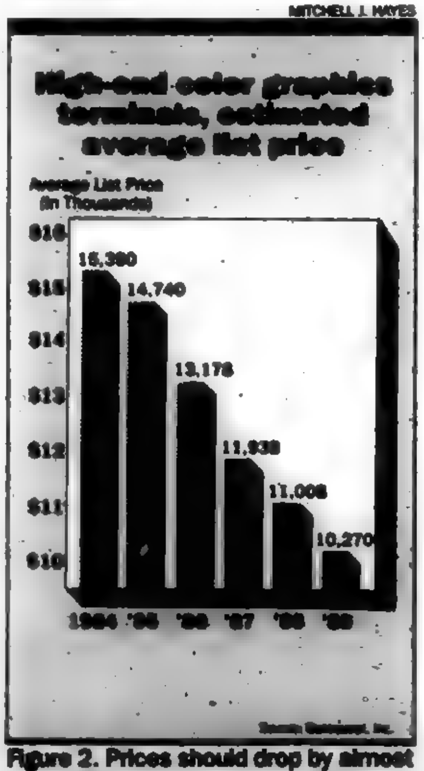
Davis is a research analyst for the Graphics Terminal Industry Service of Dataquest, Inc., an electronics market research firm based in San Jose, Calif.

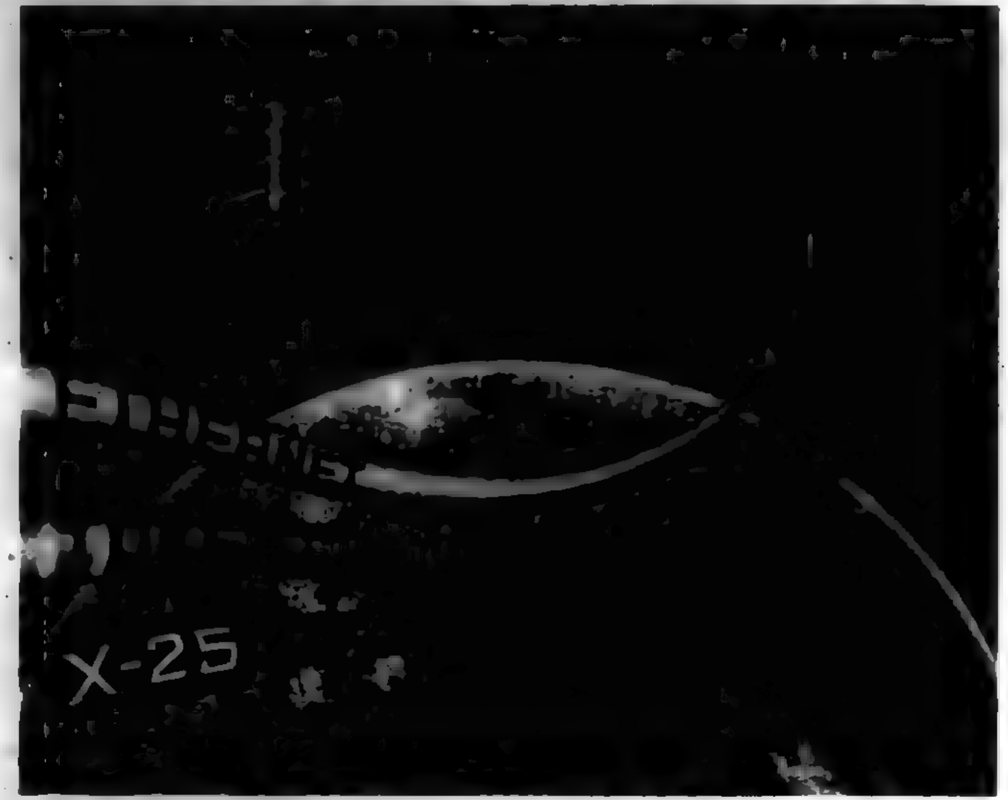
MITCHELL J. HAYES



Source: Dataquest, Inc.

Figure 2. Prices should drop by almost one-third between now and 1989.

The LAN's IBM Mainframe Connection



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between 16 and 256 colors. Some use new chip designs for fast display list processing.

A decline in terminal prices. Prices for high-resolution terminals are rapidly declining — they now start at approximately $10,000 — while performance is increasing, primarily as a result of lower prices for memory chips.

Users can expect future generations of products to provide even greater performance at lower prices.

Because the computational complexities of high-end applications require great processing capability that can slow down a host computer, manufacturers are providing more intelligence in their terminals.

This local intelligence increases graphics processing speed and frees the host for more general-purpose functions.

The current prices for chips that have specific memory capacities will factor greatly into the future price/performance equation for graphics terminals.

A typical high-end graphics terminal, for example, requires 512K bytes of display list memory. This can be provided by 64 chips, each with 64K bits of dynamic random-access memory (RAM); 16 chips, each with 256K bits; or four chips with 1M bit apiece.

The current average price for a 64K-bit dynamic RAM chip is $1.03; the price for a 256K-bit chip is $3.73; the average price for a 1M-bit chip, which is new this year, is steep — $162.50 — but it is expected to be approximately $2.50 by 1990. Today, it is more economical for manufacturers to use 256K-bit chips than 64K-bit chips (see Figure 1).

Availability of lower cost color. The price of memory for any given screen resolution increases proportionately to the number of colors that can be displayed simultaneously. Because of this, cost has traditionally been a barrier to the use of color with the large, high-resolution screens that are used in high-end applications.

Use of color is becoming more widespread, however, because memory prices have dropped and users have become more aware of the benefits that color offers. Color is now accepted as a useful design tool, and it is almost exclusively found within the domain of raster display technology.

Dataquest, Inc., a market research firm based in San Jose, Calif., estimated that half of the raster graphics terminals manufactured in 1984 had color capability. In addition, shipments of color terminals seem to be growing faster than those of monochrome tubes and should represent half of all shipments by 1987.

Graphics terminal manufacturers can be expected to take advantage of current chip prices to offer users better performance at lower prices. Dataquest estimated that the average price for high-end color graphics terminals that use 64K-bit dynamic RAM chips should drop by almost one-third between now and 1989 (see Figure 2).

Future bright for raster graphics display

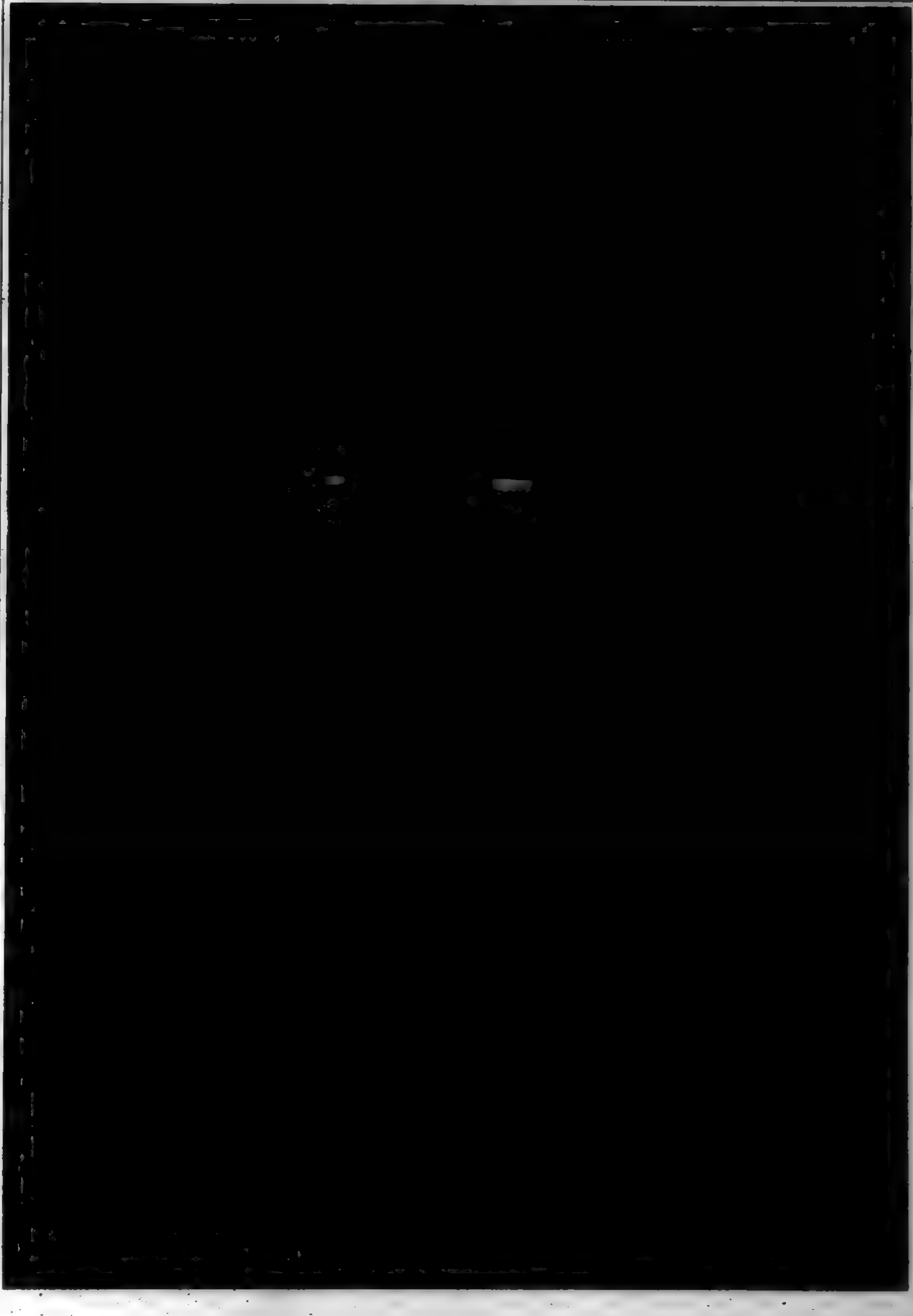
Raster graphics display has caught on with users of high-end graphics applications because it offers a better balance of price and performance than either storage tube or vector refresh technology.

This was not always the case, however. Until recently, raster graphics display technology had two major drawbacks:

- Its memory-intensive nature, which elevated terminal prices.
- Its resolution, which was in the medium range.

It overcame the first hurdle in 1983, when prices for memory chips — and thus for color and speed — began decreasing.

Continued on page 100



Fine-tuning workstations screens out VDT discomfort

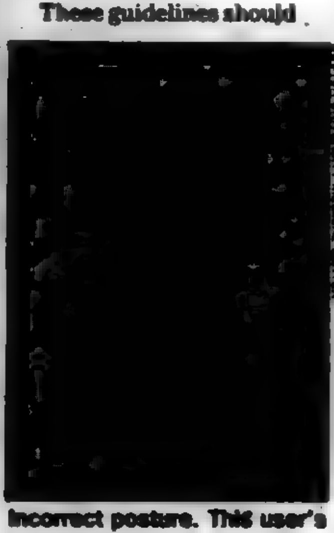
By Fran Wagner
Special to CW

Although studies remain inconclusive regarding the health effects of VDT radiation, a clear picture is emerging of many VDT users experiencing a variety of muscular aches and pains, stresses and visual discomfort. Fortunately, these problems can largely be avoided through education.

VDT users can learn how to adjust workstations and the surrounding environment properly to fit their individual needs, or more formally stated, to create an ergonomically sound work environment. Users can also learn and incorporate exercises into their daily routines to limit VDT-related discomforts (see story page 99).

The primary components of a workstation are the furniture, the screen and keyboard, accessories and the surrounding environment. The workstation furniture consists of a worktable and chair. Although the adjustment of a workstation depends primarily on what is most comfortable and effective for an individual, there are general guidelines for each component.

These guidelines should be followed regardless of whether or not an employee works on the VDT for short periods or for the entire workday.



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Incorrect posture. This user's chair is too low; she would be more comfortable if she unwrapped her legs from under her chair and raised her seat. In addition, her workstation table is too high, and her copy stand is placed too far to the right.

A workstation should be arranged according to the user's body size and the task that is being performed. The ideal seated posture for an individual using a VDT is as follows:

- Feet should be flat on the floor or on a footrest.
- The angle between the lower and upper leg should be slightly more than 90 degrees. (The chair seat should not cut into the thighs.)
- The chair's backrest should support the middle to lower back, and its angle should be either vertical or slightly tilted back.
- Fingers should rest on the keyboard comfortably with the hands positioned slightly higher than the elbows.

Users should adjust chairs and tables to attain this posture. If neither piece of furniture is adjustable, or if they have limited flexibility, one option is to make do. For example, a phone book provides a lift for feet that don't quite touch the floor, and a pillow or cushion can add padding to a chair that doesn't offer adequate middle- or lower-back support.

Some of the most common complaints associated with VDT use result from improper adjustment of the keyboard and screen. In particular, even if the task changes, an operator may not shift the placement of the terminal. For example, data entry

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Wagner is marketing coordinator for Your Side of the Screen, *an educational program designed to help VDT operators and their supervisors cope with the ergonomic and health aspects of VDT use. The program is offered by Consulting Statisticians, Inc. of Wellesley, Mass.*

requires very little screen or keyboard viewing. Because the operator focuses on the document from which the data is being extracted, the keyboard should be placed in the most accessible location with the document at a comfortable viewing distance.

On the other hand, when performing data inquiry, the screen and document play an equal role. If the bulk of an operator's work is data entry and he then switches over for a brief data inquiry task, adjustments must be made. The screen must be brought back to a manageable position so that the operator is comfortable.

Before a VDT user begins a task, he should think about what his focal point will be — the screen, the keyboard, the document or a writing pad. The user should then take a second to adjust these features into the most comfortable position.

Another problem resulting from a misplaced screen is glare. VDT screens, regardless of whether or not they already have a glare filter, should be placed perpendicular to the windows or away from windows altogether. Filters are not always recommended because they tend to distort the characters. Glare can also be avoided by proper placement of lighting fixtures. Desk lamps should never be directed onto a display terminal screen.

A comfortable workstation extends beyond the immediate furniture and equipment in the area. Of equal importance is the surrounding environment. Important components of the environment include room temperature, noise level and visual distractions located near a VDT. It is difficult to suggest an ideal room temperature or to define the recommended decibel noise level since both vary according to individual tolerances.

The steps for achieving a comfortable and ergonomically correct workstation must first be learned and then practiced until they become as routine as adjusting the rearview mirror and seat belt in a car. Investing the minimal amount of time and energy required to learn more about these issues will maximize employee comfort and productivity.

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Correct posture. This user can see her copy stand without straining; her chair's backrest supports her lower back, and her hands are slightly higher than her elbows.

Eye exercises help minimize vision strain

Despite proper workstation design, VDT operators can still experience visual discomfort. To minimize these discomforts, operators can incorporate vision-maintenance exercises into their work routines.

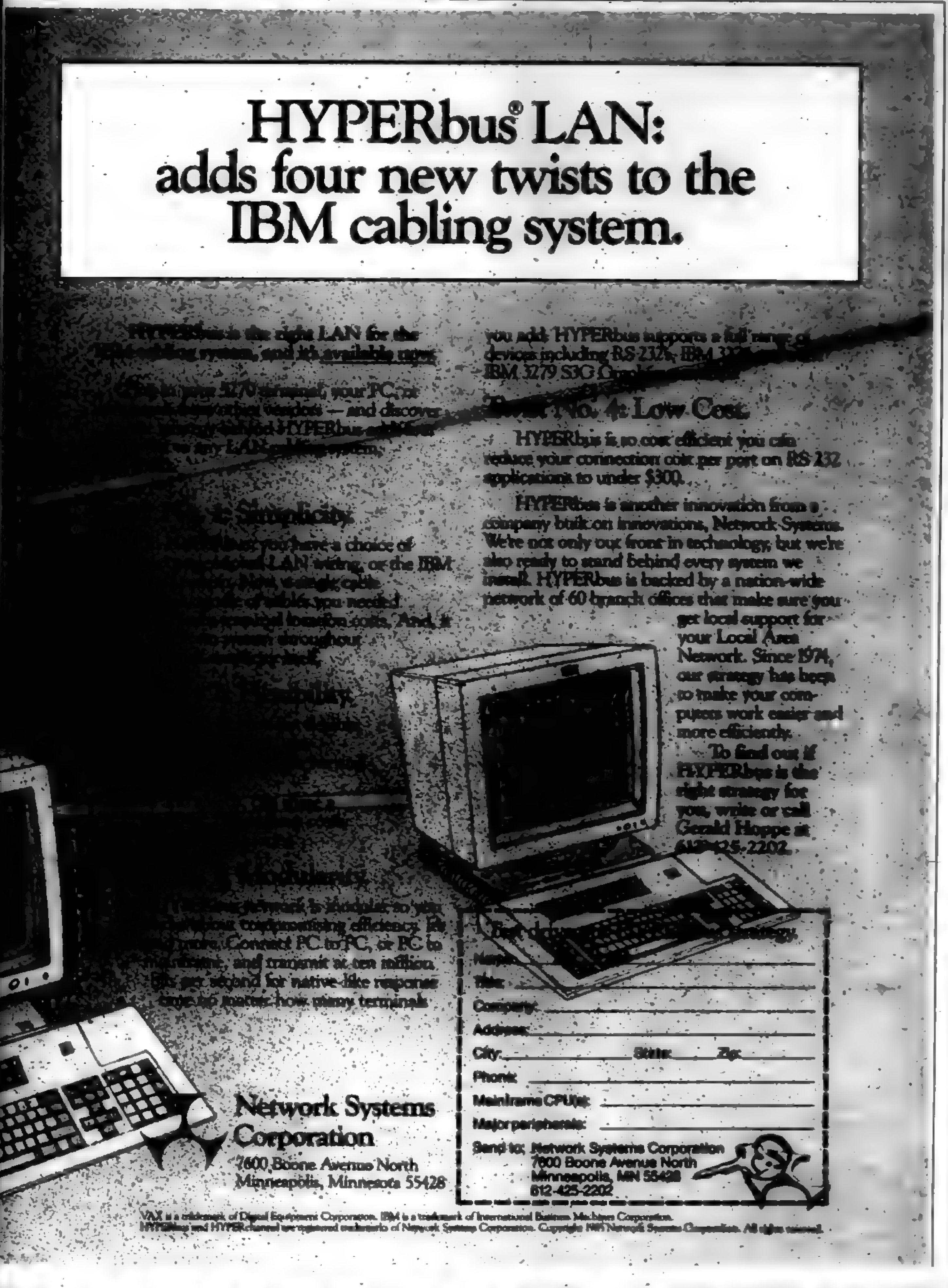
These exercises can minimize the ill effects of continued near focus and emotional stress. In addition, recuperative exercises can relieve the pressures and strain on the eyes developed during the course of the day.

One simple technique for preventing eye strain is blinking. Blinking keeps the eyes moist and mobile. Although everyone knows what blinking is, most may not do it in the way that is most helpful to the eyes. It should be a soft, gentle motion requiring no use of any surrounding eye muscles.

VDT users who experience eye strain should follow this simple exercise routine:

● Place elbows on a flat surface with one finger on the outside orbit of each eye and practice blinking by just letting the eyelids close. When this is

Continued on page 102



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From page 97

Future bright for raster graphics display

With the decrease in prices, raster display terminals became reasonably priced and gained poplularity with users of low-end applications.

These users, typical business employees, had no need for high resolution but were attracted by low prices and the availability of color.

Their attraction has been so great that the growth in business graphics, a previously untapped market, has been phenomenal. That growth, in turn, has created a demand-driven market, which has been fueled further by this past year's unprecedented drop in chip prices.

> *High-end users have a number of color raster terminals from which to choose, at prices as low as $10,000.*

The developments in this low end contributed to the reevaluation of needs by users of high-end applications, who began demanding similar products that would suit their own applications.

These users wanted higher resolution, more local processing power, lower prices, color and more software to run their specialized applications.

Manufacturers listened to the users' demands. In 1984, they began breaking the high-resolution barrier for raster graphics. Their terminals introduced a price/performance level that challenged storage tube and vector refresh products by offering features like solids modeling and low-priced color display.

Today, the high-end user has a number of color raster terminals from which to choose, at prices as low as about $10,000. Many of these products have pixel resolutions of 1,024 by 1,024 or 1,280 by 1,024, and some offer even better clarity.

More vendors can be expected to compete in the high-end raster display market. As they do, they will offer users a wide range of competitive features, prices and applications-specific terminals.

From page 78

Telecommuting extends nets beyond offices

train them to work well when they are separated by several miles instead of several floors.

Some companies have had great success. Their methods can serve as examples for others:

- J. C. Penney Co. has about 20 telecommuters working from their homes near three of the firm's 13 telephone catalog order centers. The in-home sales associates use Protocol Computers, Inc. PCI Networker Terminals tied to the local catalog order center to take calls and place orders. The telecommuting program has been operating for four years in the Milwaukee, Atlanta and Columbus, Ohio, metropolitan areas.
- Pacific Bell Telephone Co. recently shifted 32 maintenance project implementation specialists out of three California offices in Sacramento, San Jose and San Francisco and into their homes nearby. The workers use Televideo Systems, Inc. terminals for electronic mail and to access project files. Projected annual office space savings for this group is roughly $40,000, and the three office clerks who previously supported the 32 maintenance workers have been assigned to other tasks.
- Public Service Co. of New Mexico has installed Wyse Technology, Inc. terminals in the homes of about 15 senior managers for after-hours work. It also keeps on hand a supply of loaner kits — each consisting of a Wyse terminal, a 1.2K bit/sec. modem and a protocol converter — for managers who want to work from home occasionally.

> *The key to successful telecommuting is the astute use of terminals to support employees.*

The common thread that ties these three examples is the astute use of terminals to support employees when they or the company chooses to have them work from a remote site. Their jobs are such that they do not need the full computing power and other features of a personal computer.

The three company examples cited above also demonstrate the most exciting aspect of telecommuting: the range of alternate work arrangements that can be used. Telecommuting is not an either-or situation, in which employees are at home five days a week or in the office five days a week. Times and locations can be mixed and matched.

Time at a remote site can range from two to four days each week; in almost all cases, workers need to spend some time in their offices. Locations can include a worker's home or an organization's satellite office. Workers can also share space in a branch office or can assemble in what has come to be called a neighborhood work center, a building that has rooms reserved for different companies' use and may include a common day-care center and other amenities.

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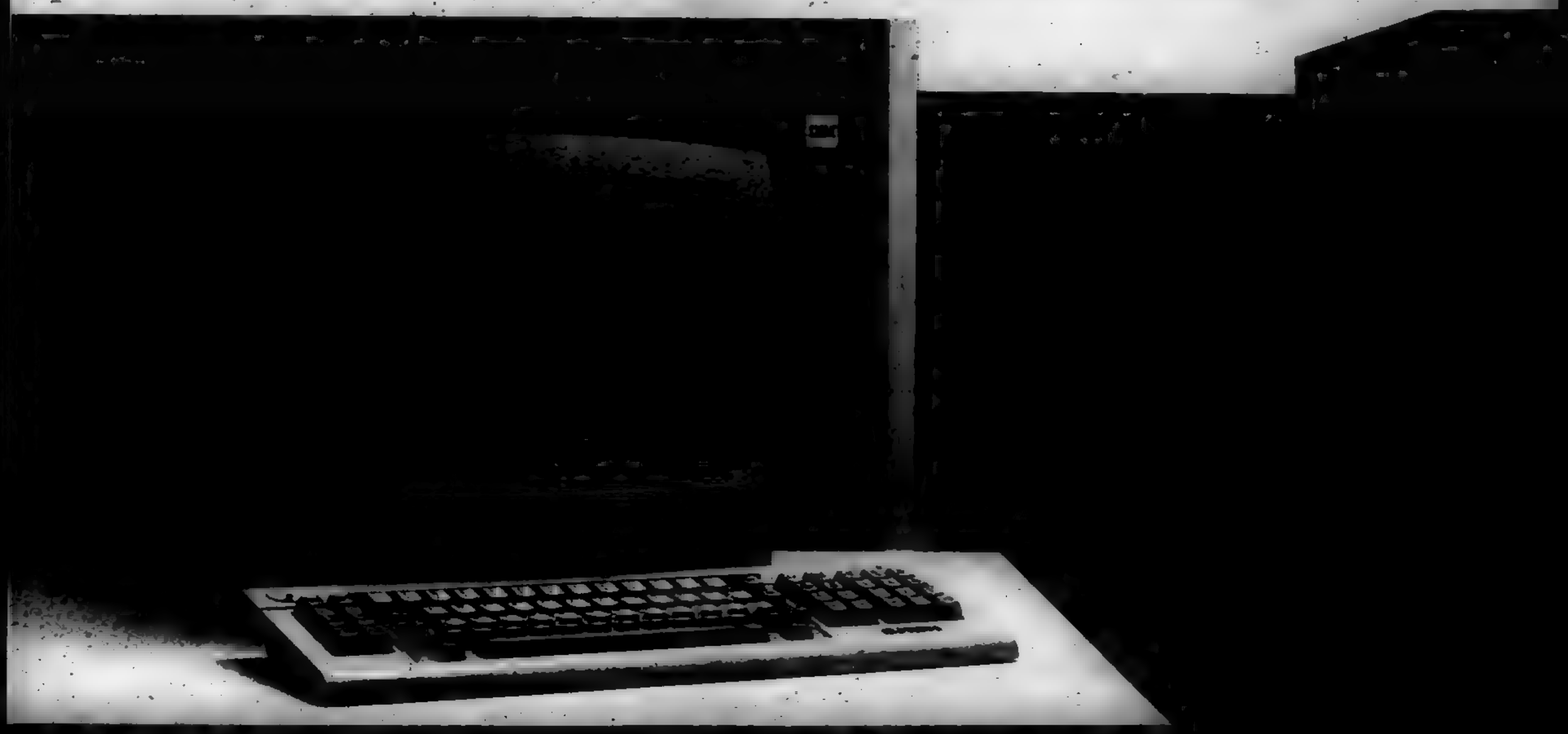

Ergonomic workplace improves productivity

Studies show proper setup aids workers

By Karen Nussbaum
Special to CW

Health problems associated with VDTs and poorly designed workstations threaten to decrease office workers' productivity, but managers can stave off the decline if they act to protect employees' well-being.

It is the manager's responsibility, in fact, to ensure employees' comfort and safety and to afford workers the opportunity to perform at their highest possible level.

Improper equipment can cause increased eye strain; back, neck and arm pain; and stress. All of these cut down an operator's productivity. Ergonomically correct equipment provides a more comfortable and convenient work environment, which fosters increased operator performance and can help reduce absenteeism and turnover.

Connections between office equipment and productivity have been documented in several studies, including the following:

- VDT operators who used standard, nonadjustable office furniture during a four-day study conducted by the National Institute of Occupational Safety and Health (NIOSH) in 1983 showed an 8% to 20% decrease in productivity from day one to day four. From morning to night each day, their production levels dropped between 20% and 30%.
- Another NIOSH-sponsored study, conducted in 1982 by Marvin J. Dainoff of Miami University in Ohio, compared operator performance in ergonomically correct and incorrect settings. A group of temporary typists worked for two days at standard workstations and two days at ergonomically designed ones. Their productivity was an average of about 24% greater at the well-designed stations.

As the second study indicates, managers have within their reach one method of increasing productivity and improving working conditions: the installation of ergonomically improved workstations. A good, ergonomically correct workstation should include a terminal that can be tilted and turned, an adjustable desk, a chair with adjustable seat height and backrest height and pitch and a detachable keyboard.

On its own, a properly designed chair can add as many as 40 productive minutes a day — 21 productive days a year — for most office workers, according to E. R. Tichauer, a professor of human factors engineering at New York University.

A fully adjustable workstation — one in which both the chair and the terminal can be adjusted to fit an operator's physical requirements — is not a costly investment, considering its payback in worker productivity.

The difference in cost between a fully adjustable chair and terminal and a nonadjustable chair and terminal, for example, can be recovered in less than five months (Figure 1).

For additional improvements in employee comfort and productivity, 9 to 5, the National Association of Working Women, recommends the following:

- Give intensive VDT users a 15-minute rest break every hour. Such breaks relieve muscle fatigue and eye strain and help reduce the stress that can cut into productivity levels.
- Correct poor office lighting and eliminate sources of direct and indirect glare. Office lighting may be more than twice as bright as recommended for terminal work; and glare from direct light, bright windows, reflective surfaces and the VDT itself adds to the problem.

Adding indirect overhead lighting and putting antireflection filters over terminal screens will help reduce operators' eye fatigue and irritation. Using window blinds or drapes also helps.

- As an added safety measure, encourage all VDT users to have annual eye exams. The American Optometric Association and NIOSH join 9 to 5 in recommending this measure.

Nussbaum is executive director of 9 to 5, the National Association of Working Women, which has headquarters in Cleveland and Boston.

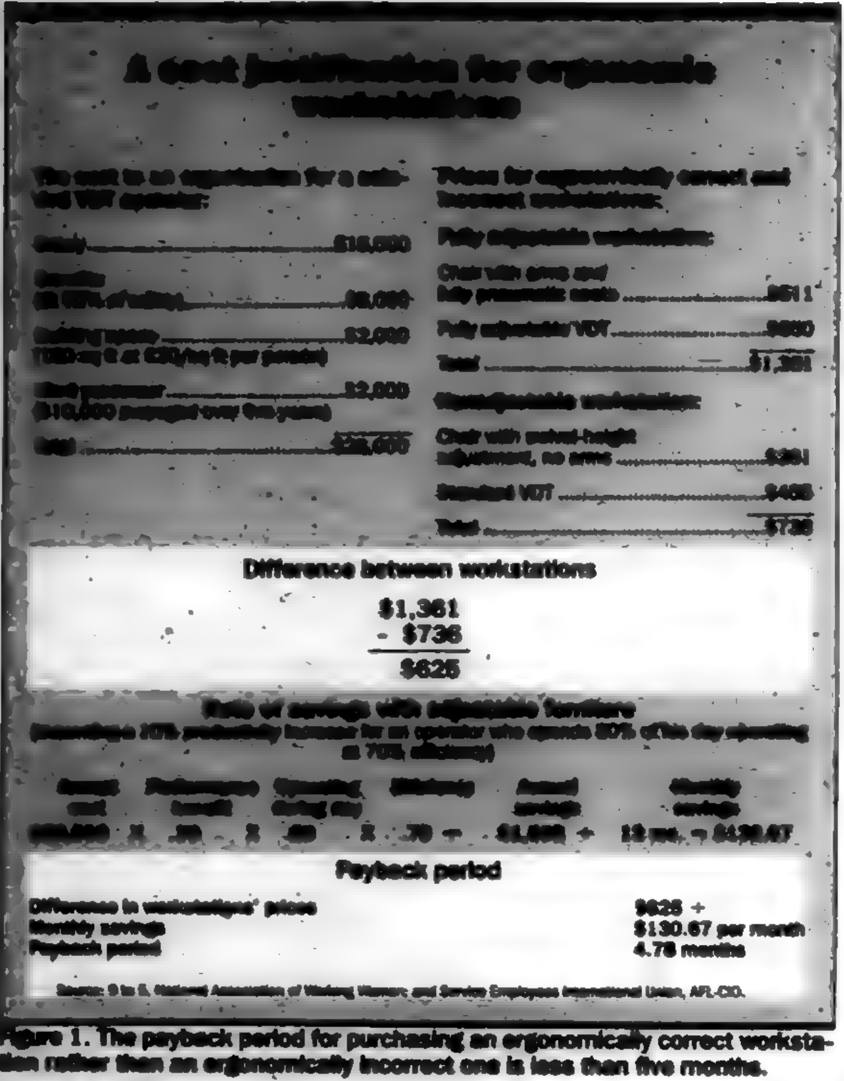

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Figure 1. The payback period for purchasing an ergonomically correct workstation rather than an ergonomically incorrect one is less than five months.

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From page 99

Eye exercises minimize strain

done properly, movement is not felt by the fingers.

- Start slowly, and gradually increase the speed of blinking. Fingers placed at the corners of the eyes should not feel any motion as this is done. If the blinks are tight, practice by blinking gently six times. Next close the eyes and rest for the count of six.
- This exercise should be practiced for about 30 seconds every hour or until the eye lashes can be fluttered without feeling any pulling on fingers.

Blink about once per line when reading and always when a change of focus is needed, such as when looking up from the terminal or if a momentary blur is experienced.

An example of a recuperative technique that can relieve eye fatigue is palming.

Palming should be done whenever eyes feel tired, including once before going to sleep. Here is the recommended technique: Close the eyes and cover them with the palms of the hands, making sure the palms do not touch the eyes. Elbows must be supported.

Next, relax the body, attempting to observe breathing patterns, counting the breaths in cycles of 10 or trying to visualize as clearly as possible some pleasant thought.

These activities should be repeated at regular intervals until they become routine.

These exercises were provided by vision specialist Rosemary G. Gordon.

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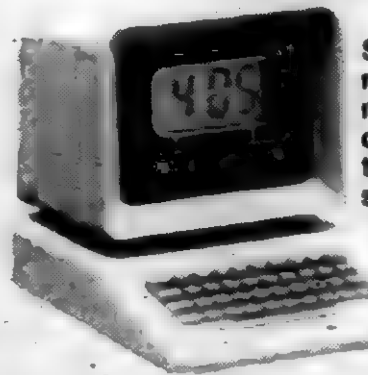

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    70. Mining/Construction/Petroleum/Refining/Agriculture
    80. Manufacturer of Computers, Computer-Related Systems or Peripherals
    85. Computer Service Bureau/Software/Planning/Consulting
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    95. Vendor: Other ________________ (Please specify)
2. OCCUPATION/FUNCTION (Circle one)
    11. President/Owner/Partner/General Manager
    12. VP/Assistant VP
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    21. Director/Manager/Supervisor DP/MIS Services
    22. Director/Manager of Operations/Planning/Admin. Serv.
    23. Systems Manager/Systems Analyst
    31. Manager/Supervisor Programming
    32. Programmer/Methods Analyst
    35. OA/WP Director/Manager/Supervisor
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    41. Engineering/Scientific/ R&D/Technical Mgmt.
    51. Manufacturing Sales Reps/Sales/Marketing Mgmt.
    60. Consulting Management
    70. Medical/Legal/Accounting/Management
    80. Educator/Journalist/Librarian/Student
    90. Other ________________ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply)
    Types of equipment with which you are personally involved either as a user, vendor or consultant.
    A. Mainframes/Superminis
    B. Minicomputers/Small Business Computers
    C. Microcomputers/Desktops
    D. Communications Systems
    E. Office Automation Systems

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NEW PRODUCTS

Kaypro IBM-compatible personal computer out

Kaypro Corp. of Solana Beach, Calif., has introduced an IBM-compatible personal computer as well as a personal computer starter kit.

The Kaypro PC is a desktop, Microsoft Corp. MS-DOS-based microcomputer. The heart of the system is the Intel Corp. 8088 microprocessor housed on the central processor board. The Kaypro PC also has a multifunction board that contains the floppy-disk controller, 256K bytes of memory expandable to 640K bytes, a serial port and a parallel port.

It comes with a 12-in. monochrome monitor with green phosphor display, two double-density disk drives and a locking keyboard identical to the Kaypro 2861 and the IBM Personal Computer AT.

In addition to MS-DOS 2.11, the Kaypro PC comes with a comprehensive set of applications software including Micropro International Corp.'s Wordstar, Mailmerge, Correctstar and Starindex. It costs $1,595.

The Kapro Starter Kit includes the Kaypro personal computer case and motherboard, complete with perpetual clock and calendar, speaker and six full-length and three half-length IBM-compatible slots.

It comes with one 350K-byte disk drive with a 5¼-in. slot for a second drive, a locking keyboard with Personal Computer AT layout and a 123W power supply that is strong enough to handle most hard disk drives.

To complete the full package, the user may add a CPU board, a multifunction board and a videoboard with monitor. The Starter Kit offers flexibility by allowing users to design a system to meet their own needs. Depending on the component selection, the user can put together a system that is compatible with the IBM Personal Computer, Personal Computer XT or AT.

The Kaypro Starter Kit costs $595.

Lanpar adds four models to Vision II

Lanpar Technologies, Inc. of Markham, Ont., has added four new models to its Vision II line of terminals, offering a choice of Digital Equipment Corp. or Burroughs Corp. compatibility.

A Vision II terminal

The Vision II-3222, priced at $1,095, is compatible with DEC's VT220, VT100 and VT52 terminals. It features 96 programmable user functions that use 1,786 bytes of nonvolatile function memory. It has on-screen function labels, dual-processor operation, a multipage system allowing up to eight logical pages of terminal memory, dual setup tables that can be assigned to two respective bidirectional host ports and VT220-style keyboard.

The Vision II-3222-GFX, priced at $1,490, is a graphics terminal. It combines full Vision II-3222 functionality with 880- by 300-pixel graphics resolution. It is compatible with Tektronix, Inc.'s 4010 and 4014. It has a Motorola, Inc. 68000 32-bit processor, up to 250 lines of display memory, graphics dump to printer and optional third port enabling the unit to be hooked up to two hosts and a printer.

The Vision II-3210 costs $975 and features all the functionality of the Vision II-3222. It has a VT220-style keyboard, DEC VT100 and VT52 compatibility and block-mode capability.

The fourth new model is Vision II-1100, which at $1,395, offers Burroughs ET1100 and TD830 emulation. It has a standard numeric keypad and a screen memory expandable to 128K bytes, which it shares with 28 programmable functions. It also features an independently addressable printer port, independent group address for a printer and 1.2K bytes of nonvolatile function memory.

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Micro Control enhances Cadkey

Upgrades computer-aided design, drafting system

Micro Control Systems, Inc. of Vernon, Conn., has enhanced Cadkey, its two-dimensional and three-dimensional computer-aided design and drafting system for IBM Personal Computers, Personal Computer XTs, Personal Computer ATs and plug-in compatibles.

New features include Cadkey's Advanced Design Language (CADL) providing ASCII I/O to Cadkey via disk files, Micro Control said.

With CADL, two-dimensional drawings and three-dimensional designs generated in Cadkey can be used in other applications such as finite element analysis, spreadsheet, data base and numerical control programs, the vendor said.

Other upgrades include cross-hatching for brick, steel, copper, alloys, aluminum, rubber and marble in ANSI standard; three-dimensional mesh generation consisting of either points or lines; ability to produce mirror images of a 2-D or 3-D object; and the ability to create disk notes with an external word processor that can be read into the Cadkey system for graphic display and documentation of a drawing or model, the company said.

System requirements include 512K bytes of memory, 256 levels and 16 colors.

Input can be from a tablet, mouse, function keys and keyboard.

Cadkey costs $2,695, according to the vendor.

An optional translator, which transfers three-dimensional data bidirectionally, sells for $750.

AT&T's SAM tool debuts

AT&T has announced Security Access Manager (SAM), a building access security system.

SAM uses an AT&T PC 6300 with hard disk, a magnetic stripe reader and AT&T frame creation system Series 350 data base and graphics system to capture, store and retrieve photographic images and clearance ratings for individuals.

SAM consists of a creation center and guard station. The creation center allows the user to create and store descriptive employee information.

When an employee inserts an identification card at a guard station, SAM establishes positive identification by accessing and displaying the employee's photo and ID information.

An entry-level SAM costs $30,500.

Adage introduces stand-alone workstations

Adage, Inc. of Billerica, Mass., is offering a series of stand-alone graphics workstations that operate in Digital Equipment Corp. and IBM environments.

The 6500 line of workstations uses the MicroVMS operating system, combining IBM 5080 Graphics System emulation, the Adage Ocean Graphics Engine and DEC's 32-bit Microvax II microprocessor.

There are four entry-level configurations. Models 6580 and 6585 provide IBM 5080 emulation, Microvax II power and two- and three-dimensional color graphics capabilities. Models 6500 and 6505 are said to provide the same graphics capabilities, only in a DEC environment, the vendor said.

All models run MicroVMS-based software including PDA Engineering Co.'s Patran; Swanson Analysis Systems, Inc.'s Ansys; and MacNeal-Schwendler Corp.'s MSC/Nastran.

Each workstation features multiwindowing, multiterminal capabilities and four to eight RS-232 ports that are available for additional user terminals, printers or other serial devices.

Workstations can reportedly be configured with 3M bytes to 9M bytes of VAX memory, up to 4M bytes of display list memory, from 105M bytes to 600M bytes of fixed Winchester disk drive capacity and 4- or 8-bit planes of double-buffered pixel memory.

Security includes system access by key lock, MicroVMS software protection and optional fixed-disk protection.

An entry-level 6500 workstation consists of the Ocean Graphics Engine; one 3M-byte Microvax II with floating-point hardware, eight RS-232 lines, dual 800K-byte floppy disks, 105M-byte ¼-in. fixed Winchester disk drive, Ethernet interface, 4-bit plane of double-buffered pixel memory, 1M byte of graphics memory, a 19-in. 60Hz noninterlaced color monitor and keyboard, according to Adage.

Operating software includes a MicroVMS license supporting up to eight users; the Adage Graphics Library, including Tektronix, Inc. 4100 and DEC VT200 emulators; and the Adage Window Management System.

Prices start at $49,500 for the Model 6500 and at $66,500 for the Model 6580.

Information appearing in the New Products section has been provided by manufacturers and has not been independently validated by Computerworld.

Systems software

Landmark Systems Corp. has announced that the **Monitor for CICS**, a CICS performance management system, has been enhanced to provide performance statistics for non-IBM data base systems that run under CICS.

This new feature enables users to gather performance data for Software AG of North America, Inc.'s Adabas, Cullinet Software, Inc.'s IDMS, Applied Data Research Inc.'s Datacom/DB, Cincom Systems, Inc.'s Total and other vendor-supplied or in-house data base systems.

The Monitor's data base support is implemented through a user interface. Summarised performance statistics for each data base are available on-line, and the Monitor's batch reporting system supports all data base performance statistics.

The Monitor for CICS is available for a permanent site license fee of $16,000 for MVS/XA, MVS and VSI systems and $8,000 for DOS systems.

Landmark Systems, 6564 Loisdale Court, Springfield, Va. 22150.

■

Tektronix, Inc. has expanded its line of automated **Structured Analysis (SA) Tools** to operate on the DEC VAX system running VMS as well as the VAX running AT&T Unix.

The SA Tools are designed to support front-end system and software modeling due to the availability of powerful graphics editing, model analysis and hard-copy output.

The SA Tools use the Tektronix 4100 series of color graphics terminals for interactive input. Hard-copy output uses the Tektronix 4690 line of color graphics copiers and 4640 line of printers.

The price of Tektronix SA Tools for the VAX is $16,500.

Tektronix, P.O. Box 14752, Portland, Ore. 97214.

■

H&W Computer Systems International has announced **Release 5.2 of SYSM**, its CICS/VS electronic mail system.

SYSM is a menu-driven message distribution system that includes filing, electronic forms, CICS printer control, teletypewriter support, multiregion and multiprocessor support and an applications program interface.

Release 5.2 features include simplified menus and screens and a check mail command allowing users to check the "In" basket from nonmenu screens. Print functions have been added as well as a carbon-copy feature for the "Out" basket.

Release 5.2 of SYSM supports CICS Releases 1.5 or later and costs $12,000 for DOS sites and $14,000 for MVS/OS sites. Calendaring and scheduling are available for $5,000.

H&W Computer Systems, P.O. Box 4785, Boise, Idaho, 83711.

■

Data General Corp. has enhanced its **DG/UX** native AT&T Unix system and **MV/UX** its hosted Unix for the 32-bit Eclipse MV family of superminicomputers and Distributed Systems (DS) workstations.

DG/UX was upgraded to support AT&T's Unix System V Release 2 Version 2 plus 95% of the system calls from the University of California at Berkeley Unix 4.2 .

MV/UX, which integrates Unix with AOS/VS software, adds AT&T Unix System V Release 2 Version 2 features — including paging, record and file locking and a security administration package.

DG/UX and MV/UX also support TCP/IP, a communications protocol that lets DS and Eclipse MV systems coexist in local-area networks consisting of DG and non-DG equipment.

Typical prices are $39,000 for an Eclipse MV/4000 DC with eight users; $27,000 for a single-user DS/4200 engineering workstation; $87,000 for an Eclipse MV/4000 with eight users; $165,000 for an Eclipse MV/8000 II with 16 users; and $310,000 for an Eclipse MV/10000 with 64 users.

DG, 6300 S. Syracuse Way, Englewood, Colo. 80111.

Productivity aids

Datamate Co. has announced three disk management utility programs for users of NCR Corp. 9000 series superminicomputers. **Disc-Pack**, **Copy-Wild** and **Directaid** all run under the NCR ITX and IRX operating systems.

Disc-Pack is a disk compression utility used to recover storage space lost due to disk fragmentation.

Copy-Wild allows users to specify the prefix or suffix of a file name and copy all the files that match that partial name to another disk.

Directaid creates directory listings which allow the user to sort by name, allocation, organization, creation date, starting sector or record length.

Disc-Pack costs $495, Copy-Wild costs $295, and Directaid costs $95.

Datamate, Suite 128, 4135 S. 100th East Ave., Tulsa, Okla. 74146.

■

Eagle Software, Inc. has released **VS Toolbox**, a set of utilities that supplements Data General Corp.'s AOS/VS operating system.

VS Toolbox contains nine utilities designed to improve DG's Infos file organization system. The utilities reportedly enhance file organization, monitor system performance, improve system security and enhance AOS/VS file access time.

The Inspector utility analyzes Infos file organization. The Architect utility allows the user to recreate Infos files and change file characteristics. The Rebuilder reorganizes Infos files to reduce sequential processing time. The Cross-Examiner compares two copies of an Infos index and data base and reports any differences. The Secret Agent monitors system performance. The Terminator watches the system for inactive consoles. The D. A. examines directories to determine an optimum hash framesize and files to determine if the number of index levels could be reduced. The Surgeon recreates a file with the same creation time but with a different element size and fewer index levels. The Director utility redirects indirect records in an Infos file.

VS Tool box is priced at $1,850.

Eagle Software, P.O. Box 16, Salina, Kan. 67402.

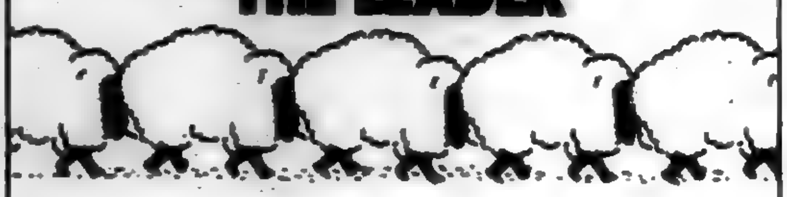
■

MacKinney Systems has announced two CICS aids, **Show and Tell** and **CICS/Swap**.

Show and Tell is designed for troubleshooting, security, training and documentation. It runs on IBM or IBM-compatible mainframes with

Continued on page 110

WHY FOLLOWERS OFTEN LOSE SIGHT OF THE LEADER



In their predictable attempts to follow our lead, our competitors have invariably lost their sense of direction. So when you first look at the new AGILE 6287, our competitors are precisely where you'd expect. Nowhere in sight.

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The 6287 supports full-feature emulation of most IBM 3270 printer applications, including APL. With built-in diagnostics, internal power supply and fan cooling, the 6287 is backed by a full two-year warranty.

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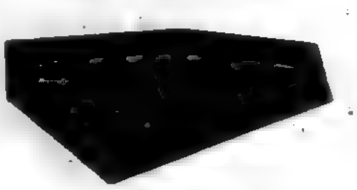

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[illegible]

Q. IF DATA NETWORK MANAGEMENT IS SO IMPORTANT, HOW COME PEOPLE DON'T AGREE ON WHAT IT IS?

A. One reason is that within the telecommunications industry there isn't much agreement on what is meant by the word "network." What one company calls a network, a second company considers to be only a small portion of what it calls a network. The differences are ones of scope and scale. And they are truly significant.

Q. Can you give me an example?

A. Some people might consider a data network to be a web of phone lines. But when manufacturers of modems (devices that enable computers and terminals to communicate over phone lines) talk about a network, they usually mean the phone lines *plus* the modems.

And when IBM talks about a data network, we mean something far more inclusive.

Q. What's IBM's definition of a network?

A. First, let's look at why data networks exist. A network's purpose is to enable a person at a terminal to communicate with a host computer and other users, and thereby produce useful work.

In IBM terms, a network includes the communications capability of the host computer, the individual terminal and everything in between—regardless of whether that terminal is located in the next room, in the next state or in the next continent. And regardless of whether it's one terminal—or one thousand terminals.

So when IBM says "network management," we mean the end-to-end management of your entire IBM data network.

Q. What's IBM's approach to network management?

A. We provide a system of hardware and software products that enables the network operator to "see" down the communication lines all the way to the end terminal. With this ability the operator can anticipate and correct potential network problems before they become real network problems.

And if there is a real network problem—an interruption or slowing of service—the operator can isolate and identify the specific component that is causing the problem and recommend the best way to fix it. You see, the purpose of network management is to ensure the consistent delivery of quality information to the network users.

Or, more simply stated, it's the ability to detect and correct problems rapidly, regardless of where they occur on the network.

Q. Why should I even worry about network problems?

A. For many companies, when their networks slow down, their ability to do business slows down. Network availability means that remote locations can enter customer orders, answer customer questions, check delivery schedules and just generally be productive. Your network's performance can materially affect your company's ability to compete in today's marketplace.

Q. How can I tell if my company's network is operating up to snuff?

A. One barometer is response time. That's how long it takes a terminal to answer a request. Now a lot of things can affect the network's response time. How busy is the host? How complicated is your request? What communications equipment are you using between the terminal and the host?

The point is, once the end user and the telecommunications manager agree on an acceptable response time, IBM network management products have the ability to monitor the actual response times and give an early warning of service deterioration.

Another barometer is how long it takes to get a problem fixed. We found that in networks that use our approach, the vast majority of problems are immediately fixed by the network control center during the initial phone call for help. Now, we'll be quick to add that when a tornado in Kansas tears out a lot of phone lines, that's a major problem. But most network problems aren't caused by tornados. They're caused by little things like a loose wall plug or the fact that someone forgot how to log on to the system.

Q. Is there a limit to how large a network the IBM products can manage?

A. Not really. We use our products to manage our own network of over 50,000 terminals and printers scattered all across the country. From one site we can determine the physical location and operating condition of every piece of equipment.

In addition, when your company adopts the IBM approach of end-to-end network management, you'll be able to tell from your network control center if the problem is a loose wall plug in San Francisco, a noisy line in Boston or a tornado in Kansas.

Q. Is this pie in the sky? Or are these products available now?

A. The IBM network management hardware and software are available now, and they're designed to grow with your company. In fact, this network management capability is already built into much of the IBM hardware you currently have.

Q. Why should I adopt IBM's approach to network management?

A. Because only IBM can offer you an end-to-end solution. Our hardware and software will enable your company to manage your data network from the host computer all the way to the very last IBM terminal.

Perhaps the best way to get an understanding of IBM's approach to network management is to visit an actual installation. If you'd like to do that, talk to your IBM marketing representative.

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Continued from page 108

CICS, running DOS, OS or MVS. It has four major functions. The Show function displays what is currently on another CICS terminal.

The Spy function monitors another terminal's transactions. The Tell function echoes a series of transactions run on a master terminal on other terminals or printers. A copy of each screen can be printed for reference or documentation. The Maps function will display a map into which data may be entered.

CICS/Swap is a CICS session-handling aid. It allows users to swap back and forth between two CICS transactions, making changes on either.

Show and Tell is priced at $695. An annual lease costs $295. CICS/Swap is priced at $995 for MVS systems and $695 for DOS systems. Annual leases are $395 for MVS and $295 for DOS.

MacKinney Systems, Suite 112, 2674-A South Glenstone, Springfield, Mo. 65804.

■

BMC Software, Inc. has announced **3270 Optimizer/VM**, a new VM system software product designed to reduce network loads and improve response time on remote IBM 3270 terminals in a VM network.

The product uses data stream optimization to reduce the number of characters needed to transmit a message to 3270 screens.

The 3270 Optimizer/VM is available until Jan. 1 for a perpetual license fee on the first CPU of $9,750. After Jan. 1, the cost will be $12,500.

BMC Software, P.O. Box 2002, Sugarland, Texas 77478.

■

Scott-Kennard & Associates, Inc. has introduced a CICS support package, **Transaction Documentation Processor (Help)**, designed to offer on-line documentation to transaction developers and users.

Accessed by keying in Help on the users transaction screen, the package provides a documentation menu containing seven areas, such as a general description of the transaction, a description of the functions of the transaction and a description of the product from which the transaction arises.

Components of the package include an on-line full page editor that provides for the customized addition and deletion of data and the maintenance of existing data, a print program for producing hard copy and a batch data base load program for ASCII files.

Users of IBM's Copics manufacturing software can purchase on-line documentation for its bill of materials, inventory accounting, material requirements planning, shop order release and product cost calculation.

The system is written in Cobol and requires CICS and DL/1.

The base price is $16,500 and may range up to $30,000, depending on the system components selected.

Scott-Kennard & Associates, P.O. Box 1048, Morgan Hill, Calif. 95037.

Integrated Software Systems Corp. (ISSCO) has announced **Cuechart Chartbook Library**, a software package of more than 750 predesigned charts for producing computer graphics for presentations.

Cuechart Chartbook Library, an option to Issco's Tell-A-Graf package, consists of three sets of chart books. The Management Chartbook provides 300 formats for applications such as management, budget and sales, as well as reporting experimental or production run data.

Comparison Chartbook provides about 200 formats including strip and group charts and row and column displays. Applications include product performance by branch or region and display of experimental results against predictions.

Word Chartbook provides approximately 250 formats for presenting lists of words. Formats include multiple column, tabular comparison lists and bullet.

The Cuechart Chartbook Library will be available Nov. 15 for IBM MVS and CMS and Digital Equipment Corp. VAX/VMS. The prices until Dec. 13 range between $450 and $6,200, depending on the computer system configuration. After Dec. 13, prices will range between $600 and $8,200, the vendor said.

ISSCO, 10505 Sorrento Valley Road, San Diego, Calif. 92121.

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The Computer Output Management Company
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•The IBM PC graphic shown here is not reproducible.

NEW PRODUCTS

Rand Systems Corp. has announced **Performance Utilization Plus (PUP)**, a software package said to maintain a minimum of 70% CPU use for the IBM System/38 during peak hours of operation.

The product will periodically extract information from the System/38 to determine the adjustments necessary to maintain peak efficiency, according to the vendor.

The program is available for $550.

Rand Systems, Suite 305, 7071 Orchard Lake Road, W. Bloomfield, Mich. 48033.

■

Financial Dynamics, Inc. has announced **programming utilities** for Dbase III and Turbo Pascal.

Dbase III utilities consist of a menu system, data maintenance and archival routines plus dynamic Help routines.

Pascal utilities include a menu-generation system that allows programmers to create menus similar to Lotus Development Corp.'s 1-2-3 with submenus, a descriptive message line and context-sensitive Help.

Among the other 45 Pascal utilities are date math, time math and formatting routines similar to Dbase picture formats.

String and numeric functions, such as case conversion, string conversion, five text trim functions plus Dbase II and III direct file access, are also supplied.

The utility packages, each priced at $49.95, operate on computers that run Dbase III or Turbo Pascal, the vendor said.

Financial Dynamics, P.O. Box 10898B, Arlington, Va. 22210.

Application packages

J. L. Ham & Associates, Inc. has unveiled a **Fixed Asset Control One System** version for the IBM System/36.

Fixed Asset Control One System is a menu-driven tax planning program. It supports the Tax Reform Act of 1984, and it allows for the processing of multiple companies or entities. It is used to produce depreciation schedules and other reports.

Data entry is all on-line, and there is an on-line inquiry facility allowing users to review the status of assets or accounts without printing the schedules.

Fixed Asset Control One System for the IBM System/36 costs $2,500.

J. L. Ham & Associates, Maple Professional Building, 693 Maple St., Plymouth, Mich. 48170.

■

Westinghouse Electric Corp. has announced an **on-line personal and resource scheduling calendar** enhancement to Mailtronic, its electronic mail system.

The new feature is said to enable users to schedule meetings and the use of physical resources such as conference rooms. The scheduling system allows a user to request a meeting. It then updates the personal calendars of the attendees and checks for conflicts. In the case of a conflict, alternative dates, times and locations are suggested.

Mailtronic operates as an application under the Westinghouse's Westi teleprocessing system or as a task under IBM CICS. Versions are available for IBM operating systems DOS/VSE or OS/MVS. Files are maintained through VSAM.

The cost of Mailtronic is $9,000 for VSE systems and $16,000 for MVS systems.

Westinghouse Electric, Building 7, Penn Center, Pittsburgh, Pa. 15235.

■

M&D Systems, Inc. has upgraded its **Myte Myke** business and manufacturing software to provide one-stage or two-stage billing, Canadian sales tax calculations

Continued on page 112

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NEW PRODUCTS

Continued from page 111

and recapitulations and immediate print invoices for point-of-sale transactions.

Other Myte Myke Version 3 enhancements include recurring order handling for standing orders, back orders placed during order entry or prior to billing, 26 additional user-defined fields of customer information and sales commission based on price or profit. Version 3 also includes blanket orders for individual promise dates per line item and daily shipment planning report.

Written in RM Cobol, the software runs on systems including IBM Personal Computers, Personal Computer XTs, ATs and compatible computers; IBM System/36s; Televideo Systems, Inc. Personal Minicomputers; and AT&T 3B2s.

Myte Myke costs between $795 and $1,495, depending on the hardware and operating system, according to the vendor.

M&D Systems, P.O. Box 108, 3885 N. Buffalo Road, Orchard Park, N.Y. 14127.

■

EVB Software Engineering, Inc. has released a 22,000 line object-oriented design application called **Complexity Metrics Tool** (CMT) for Ada software that consists of more than 700 pages of documentation, source-code listings and a user reference manual.

The Ada source code consists of 256 separate compilation units that are direct representations of the design process, according to the vendor.

Prices are $2,789 for the first site and $499 for each additional site.

EVB Software Engineering, Suite 100, 451 Hungerford Drive, Rockville, Md. 20850.

■

Westmoreland Systems, Inc. has enhanced its **3D-Doc** data dictionary documentation system for the IBM System/34 and System/36.

The latest version of 3D-Doc adds security for fields and files, more room for comments plus edit codes and headings for interfacing with the firm's ADD system. ADD is the Application Design & Development system that creates report program generator source code automatically for reports, inquiries, on-line maintenance and batch programs.

3D-Doc costs $750.

Westmoreland Systems Suite I, 228 Park Ave. N., Winter Park, Fla. 32790.

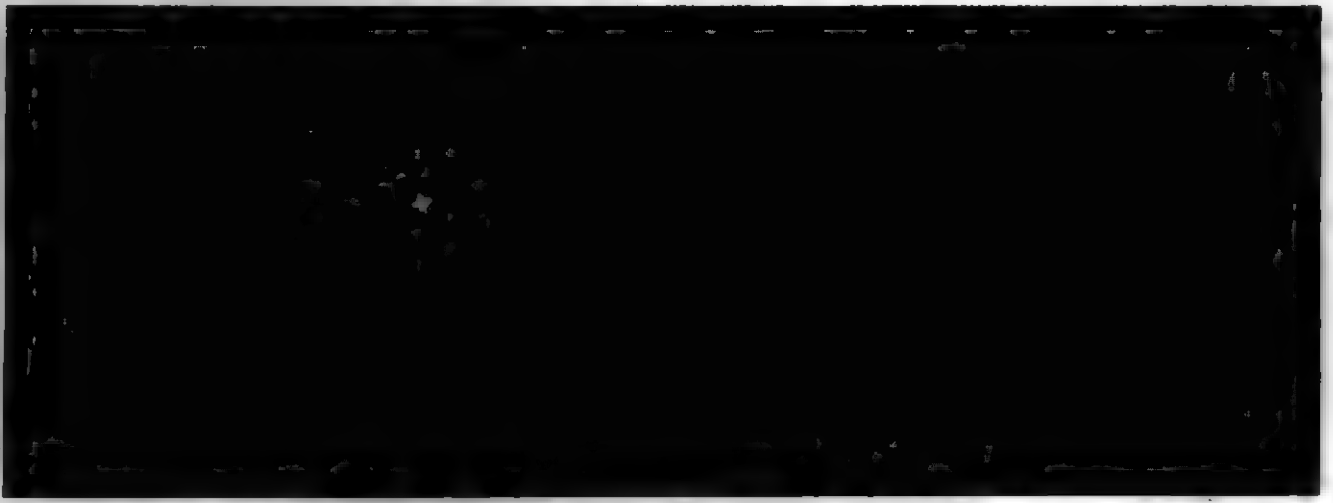
Languages

Hewlett-Packard Co. has announced **HP Business Basic/3000**, an implementation of a Basic language for the HP 3000 business computer.

HP Business Basic/3000 is designed to simplify program development for the HP 3000. It features both an interpreter and a compiler accessible through Basic commands and statements. In the interpretive environment, developers can get immediate feedback on the effect of program modifications and on syntax errors as program lines are entered.

HP Business Basic/3000 comes with an extended feature set including statements and constructs to support structured programming. The language also includes support for long identifier names and alphanumeric labels. Seven data types are provided, and numeric data can be packed into strings. HP Business Basic/3000 provides the ability to call user-supplied routines written in Pascal and system intrinsics. HP Business Basic/3000 is compatible with the HP MPE

Continued on page 113



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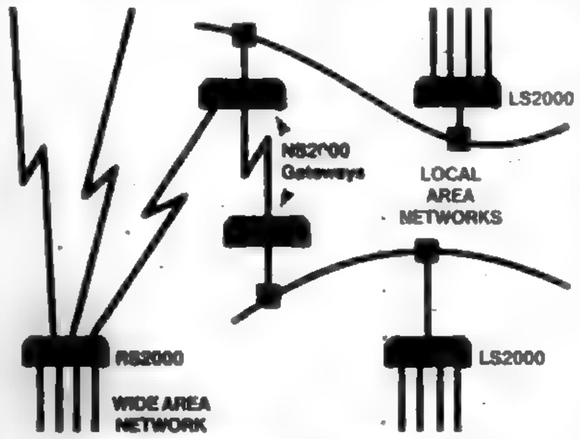
*X.25 and other networking capabilities are currently under development.



NEW PRODUCTS

Continued from page 112

operating system, allowing users access to MPE capabilities. Call compatability is also maintained with other MPE languages such as Cobol and HP Fortran.

The product also allows users of HP 250 and HP 260 multiuser systems to convert programs and files to the HP 3000 environment.

HP Business Basic/3000 is priced at $5,500, including documentation and utilities for converting HP Basic/250, HP Basic/260 and HP Basic/3000 to HP Business Basic/3000.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

■

AT&T Information Systems has announced Advanced Computer Techniques Corp.'s compiler products for the AT&T 3B series of computers. **AT&T Integrated Compiler Products** are programming languages designed to generate efficient object code while sharing a common code generator and common routine libraries.

The languages offered are Command Cobol, Command Fortran, Command Pascal, Command Basic as well as a Common Integrated Runtime Symbolic Debugger. All four compilers conform to the most current language standards and are fully integrated with the C language and the AT&T Unix System V environment.

They use a common Unix file format, allow cross-calling between languages and use native operating system services to enhance the efficiency of the compilers and their generated application programs.

Command Basic and the debugger each cost $1,000 for the 3B2 computer and $2,000 for the 3B5. Command Fortran and Command Pascal each cost $1,200 for the 3B2 and $2,500 for the 3B5. Command Cobol costs $2,500 for the 3B2 and $6,000 for the 3B5.

AT&T Information Systems, 200 Southgate Pkwy., Morristown, N.J. 07920.

■

Amalgamated Software of North America, Inc. is offering an **RPG-III compiler** for System 5364, IBM's desktop System/36.

The RPG-III compiler provides structured programming constructions including DO, DO-WHILE, DO-UNTIL, IF-THEN-ELSE, COMPARE-AND-BRANCH and CASE operations. These facilities eliminate indicator usage in Calc specifications, the vendor claimed.

Advanced disk file operations supported by the compiler include READ, PREVIOUS, OPEN, CLOSE and UPDAT. I/O operations are READE, SETGT, EXFMT and WRITE.

In addition, the RPG-III supports externally defined files, data areas and indicators as fields and arrays, the vendor said.

Language features are upwardly compatible with the System/38. Programs compiled in RPG-III can run on systems not using the product, according to the vendor.

A one-time license fee costs $750.

Amalgamated Software of North America, P.O. Box 6610, Malibu, Calif. 90264.

Intel Corp. will market **C-Line/C-English**, a fourth-generation programming language that generates C programs for its System 300 microcomputers, including the 286/310 supermicrocomputer.

With a syntax similar to Ashton-Tate's Dbase III, C-Line/C-English acts as a front end to resident C compilers, enabling programmers with no knowledge of C to generate C programs, a spokesman claimed.

C-Line/C-English has been available for a year from its developer, C Line, Inc., for DOS and IBM PC-DOS-based personal computers and intelligent workstations. The software is now offered under both Microsoft Corp.'s Xenix 286 and DOS.

The package costs $1,695 for Intel 286/310 systems.

Intel, 2402 W. Beardsley Road, Phoenix, Ariz. 85027.

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NEW PRODUCTS

Remote computing services

General Electric Information Services Co. (GEISCO) is offering **Surenet Returns Service**, an automated clearinghouse for returns and notifications of change processing for financial institutions.

Surenet Returns Service provides automated clearinghouse returns processing for commercial entries and federal recurring payments such as Social Security or veterans' benefits payments.

Automated clearinghouse returns processing involves returning entries transmitted through the automated clearinghouse, such as payroll deposits, for such reasons as incorrect account numbers or the death of the beneficiary.

Software that operates on IBM Personal Computers, Personal Computer XTs or compatible microcomputers provides for key entry and tranamission of automated clearinghouse returns and notifications of change.

The software costs $25 per package, the vendor said. A Hayes Microcomputer Products, Inc.-compatible modem and an 80-col. printer is also required.

GEISCO delivers submitted entries to the Federal Reserve System for distribution back to the originator. Charges are 50 cents for each return, 20 cents for each notification of change plus an initial setup charge of $30.

The service supplies initial copies of daily reconciliation and monthly activity reports for free.

GEISCO, Payment Services Operation, 401 N. Washington St., Rockville, Md. 20850.

Training

DB View, Inc. has announced that a three-day, on-site **training course** is now available to aid users of DB2, IBM's relational data base system, in performance monitoring and tuning.

The course offers instruction on data collection, interpretation and performance tuning using DB2 accounting information. The on-site course includes a one-day workshop to evaluate and improve DB2 performance at the user site.

The course costs $2,000.

DB View, 314 Beacon St., Boston, Mass. 02116.

■

Boeing Computer Services Co. has announced **Scholar/Teach microcomputer Version 3** and **Scholar/Teach mainframe Version 5.4**, enhanced releases of its Scholar/Teach computer-based training system for IBM and compatible processors.

Both versions now offer a menu-driven screen development editor that eliminates the need for command statements. Users can build course screens that combine text, input fields, highlighting, color and keyboard graphics by using menus plus cursor and function keys.

The enhanced microcomputer system also includes an expanded color graphics editor and an interface with videodisk technology.

A video interface used with interconnected microcomputer and video equipment lets authors develop multimedia courseware that allows students to view video demonstrations of experienced users working with equipment.

An additional upgrade to the mainframe system is a menu designed for novice or occasional course developers that prompts the user with available course development alternatives.

Scholar/Teach microcomputer Version 3 operates on the IBM Personal Computer or Personal Computer XT under IBM PC-DOS with at least 192K bytes of memory. Licenses cost $495 for Author plus Presentation versions and $95 for Presentation systems only.

Priced at $35,000, the mainframe Version 5.4 runs on IBM mainframes.

Boeing Computer Services, 7980 Gallows Court, Vienna, Va. 22180.

Software

Zsoft Corp. has released **Version 3 of PC Paintbrush**, its drawing package for IBM Personal Computers.

Version 3 of PC Paintbrush has 16 new features, including rubber band circles, automatic curve drawing, rounded boxes and variable font stroke widths. PC Paintbrush has adjustable palettes and Lotus Development Corp.'s 1-2-3 Pic file interpreter. It is now possible to edit pictures that are larger than the screen and to edit the entire screen void of menus.

PC Paintbrush requires a minimum of 320K bytes of memory.

Version 3 costs $139. PC Paintbrush is also available bundled with several digitizers like Kurta Corp.'s wireless pen mouse.

Zsoft, Suite A-495, 1950 Spectrum Circle, Marietta, Ga. 30067.

■

Computer Associates International, Inc.'s Micro Products Division has released an **enhanced version of Supercalc3A** for Apple Computer, Inc.'s Apple IIc and enhanced Apple IIe computers with at least one disk drive.

The version supports Apple's Unidisk 3.5 disk drive, the Apple II Memory Expansion Card and the Imagewriter II color dot matrix printer.

Unidisk's 3½-in. disks contain 800K bytes of memory, making it possible to put the Supercalc3A program and all utilities on a single disk. The Memory Expansion Card provides up to 1M byte of random-access memory, allowing users of Supercalc3A to use up to 512K bytes of memory. The Imagewriter II printer

Continued on page 117

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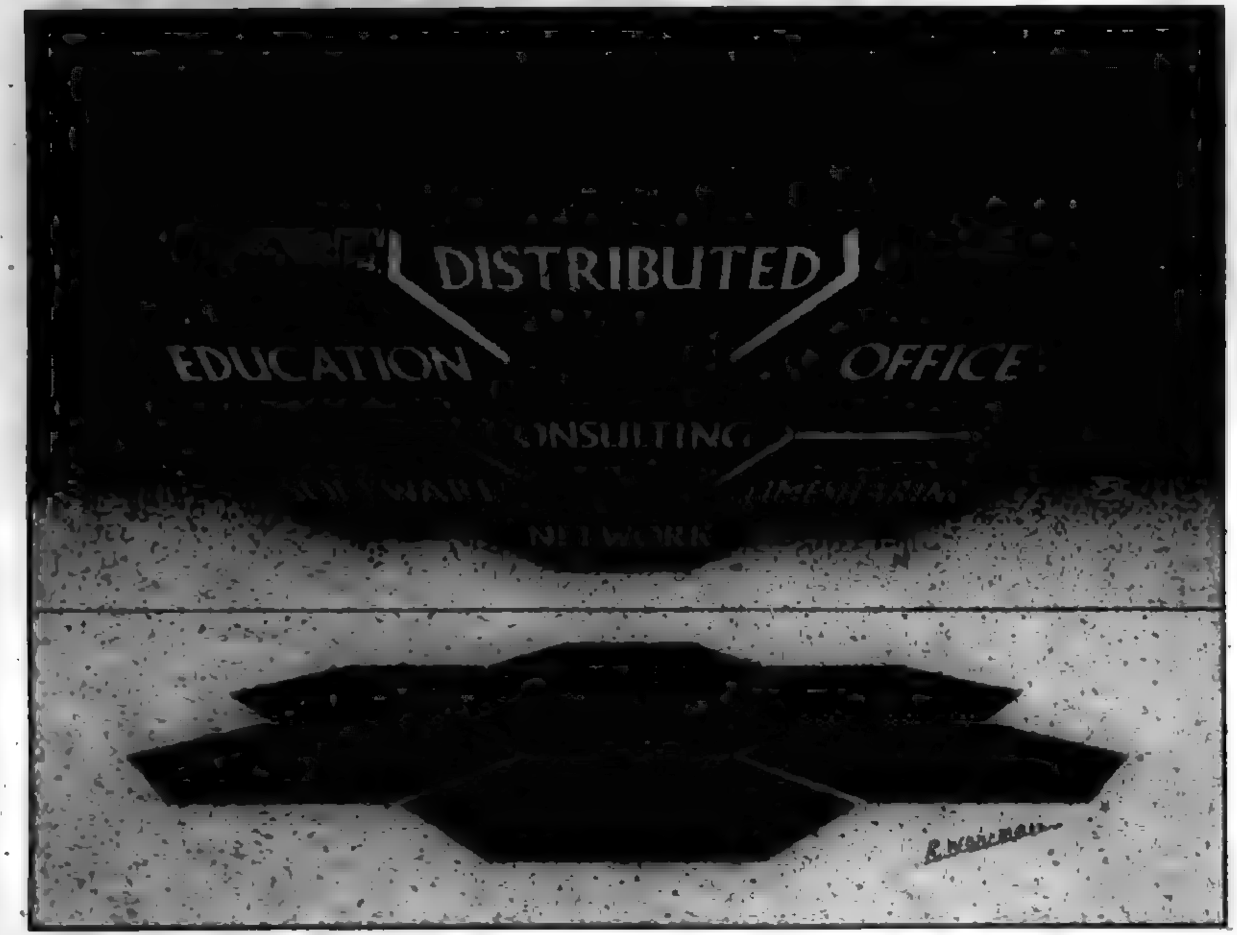

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Continued from page 116

allows users to convert Supercalc3A's screen displays to color hard copy.

Supercalc3A is priced at $195.

Computer Associates International, 2195 Fortune Drive, San Jose, Calif. 95131.

◆

Software Publishing Corp. has announced new versions of **PFS:File, PFS:Report, PFS:Write, PFS:Plan and PFS:Graph** for Apple Computer, Inc.'s Apple IIc and IIe computers.

The versions will support Apple's Prodos operating system, a Unidisk 3.5 disk drive, a Profile hard disk, the Apple II Memory Expansion Card, the Imagewriter II printer and the Colormonitor IIe and IIc.

The Prodos versions of the PFS software series will be available in November for $125 each. A utility program to convert data files created with the non-Prodos versions of PFS software into Prodos format is available at no charge.

Software Publishing, 1901 Landings Drive, Mountain View, Calif. 94043.

◆

Megahaus Corp. has unveiled **Reportworks,** an addition to its Megaworks mail-merge and spelling checker program for Apple Computer, Inc.'s Apple II computers.

Reportworks enables users to import data from Apple's Appleworks data base and spreadsheet files to create and print reports, tables, lists and forms.

Reportworks supports the Apple II Memory Expansion Card and Apple's Unidisk 3.5 disk drive.

It costs $125.

Megahaus, 5703 Oberlin Drive, San Diego, Calif. 92121.

◆

Quark, Inc. released **Version 3** of its **Catalyst** program selector for Apple Computer, Inc.'s Apple IIc and the enhanced 128K-byte Apple IIe.

Version 3 features include an interface similar to that of the Macintosh computer and desk accessories like a calculator. It supports Apple's Unidisk 3.5 disk drive and Profile hard disk and the Quark QC10 and QC20 hard disks.

The cost of Catalyst 3 is $149. Upgrades are available for $45.

Quark, Suite 220, 2525 W. Evans, Denver, Colo. 80219.

◆

United Software Industries, Inc. has released a new version of its **ASCII Express** telecommunications software package for Apple Computer, Inc.'s Apple IIe and IIc computers.

The version runs under Apple's Prodos operating system, supports Apple's Unidisk 3.5 disk drive and Colormonitor IIe and IIc. It is compatible with the Apple Personal Modem as well as direct-connect applications. ASCII Express costs $129.95.

United Software Industries, Suite 300, 1880 Century Park E., Los Angeles, Calif. 90067.

◆

Fischer Innis Systems Corp. has released **Watchdog 4,** a new version of its software-based security package for the IBM Personal Computer XT, AT and Personal Computer compatibles with hard disks.

New security features include a system of permissions to control the scope of user activity and encryption keys that activate automatic scrambling and unscrambling of protected files and programs. New file management features include an expanded number of protected directories and on-line Help screens.

Watchdog 4 costs $295.

Fischer Innis Systems, 4175 Merchantile Ave., Naples, Fla. 33942.

◆

Broderbund Software, Inc. has announced that its two graphics software packages for the Apple Computer, Inc.'s Apple II computer series, **Dazzle Draw** and **Fantavision,** will support Apple's new peripherals.

Dazzle Draw will work with the Colormonitor IIe and IIc, the Imagewriter II printer and the Unidisk 3.5 disk drive. Fantavision will run on the Colormonitor IIe and IIc.

Dazzle Draw is priced at $59.95. Fantavision is priced at $49.95.

Broderbund Software, 17 Paul Drive, San Rafael, Calif. 94903.

◆

Orange Micro, Inc. has released a revision of its **Serial Grappler** printer interface for Apple Computer, Inc.'s Apple II computer series.

The version supports the Apple Imagewriter and Scribe printers. The Serial Grappler still supports the Imagewriter I. It costs $119.

Orange Micro, 1400 Lakeview Ave., Anaheim, Calif. 92807.

◆

Individual Software, Inc. has introduced the **Individual Training for Dbase III** training program for users of Ashton-Tate's Dbase III.

Individual Training for Dbase III features interactive lessons designed to involve users in data base models.

The program is available for the IBM Personal Computer, Personal Computer XT, AT and PCjr and compatibles having a minimum of 128K bytes of memory and DOS Version 2 and up. The price is $69.95.

Individual Software, 1163-I Chess Drive, Foster City, Calif. 94404.

◆

Perelman/Calmus has released **Direct Mail Manager,** a direct mail software package for small- and medium-size mail order operations.

Continued on page 118

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NEW PRODUCTS

Continued from page 117

Direct Mail Manager prints packing slips, invoices, packing lists and shipping labels. It tracks customer buying patterns and inventory movement and generates shipping and payment reports.

The system costs $1,495.

Perelman/Calmus, P.O. Box 241758, Los Angeles, Calif. 90024.

■

Viewlogic Systems, Inc. has unveiled **Workview 700**, a personal computer-aided engineering (CAE) package that reportedly lets users perform analog and digital designs from one multiwindow user interface.

The software, which runs on IBM and compatible personal computers under DOS, combines into one system the Workview 100 entry-level package, Workview 300 digital design software and Workview 500 analog design program.

Workview 700 features include schematic entry; a waveform processor; document processing that merges text and graphics; Edit interface, including net list, schematics and symbol conversion files; and communications facilities for electronic mail and file transfer among mainframes, superminis, personal computers and other engineering workstations.

A hierarchical menu structure is said to provide browse ahead and look back functions. Journaling lets users retrace their steps in the event of a system crash, the vendor said.

Workview 700 requires at least 512K bytes of random-access memory and a monochrome screen. It supports many standard graphics boards and an optical mouse. Available options include plotting; interfaces to CAE/computer-aided design systems and simulation on superminicomputers.

Prices range from $6,500 to $13,000, depending on whether document processing is included.

Viewlogic Systems, 33 Boston Post Road West, Marlboro, Mass. 01752.

■

GT National Corp. has added **Membership Manager** to its Target/1 line of fund-raising and membership software for nonprofit organizations. The microcomputer software is said to combine data base, accounting and word processing functions to assist with membership development programs.

The package tracks 99 membership levels, allows for multiple membership purchases by a member, generates up to four renewal notices and sorts and selects members by 100 criteria, according to the vendor.

Accounting features reportedly include flexible billings, aging reports, receivables reports and a daily financial journal. The software supports organizations using cash, accrual or fund accounting methods.

Priced at $1,500, Membership Manager runs on most Microsoft Corp. MS-DOS and Digital Research, Inc. CP/M-86 microcomputers including IBM Personal Computers XT and AT, Digital Equipment Corp. Rainbows, Wang Laboratories, Inc. Professional Computers, Texas Instruments, Inc. Professional Computers and NEC Corp. NEC-APC IIIs. It requires 128K bytes of random-access memory, hard-disk storage and a 132-col. printer.

GT National, P.O. Box 3008, 400 Center St., Auburn, Maine 04210.

■

Stilwell Software Products is offering **Freefile**, a relational data base program for the IBM Personal Computer.

Menu-driven Freefile lets users import data from other programs and, in turn, export data base information to other applications such as spreadsheets. Data is selectable using relational operators.

Freefile also supports computed fields that are similar to formulas in a spreadsheet. This capability lets users define fields in which values are derived from values in other fields.

A companion program, Rebuild, is also available for recovering data lost when exiting Freefile abnormally.

A single copy of the program costs $45 and includes a printed manual and Rebuild. Users can buy the program and the documentation without vendor support for $10.

Stilwell Software Products, 16403 N. 43rd Drive, Glendale, Ariz. 85306.

■

Successware, Inc. has unveiled a marketing software package called **Marketing Edge** for IBM Personal Computers and compatibles that has 17 applications as well as presentation graphics.

Designed to work with Lotus Development Corp.'s 1-2-3, Marketing Edge includes tools for sizing market opportunities, determining target customer needs, analyzing competition, defining product requirements, making profit and loss projections and tracking project milestone schedules.

Marketing Edge comes in two volumes: Volume 1 is Market Analysis, and Volume 2 is Market Implementation. Each volume sells individually for $195. When purchased together, the cost is $325.

Successware, P.O. Box 5007, 203 Annandale Drive, Cary, N.C. 27511.

■

Two RM/Cobol business packages, **Bill of Material Processor and Customer Order Processing**, are available from **MCBA, Inc.**

Both packages provide user-defined function keys, printer and file I/O error messages plus the ability to store programs and multiple sets of data files on any disk or directory for sharing among companies.

Each package runs under IBM's PC-DOS or Microsoft Corp.'s MS-DOS on the IBM Personal Computer XT, Wang Laboratories, Inc. Professional Computer and Texas Instruments, Inc. Professional Computer. Prices range from $900 to $1,500.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

■

A co-resident on-line Help system, called **DOS Helper**, for DOS that can substitute for the DOS Reference Manual is available from **Aristo Software Co.**

The program provides Help files for each DOS and Debug command. Besides supplied files, users can add their own Help files, the vendor said.

The package includes two versions. A co-resident version loads into memory and can be accessed from other applications, and a standard version must be invoked from the DOS prompt.

DOS Helper operates on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatible processors running DOS 2 or higher. Other requirements are an 80-column by 25-row color, monochrome or black-and-white display; one disk drive; and at least 128K bytes of memory.

The software costs $29.

Aristo Software, Suite 213, 16811 El Camino Real, Houston, Texas 77058.

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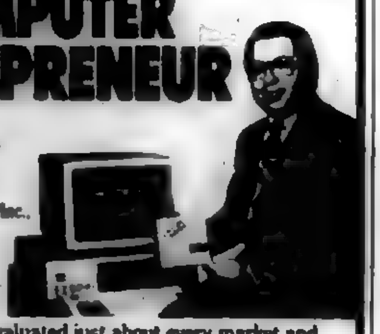

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NEW PRODUCTS

The Software Link, Inc. has released **Version 3.02** of its Multilink Advanced, software that lets users connect up to eight dumb terminals to a single computer in a multiuser multitasking environment running IBM's PC-DOS, according to the vendor.

The software reportedly supports PC-DOS 3.1; provides file and record locking, boards that expand available memory to more than 640K bytes, the 8087/80287 coprocessor and user-definable automation of the disk-based print spooler.

Up to 3M bytes can be used to store documents in the printer queue, the vendor said.

In addition, users can redefine the host computer's Multilink keys, the Alternate and Function key combinations.

Release 3.02 is available for $495.

The Software Link, Suite 632, 8601 Dunwoody Place, Atlanta, Ga. 30338.

■

Haba Systems, Inc. has announced **Habacalc**, a mouse- and menu-driven spreadsheet for the Apple Computer, Inc.'s Apple IIc.

Habacalc supports a maximum 64-column by 256-row spreadsheet size and provides 46K bytes of memory for calculations.

Other features include pull-down menus; cut, copy and paste edit commands; scroll bars and specialized mathematical functions such as averages and square roots.

In addition, users can create bar and pie graphs automatically from spreadsheets.

Habacalc costs $74.95.

Haba Systems, 6711 Valjean Ave., Van Nuys, Calif. 91406.

■

Anex Technology, Inc. and **Softeam, Inc.** will jointly market **Doctor DOS**, a utility program that increases the operating speeds of Intel Corp. 8080-based IBM Personal Computers and compatible personal computers two to five times by replacing or enhancing system calls within the operating system.

Doctor DOS replaces the portion of PC-DOS and MS-DOS that handles character I/O, doubling screen response time. Nondisk related system calls are also replaced, yielding speed increases of up to five times.

In addition, Doctor DOS increases the size of the keyboard buffer from 15 to 160 characters, alleviating problems associated with fast typing and bar code reading.

It costs $49.95.

Anex Technology, 151 North Rt. 9W., Congers, N.Y. 10920.

■

Haba Systems, Inc. has announced a software series called **Solutions** for the Apple Computer, Inc. Macintosh. The series provides six applications for the Macintosh: Business Forms, Business Letters, Wills, Checkminder, Windowdialer and Quickfinder.

Designed for use with Macintosh word processors, Business Forms and Business Letters let users create and print customized business documents and personalized business correspondence. Data can be entered while forms appear on the screen or filled in after blank documents are printed. Business Forms offers 40 predesigned forms in seven categories. Business Letters reportedly provides 50 prewritten letter and memo formats.

Users can select different type fonts, styles and sizes. Each letter file includes page setup, letter content, rules for letter writing and capability for mail merge applications. Wills uses 14 legally prepared documents to allow married and single individuals to write their own wills or update existing documents with a codicil form.

The personal money management program, Checkminder, is said to maintain multiple checking accounts and offer automatic checkwriting, depositing, reconciling and tax-deductible expense reporting.

Windowdialer dials telephone numbers from a window containing up to 200 names and numbers.

Quickfinder lets users bypass the Macintosh desktop menu to move from one program to another.

This utility works with Switcher and with 128K-byte or 512K-byte Macintosh models.

Prices are $49.95 for Business Forms, Business Letters, Wills and Checkminder and $29.95 for Windowdialer and Quickfinder.

Haba Systems, 6711 Valjean Ave., Van Nuys, Calif. 91406.

Continued on page 120

Looking for an information center system that handles just about anything they throw at you?

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Martin Marietta's RAMIS II.
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From page 119

Software

Syntactics Corp. has announced an enhancement to its Crystalwriter word processing program, **Crystalwriter Plus**, for AT&T's 3B2, 3B5 and Unix PC 7300 computers.

Crystalwriter Plus includes text merge capabilities, a records editor, an object-based footnoting procedure plus a spelling checker and corrector.

The text merge module, Crystalmerge, merges variable text into form letters, preprinted forms and other documents. The records editor lets users create and edit lists produced by relational data bases that can then be integrated into mass mailings using Crystalmerge.

Object-based footnoting automatically numbers and positions footnotes on the correct page, even in instances when the reference moves.

Crystalspell, the spelling checker, uses a dictionary of more than 80,000 words to check documents for spelling errors and suggest correct spellings.

Other enhancements include decimal tabs for creating tables of numbers for documents that require statistical typing; model document selection that provides a directory of fully formatted model documents and forms; and directory management for accessing the file directory from within Crystalwriter Plus.

Prices are $895 for the 3B2, $1,795 for the 3B5 and $675 for the PC 7300. Existing Crystalwriter users can upgrade to Crystalwriter Plus for $100 on the 3B2 or 3B5 and for $80 on the PC 7300.

Syntactics, Suite 145, 3333 Bowers Ave., Santa Clara, Calif. 95051.

Programming Concepts, Inc. has upgraded **Clist**, a package that provides hard-copy printouts and cross-references for programs written in C.

Version 2 adds the ability to calculate and print metrics and statistics for analyzing programming projects, according to the vendor.

Priced at $129 for a single CPU license, Clist will operate under IBM's PC-DOS 1.1 or higher.

Programming Concepts, 2150 Smithtown Ave., Ronkonkoma, N.Y. 11779.

■

Hayden Software Co. is offering **Macbase**, a relational data base program for the Apple Computer, Inc. Macintosh.

The software uses icons and pull-down menus for designing data base forms. Data types can be alphanumeric, integer, floating point, telephone data and calculations. Items in one form can be related to other forms, allowing multiple views of data and cross-updating of files.

Macbase costs $195 and works with a minimum of 512K bytes of memory.

Hayden Software, 600 Suffolk St., Lowell, Mass. 01854.

■

Sheppard Software Co. has unveiled **Micropert 1**, a project management system for IBM Personal Computers, Personal Computer XTs and ATs and compatible processors.

Micropert 1 schedules time, produces time-scaled network diagrams and summarizes resource use or costs across projects. A full screen editor displays up to 23 activities at once.

Micropert 1 can produce data interchange format files through which project data can be communicated to other software packages. The project management system can also produce Gantt charts, cost or resource histograms and eight standard reports.

Priced at $350, Micropert 1 requires IBM's PC-DOS 2 or higher, 256K bytes of memory and two disk drives. A demonstration disk is available for $25.

Sheppard Software, 4750 Clough Creek Road, Redding, Calif. 96002.

■

Affiliated Service Bureaus, Inc. is offering the **What-If Amortization Schedule** for users of Microsoft Corp. Basic.

The software package generates amortization schedules based on alternative payment methods such as applying an additional amount to the principal when each payment is made; making payments weekly, biweekly, semimonthly or any other nonmonthly schedule; and paying enough to cover the next payment's principal amount. All reports on full or partial schedules can be printed.

The What-If Amortization Schedule lets users enter legal alternative payment scheme information as economic conditions require different uses of cash flow. The package can also be used to enter loan criteria under consideration to test the effects on overall payment requirements.

The software costs $19.95.

Affiliated Service Bureaus, Software Products by Lewis Division, Box 239, R.R. #3, Marshalltown, Iowa 50158.

Systems

Vector Automation, Inc. has announced three IBM Personal Computer-based auxiliary workstations, the **XT-511 Basic Workstation**, the Mod-

Continued on page 126

Congratulations.
You're qualified to operate the Hewlett-Packard ¼" Tape Backup System.

It's really that easy. In fact, the HP Tape Backup system, with its menu-driven software, can be mastered in a few minutes.

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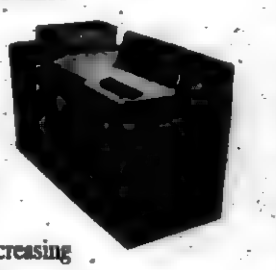
EMC introduces its 1MB memory expansion card for the System/38.



EMC has just added a feature to add-in memory for IBM's System/38 that's been sorely lacking.

Competition.

Like IBM's 1 Megabyte add-in memory, our new memory expansion card lets you boost the speed and performance of your System/38. Without increasing software or other hardware costs.

But unlike IBM, we let you do it for $2,000 less. (IBM's price is $7,500, ours is just $5,500.)

And our new 1 Megabyte memory uses newer, more reliable technology. It's *so* reliable, there are *no maintenance charges* of any kind.

IBM, on the other hand, charges you a memory maintenance fee of more than $1,000 a year. Every year.

Our memory comes with the industry's only unconditional warranty.

EMC is the first company to ever offer you an *unconditional lifetime warranty* on a System/38 memory card. And we offer the same warranty on every other memory card we make.

If you even *suspect* a problem, just call our special toll-free hotline and we'll send you a new card *within 24 hours*—absolutely free.

And our new memory expansion card is *100% plug compatible* with the System/38. So it supports all IBM memory and memory diagnostic features. Installation takes just 10 to 15 minutes (you can even do it yourself) and does not affect your IBM maintenance coverage in any way.

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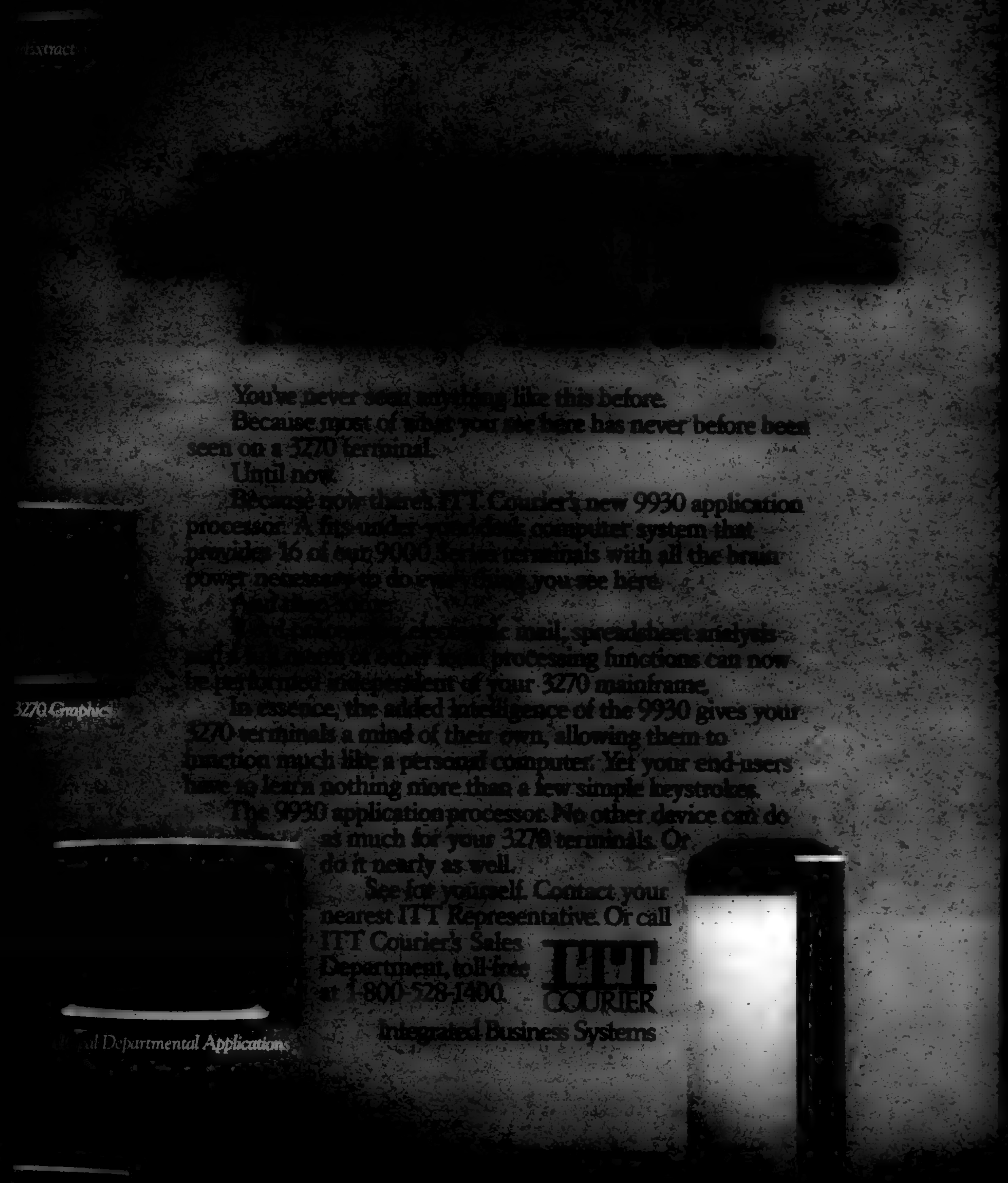

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European agents: Software Engineering Benelux Inc., The Netherlands, Telex 84431117; Thorn EMI Computer Software, U.K., Telex 851858015.

INFODATA®

[illegible]

NEW PRODUCTS

Continued from page 120

el **XT-512 Advanced Workstation** and the **Model AT-513 Advanced Workstation**, as options to its Cadmax series of computer-aided design and manufacturing systems.

The XT-511 Basic Workstation is an IBM Personal Computer XT with 256K bytes of memory, a 360K-byte floppy disk, a 10M-byte fixed disk plus monochrome adapter and display.

Model XT-512 Advanced Workstation is an IBM Personal Computer XT with 512K bytes of storage, a 360K-byte floppy disk, a 10M-byte fixed disk, enhanced color graphics adapter and display and the Intel Corp. 8087 math chip.

The AT-513 Advanced Workstation is an IBM Personal Computer AT with 512K bytes of memory, a 1.2M-byte floppy disk, a 20M-byte fixed disk, enhanced color graphics adapter and display plus the Intel 80287 math chip.

With Cadmax communications, the workstations range in price from $6,300 to $9,600.

Vector Automation, Village of Cross Keys, Baltimore, Md. 21210.

Communications

American High-Tech Industries, Inc. has unwrapped **Magnum MCS-A**, an asynchronous multifunction communications system that provides asynchronous emulation capability through a character translation mechanism for the IBM Personal Computer, Personal Computer XT, AT and compatible computers.

The system is said to use a password handshake protocol with Turbocom, the vendor's communications software, to offer security protection for transferring files between an unattended central personal computer and other local or remote units.

Magnum MCS-A provides the capability to emulate Digital Equipment Corp. VT52 and VT100, IBM 3101-MOD 10/20 and Data General Corp. Dasher 210/211 terminals.

The system is available in two forms: a unit with an AT&T 212A modem, serial port, parallel port, mouse and game port, clock calendar and support software, costing $695; and a unit with those features plus 64K bytes of memory expandable to 512K bytes and software to create an electronic random-access memory disk, costing $1,195.

American High-Tech Industries, Suite 201, Eleven One Eleven Wilcrest Green Drive, Houston, Texas 77042.

■

Eicon Technology Corp. is offering networking products, **Network Adapter, Attach/X.25 and Access/X.25**, for integrating the IBM Personal Computer, Personal Computer XT, AT and PC Network with X.25 packet networks.

Network Adapter is an intelligent communications card consisting of a Motorola, Inc. MC68008 microprocessor, 128K bytes of random-access memory, four direct memory access channels and two serial communications ports.

Designed to connect IBM and compatible personal computers to packet-switched networks, Network Adapter also provides an RS-232C interface port that supports full-duplex data transmission at up to 64K bit/sec.; a second port is said to offer full compatibility with Apple Computer, Inc.'s Apple Talk.

Attach/X.25 and Access/X.25 support the CCITT X.25 recommendation and integrate packet assembly/disassembly facilities (PAD) directly within the micro. Up to 32 virtual circuits can be maintained concurrently with combined throughput of more than 75 packet/sec., a spokesman said.

Attach/X.25 lets users access a remote Personal Computer.

Access/X.25 supports the standard X.3/X.28/X.29 interface for asynchronous start-stop terminals on public data networks. The software lets users define required PAD parameters and optional network administration user facilities.

When used with the Network Adapter, Attach/X.25 and Access/X.25 are said to provide access to GTE Telenet Communications Corp.'s Telenet, McDonnell Douglas Network Systems, Inc.'s Tymnet and AT&T's Accunet packet service.

Attach/X.25, including the Network Adapter, costs $1,195 for a single-user version and $1,395 for a multiuser version. Similar Access/X.25 configurations cost $995 and $1,195, respectively.

Eicon Technology, 3452 Ashby St., Montreal, Canada H4R 2C1.

Storage

CMS, Inc. has announced **Perfect 120**, a 120M-byte hard disk subsystem for the IBM Personal Computer AT and Compaq Computer Corp. Deskpro 286.

The Perfect 120 has a 30-msec access speed with a 5M byte/sec. transfer rate. The cost is $7,395.

CMS, 401-B W. Dyer Road, Santa Ana, Calif. 92707.

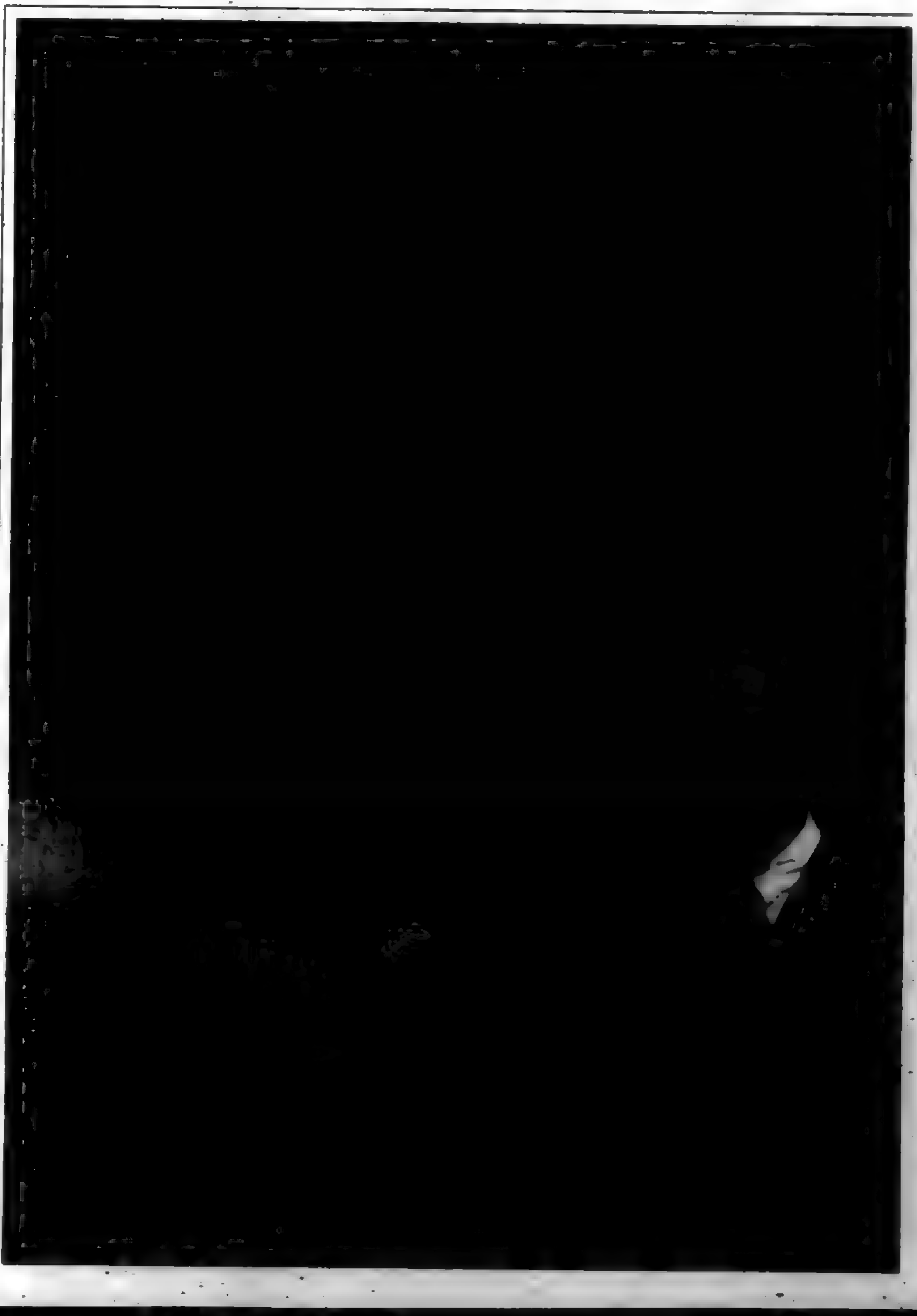
■

Priam Corp. has added a 5¼-in. add-in Winchester disk drive to its **Innerspace** line and cut replacement drive prices between 15% and 20%.

Geared for the IBM Personal Computer and Personal Computer XT without disk controllers, the Innerspace drive offers 43M-byte or 60M-byte capacities with a data access speed of 30 msec.

It costs $1,998 for the 43M-byte ID40-PC and $2,298 for the 60M-byte ID60-PC. In addition, Personal Computer XT and AT drive prices were reduced 15% to $1,698 for 43M-byte capacity drives and 20% to $1,998 for 60M-byte drives.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134.



NEW PRODUCTS

Printer/Plotters/ Peripherals

Roland DG has released the **CD-240**, a 12-in. monitor for the IBM Personal Computer and compatibles.

The CD-240 monitor features 720- by 400-pixel resolution, a 0.31mm dot pitch, 25-kHz scan frequency and a black matrix screen.

The unit costs $799.

Roland DG, 7200 Dominion Circle, Los Angeles, Calif. 90040.

■

Sakata U.S.A. Corp. has introduced the **SP-5500** printer for micros that contains a built-in parallel Centronics Data Computer Corp. interface and an optional serial interface.

The SP-5500 printer is said to print up to 136 pica columns on spreadsheet-width paper. The unit comes with either a 3K-byte input data buffer or 256 user-defined characters and prints at 180 char./sec. at a 60-dba noise level. It costs $699.

Sakata U.S.A., 651 Bonnie Lane, Elk Grove Village, Ill. 60007.

■

Citizen America Corp. has announced the **120D**, a dot matrix printer that operates at 120 char./sec.

The 120D features switch-selectable IBM and Epson America, Inc. compatability. It offers a correspondence-quality mode operating at 25 char./sec. The printer has graphics capability, a 4K-byte memory buffer, variable-width tractor feed and bottom and rear paper feed. The 120D costs $249.

Citizen America, 2425 Colorado Ave., Santa Monica, Calif. 90404.

■

Citizen America Corp. has announced the **Premiere 35**, a letter-quality daisywheel printer.

The Premiere 35 reportedly prints 35 char./sec and has an operating noise level of 55db. It features an 8K-byte user-available buffer and a built-in switch-selectable Diablo Systems, Inc. 630, NEC Corp. 3550 and Qume Corp. Sprint 11+ compatibility. It uses Diablo 630-compatible print wheels and ribbons. It costs $599.

Citizen America, 2425 Colorado Ave., Santa Monica, Calif. 90404.

■

NEC Home Electronics, Inc. has introduced four 12-in. monochrome monitors, the **JB-1270MA, JB-1275MA, JB-1280DA** and **JB-1285DA.**

Two are directly compatible with the Apple Computer, Inc. Apple IIc, Apple IIe and Apple III and the IBM PCjr. The JB-1270MA model has a green phosphor display and the JB-1275MA has an amber phosphor display.

The other two are for the IBM Personal Computer, Personal Computer AT and compatibles equipped with a monochrome display/printer adapter card. The JB-1280DA has a green phosphor display and the JB-1285DA has an amber phosphor display.

The JB-1270MA and the JB-1275MA cost $179.

The JB-1280DA and the JB-1285DA cost $199.

NEC, Suite 10, 700 Nicholas Blvd., Elk Grove, Ill. 60007.

■

The **Torrington Co.** has introduced **Manager Mouse**, a mouse designed with an independent suspension system and a self-contained drive mechanism.

Manager Mouse plugs directly into any IBM Personal Computer, Personal Computer XT, AT, Compaq Computer Corp. Compaq Portable, Plus and Deskpro and other compatibles with a standard RS-232C interface. It comes with TMouse software.

The Manager Mouse costs $198

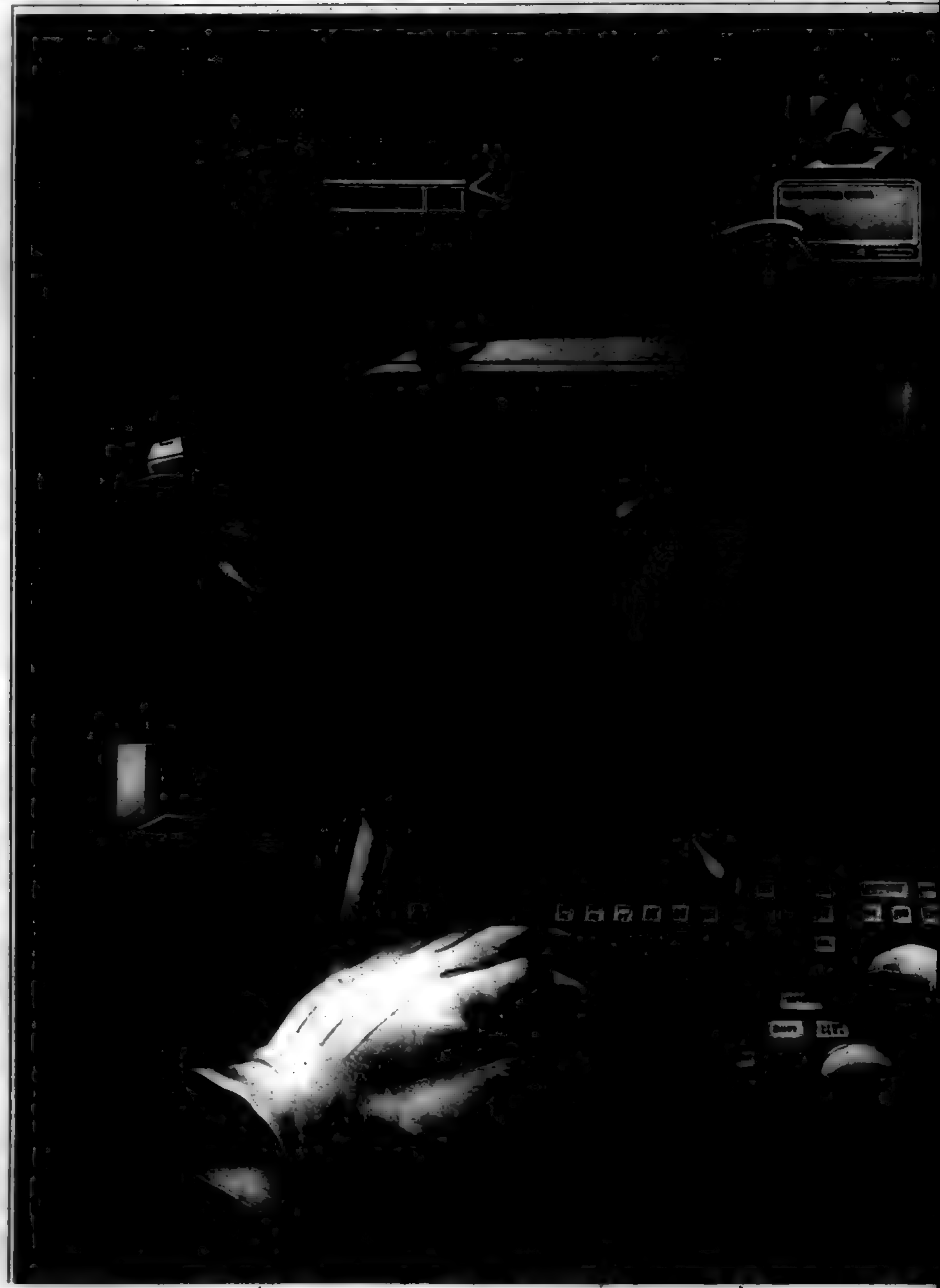
Torrington, 59 Field St., Torrington, Conn. 06790.

■

Epson America, Inc. has added **Epsom DX-35**, a wide-carriage printer, to its line of daisywheel printers.

The Epson DX-35 prints 35 char./sec. Standard features include friction paper feed, a Diablo Systems, Inc.-compatible interchangeable daisywheel, 3K-byte print buffer and a Diablo all-purpose interface that allows compatibility with the IBM Personal Computer, Personal Computer XT, AT and the Apple Computer, Inc. Apple II.

The DX-35 offers variable



NEW PRODUCTS

character pitch with 10, 12 and 15 char./in. plus a proportional spacing mode.

The DX-25 costs $899.

Epson America, 2780 Lomita Blvd., Torrance, Calif., 90067.

[redacted]

Controllers

Backus Data Systems, Inc. has expanded its automatic callback computer security system with **Dialsafe 18**, which supports a maximum of 18 computer ports.

Dialsafe 18 includes a security directory that can accommodate 500 user IDs, passwords and telephone listings. Residing between the dial-up modem and the host computer, Dialsafe 18 asks callers for an ID and password. Callers are called back and must supply the ID and password again being connected to the host.

The 18-line computer security system costs $9,020.

Backus Data Systems, Suite 110, 1440 Koll Circle, San Jose, Calif. 95112.

■

Advanced Computer Communications Co. has introduced the **ACP 5250**, a single-board Microvax front-end communications processor with on-board X.25 firmware.

The ACP 5250 is a Motorola, Inc. MC68000-based intelligent front-end processor for Digital Equipment Corp. Unibus and Q-bus computers that can connect public and private packet-switched networks.

The ACP 5250 offers two levels of networking capability, basic mode and extended mode, which support up to 128 switched or permanent virtual circuits at speeds up to 64K bit/sec.

Basic mode comes with 128K bytes of memory and standard network default capacities. Extended mode raises memory to 512K bytes, boosts frame and packet sizes to 1,024 bytes and adds extended sequence numbering.

Single-quantity prices are $5,290 for the basic mode ACP 5250 and $5,890 for the extended-mode version.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101.

Protocol Converters

Network Software Associates, Inc. has announced **Adapt-SNA LU6.2**, a communications package for IBM Personal Computers and compatibles designed to implement IBM's LU-type 6.2 (LU6.2) protocol.

Adapt-SNA LU6.2 allows the Personal Computer to communicate and transfer files as an LU6.2 device in an IBM Systems Network Architecture/Synchronous Data Link Control network.

It can be used for both Personal Computer-to-mainframe and Personal Computer-to-Personal Computer applications.

It is available as a complete software/hardware package for $1,590 or as a software-only product for $795.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653.

Software

Communications Research Group, Inc. has announced **Vaxblast**, an addition to its line of Blast communications software products.

Vaxblast is a file transfer utility for Digital Equipment Corp.'s VAX computers, designed to combine asynchronous file transfer with virtual terminal connections among VAXs, remote personal computers and other computers running Blast software.

Blast allows the VAX to initiate and control file transfers and remote functions. Blast's terminal mode allows users to log on and work interactively on unattended remote systems or to transfer files to other computers. Vaxblast requires RS-232 ports and dial-up phones.

It costs $895.

Communications Research Group, 8939 Jefferson Highway, Baton Rouge, La. 70809.

■

Simware, Inc. has released an enhanced version of **Sim3278/PC**.

Sim3278/PC, with Sim3278 running on a host mainframe, is a communications program offering IBM users a micro-to-mainframe link without the requirement for additional hardware or

Continued on page 129

Manage all elements of your high-speed DataComm universe.

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A real-world lesson in using a computer as a marketing tool.

Here's how it's done at WTC Air Freight. With the all-important help of a Sperry MAPPER® System.

WTC is a major worldwide freight forwarder. And in that tough competitive environment, large contracts can be won or lost on seemingly small vendor differences. For WTC's primary customer target, traffic management, control of goods in transit ranks high on the list.

So WTC developed a MAPPER-based computer system that gives the company a competitive edge by giving the traffic manager total information and control. Right at his own PC or terminal.

With just a few simple English-language commands, a traffic manager can get tracking information just about any way he wants it. A P.O. number is all he needs to get instant information on the status of any shipment, anywhere in the world. He can even pull one item out of a shipment and have it rushed to a new destination.

And a lot more. Right at his own PC or terminal.

What it all comes down to is a powerful marketing advantage for WTC.

Where competitors' systems require learning obscure computer codes, the MAPPER System uses plain English. In terms of user convenience, it's no contest.

MAPPER made development of the system a lot easier, too. With COBOL programming, it would have taken 60 man-months. With MAPPER, the job was done in just 12 man-months.

And because of the inherent simplicity of MAPPER language, non-DP management people were able to test and modify the system all through the development process. So they got precisely what they needed, instead of someone else's approximation.

The fact is, MAPPER's simplicity makes it a powerful tool for any task, any business. With the MAPPER System, ideas become computer solutions in astonishingly short order.

Seeing is believing. Come to a nearby Sperry Productivity Center and see MAPPER in action. Or, next best, look over our MAPPER literature. Call us toll-free: **800-547-8362, ext. 101.**

Or write: Sperry Corporation, Box 500, Blue Bell, PA 19424-0024.

MAPPER is a registered trademark of Sperry Corporation.

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SPERRY

Continued from page 127

add-on boards. It also provides users of IBM Personal Computers, Personal Computer XTs and compatibles with full-function 3278 Model 2 emulation.

Sim3278/PC Version 2 includes features such as Digital Equipment Corp.'s VT100 terminal emulation, support for the Xmodem protocol and increased DOS command functionality.

Sim3278/PC is priced at $250 for a single copy, $195 per copy for two to nine copies and $165 per copy for 10 or more copies. Corporate licenses are priced at $7,500 per mainframe.

Simware, 14 Concourse Gate, Nepean, Ont. K2E 7S6.

Multiplexers/Modems

Anchor Automation, Inc. has announced a 1,200 bit/sec. modem, the **Signalman Secure 12**, with a built-in security callback system designed for applications where users at remote locations access information.

Signalman Secure 12 ensures security through a password callback procedure in which a remote user at a terminal equipped with a standard modem calls the Secure 12 and inputs a password. The Secure 12 disconnects the line, verifies the password against a stored list and, if the password is valid, automatically calls the telephone number it has associated with the password.

The system stores an average of 64 password and callback combinations in 1.2K bytes of memory. Security levels are configured by the user. A secondary password is offered in addition to the primary password. The security features can be bypassed, enabling the Secure 12 to operate as a standard Signalman Express modem.

The cost of Secure 12 is $499.

Anchor Automation, 6913 Valjean Ave., Van Nuys, Calif., 91406.

■

Keene Corp.'s Versitron Division has announced **Versimux**, a fiber-optic multiplexer.

Versimux can reportedly multiplex up to 60 voices or 120 data channels on fiber-optic lines that can be up to 3 kilometers apart. It is plug compatible with a number of standard interfaces. The multiplexer operates in a 14-port high-speed mode, with transmission speeds up to 76.8K bit/sec., or a 30-port low-speed mode, with speeds up to 38.4K bit/sec.

A Versimux unit consists of one master multiplexer card and 14 port modules. Each port module is configured to be plug compatible with a particular interface and to support the required control signals.

Versimux systems range in price from $3,280 to $25,575.

Versitron, 6310 Chilluim Place N.W., Washington, D.C. 20011.

■

Datatel, Inc. has introduced the **DCP9050**, a six-channel time division multiplexer that operates at speeds from 9.6K to 64K bit/sec.

The DCP9050 works with telephone lines and AT&T's Dataphone Digital Service. Input channel speeds are switch-selectable from 2,400 to 19.2K bit/sec. Link speeds can operate at 9.6K, 14.4K, 19.2K or 56K bit/sec. The product employs bit interleaving time division multiplexer techniques.

DCP9050 can use products that incorporate RS-232, RS-422 and CCITT V.25 interfaces.

The multiplexer costs $2,150. An optional Channel Service Unit/Data Service Unit is available for $500, and a kit for installing the product in a 19-in. rack sells for $100.

Datatel, Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

■

Lightcom, Inc. has unwrapped the **LC 100** universal data multiplexer for use with IBM 3270 and asynchronous RS-232C devices.

The LC 100 consists of fiber-optic cables connecting at both ends to modular rack-mounted universal data multiplexer units that interface to computers and terminals.

There are up to eight interface modules supporting a maximum of 15 ports each.

Designed to link installations that are up to 2 kilometers apart, the LC 100 allows the coaxial transmission schemes of the IBM 3270 and RS-232C asynchronous start/stop to operate concurrently over the same optical fiber.

The system is compatible with the IBM Cabling System and transparent to a user's attached systems.

Point-to-point configurations reportedly allow two LC 100 units to connect with both ends in channel-to-channel correspondence using dual-fiber cables. Multipoint loops have clusters of terminals at different locations.

The LC 100 costs $3,000 per average single-end configuration.

Lightcom, 3853 Breakwater Ave., Hayward, Calif. 94545.

Network Products, Inc. has announced **Localmux**, a local-area multiplexer that allows users to run up to eight terminals on one set of twisted-pair cables and operates for distances up to two miles.

Localmux combines a multiplexer and a short-haul modem. Terminal speeds can reach 19.2K bit/sec. asynchronous or 38.4K bit/sec. synchronous. Data is communicated directly at full speed with no flow control interposed.

Localmux works with mainframes and personal computers from Digital Equipment Corp., Hewlett-Packard Co., Prime Computer, Inc., Tandem Computers, Inc. and IBM.

The Localmux unit is priced at $995.

Network Products, 4020 Stirrup Creek Drive, Research Triangle Park, N.C. 27709.

When Control Data demanded Total Performance, Zenith delivered.

Total performance. For Control Data Corporation — inventor of Cyber 205, the world's most powerful "Supercomputer" — it's the only option.

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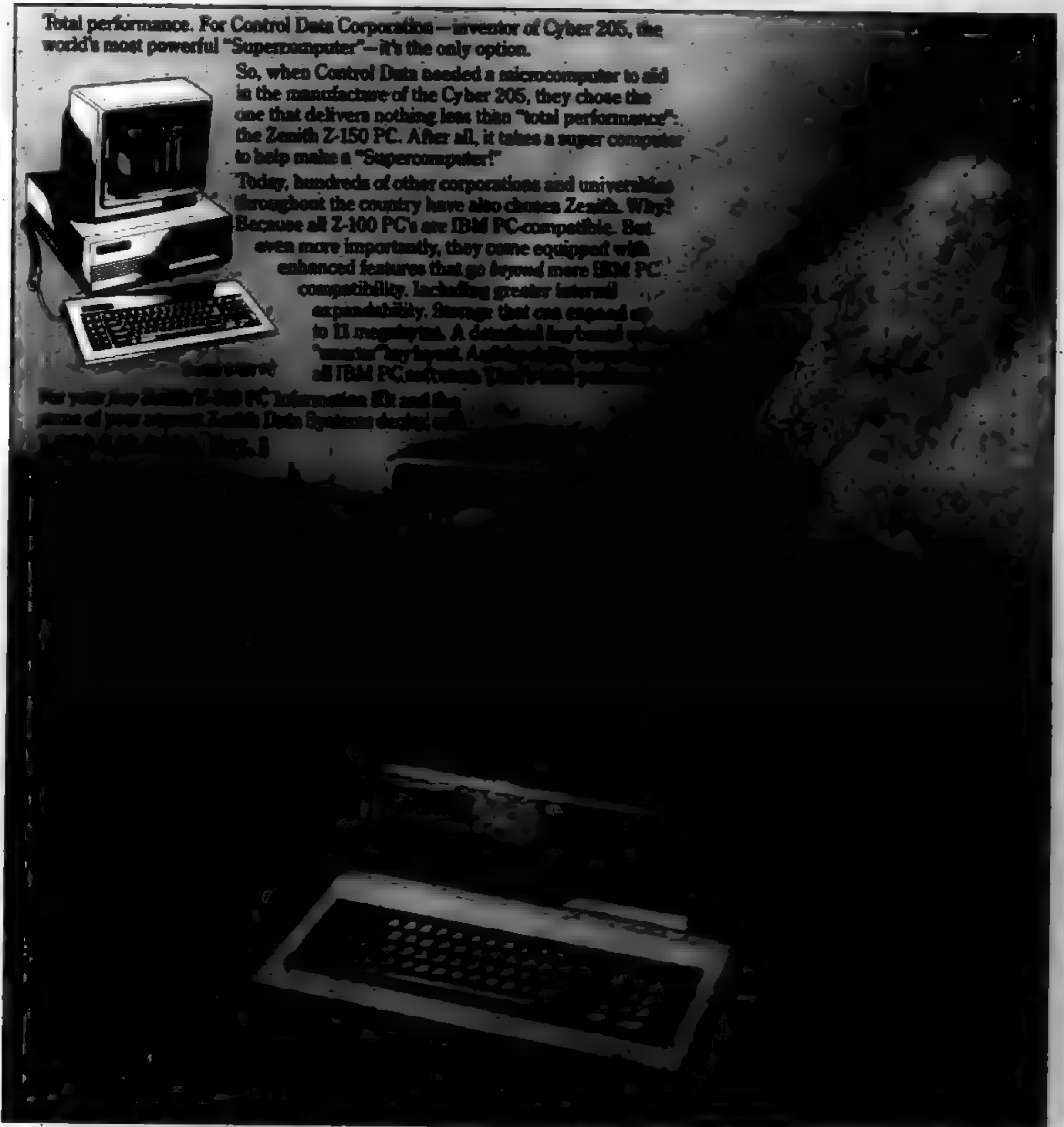
Today, hundreds of other corporations and universities throughout the country have also chosen Zenith. Why? Because all Z-100 PC's are IBM PC-compatible. But even more importantly, they come equipped with enhanced features that go *beyond* mere IBM PC compatibility. Including greater internal expandability. Storage that can expand up to 11 megabytes. A detached keyboard [illegible] "macro" key layout. [illegible] all IBM PC software. [illegible]

For your free Zenith Z-[illegible] PC Information Kit and the name of your nearest Zenith Data Systems dealer, [illegible]



ZENITH data systems

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NEW PRODUCTS

SYSTEMS AND PERIPHERALS

Data Storage

Point 4 Data Corp. has added an 86M-byte 5¼-in. Winchester disk drive for the entry-level **Mark 2** computer system.

The disk is said to double the capacity of the Mark 2, which supports up to seven concurrent users.

There is a field upgrade program for existing Mark 2 installations. The 86M-byte disk lists for $4,600.

Point 4 Data, 2569 McCabe Way, Irvine, Calif. 92714.

Terminals

Tandem Computers, Inc. has added three ergonomic terminals — **Models 6535, 6536 and 6537** — to its 6530 series.

The new models offer all the functionality of the current 6530 models. In addition, they have low-profile keyboards and meet European ergonomic requirements. Features include support options such as a local printer, voice input and bar code and magnetic stripe readers.

Model 6535 has a 15-in. diagonal screen. Model 6536 has a 12-in. diagonal screen, and Model 6537 has a 9-in. diagonal screen. Prices are $2,175, $1,975 and $1,825, respectively. Limited quantities will be available next month. Production quantities will be available in January 1986.

Tandem Computers, 19191 Vallco Pkwy., Cupertino, Calif. 95014.

The **HD-1200** series of 12- to 20-in. monochrome video displays that offer 40-MHz bandwidth is available from **Sierra Scientific**.

The HD-1200 series provides 100 pixel/in. resolution, 60db signal-to-noise ratio and 1% combined distortion and nonlinearity.

The monitors hold picture size change under 1% for combinations of picture brightness, scan rate and power line voltage. All models operate from either 110V or 220V ac power, consume less than 90W and include P4 phosphor as standard, according to Sierra Scientific.

Prices range from $3,450 to $4,770, depending on CRT size and enclosure style.

Sierra Scientific, 1173 Borregas Ave., Sunnyvale, Calif. 94089.

Printers/Plotters

Printronix, Inc. has announced its **4160 Graphic Printer** that works in conjunction with Spicer Computer Development, Inc. Cangraph software as an output device for all Cadam, Inc.'s Cadam applications.

The 4160 is said to operate in either print or plot mode on paper or mylar. Plot time is approximately 40 seconds for A-size drawings and 75 seconds for B-size drawings with a maximum width of 13½ in. Hard copy is routed by IBM print utilities through IBM 3274, 3276 or 3705 controllers. The cost is $13,700 for the printer, software and interface.

Printronix, P.O. Box 19559, 17500 Cartwright Road, Irvine, Calif. 92713.

Canon U.S.A., Inc. has released a Group III laser facsimile, **FAX-L910**, which was designed to deliver ultra-high resolution on plain paper.

The FAX-L910 consists of a digital scanner, an intelligent controller and a laser beam printer with a replaceable cartridge system. It reportedly features a built-in electronic phone directory and dialer with 20 memory keys, 30-page automatic document feeder and programmable time.

Over an ordinary phone line, FAX-L910 is said to have a transmission speed of 9.6K bit/sec. It offers three resolution settings, up to 406 by 391 picture elements per inch and can be used as a plain paper copier.

It is available now at a cost of $6,495.

Canon U.S.A., One Canon Plaza, Lake Success, N.Y. 11042.

■

Facit, Inc. has announced **Opus 1**, a laser printer for use with both parallel and serial RS-232C interfaces.

Opus 1 is said to have a print resolution of 90,000 dot/in. and to print at a rate of 12 page/min. It can emulate the Facit 4565; the Diablo Systems, Inc. Diablo 630; and Qume Corp. daisywheel printers.

Opus 1 offers eight-directional line-drawing capabilities in five line widths. It has a memory for up to four forms that can be stored for use with text overlay.

The cost is $9,500, according to the vendor.

Facit, 9 Executive Drive, Merrimack, N.H. 03054.

Talaris Systems, Inc. has announced a desktop laser printer, the **Talaris 810**, designed as a daisywheel and dot matrix replacement.

The Talaris 810 is an eight page/min, 300 dot/in. resolution laser printer said to function as either a single-user or a network printer. It features Diablo Systems, Inc.'s 630 ECS; Qume Corp.'s Sprint; Epson America, Inc.'s FX-80; and ANSI 3.64 printer emulation modes. It supports Microsystems Engineering Corp.'s MASS-11 word processing system, the American Mathematical Society's Tex computer typesetting system, Epson FX-80 bit-map graphics and ANSI line and box drawing and raster bit-map commands.

The printer uses a Canon U.S.A., Inc. LBP-CX print engine and a Motorola, Inc. 68000-based controller. Total bit-map memory for Epson FX-80 and ANSI raster plotting is 128K bytes. Down-line-loaded font and overlay storage is 80K bytes of dynamic random-access memory, permitting up to five fonts to be loaded at a time.

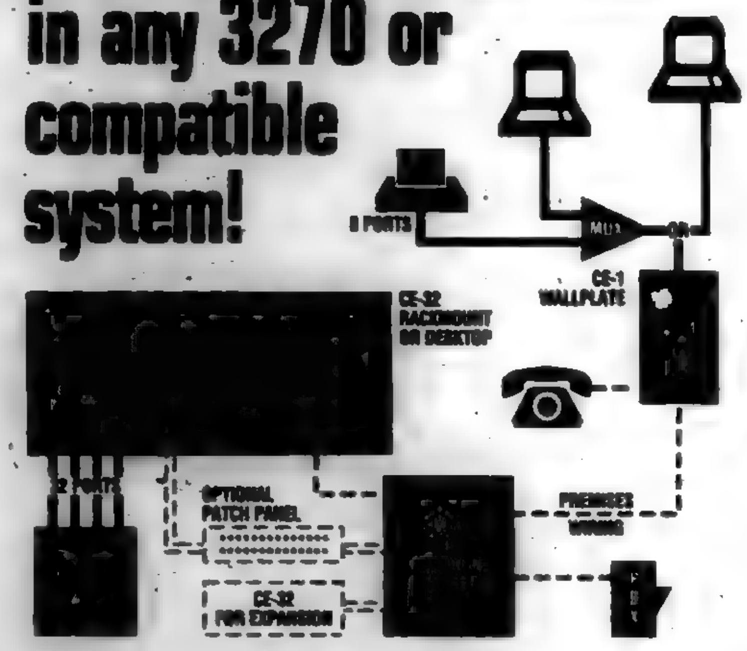
The Talaris 810 attaches to Digital Equipment Corp. VAX/VMS and AT&T Unix-based systems and workstations as well as IBM Personal Computers via an RS-232 asynchronous serial port using Xon/Xoff protocol or on a Centronics Data Computer Corp. parallel interface.

The Talaris 810 is priced at $3,850.

Talaris Systems, P.O. Box 261580, 5160 Carroll Canyon Road, San Diego, Calif. 92126.

Continued on page 131

CMS* eliminates expensive coaxial cable in any 3270 or compatible system!



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NEW PRODUCTS

From page 130

Printers/Plotters

Cado Systems Corp. has released four printers, the **P-1005, P-1006, P-2001** and the **P-4001**, for its Tiger ATS line of multiuser computer systems.

The P-1005 and P-1006 daisywheel printers are said to provide letter-quality printing. The P-1005 prints at up to 80 char./sec. and the P-1006 prints at 48 char./sec.

The P-2001 and P-4001 are dot matrix printers. The P-2001 prints draft-quality documents at 288 char./sec., correspondence-quality at 192 char./sec. and letter-quality at 96 char./sec. The P-4001 prints draft-quality documents at 180 char./sec. and near-letter-quality documents at 25 char./sec.

The P-1005 and P-1006 cost $2,455 and $1,575, respectively. The P-2001 and P-4001 cost $2,095 and $630, respectively.

Cado Systems, P.O. Box 3759, 2055 W. 190th St., Torrance, Calif. 90510.

■

Addressograph Farrington, Inc. (AFI) has announced its **3100 Direct Impression (DI) printer** designed to print directly onto different-size mailable media.

The AFI 3100 DI produces dot matrix print impressions at a rate of 80 char./sec. It can generate six lines of 40-char. text in standard or bold sizes or up to six lines of 20-char. text in the enlarged size. It is a 40-col. printer at 12 char./in. and a 20-col. printer at 6 char./in. It can handle forms with a minimum width of 4.5 in. and a minimum length of 4.125 in.

The AFI 3100 DI has built-in test functions and material-feed on-line controls. It interfaces directly to an AFI microprocessor using AFI Mail 5 or AFI Mail 6 software or to other mainframe or personal computers via a Centronics Data Computer Corp. parallel interface or an optional RS-232 serial interface. It costs $2,650.

Addressograph Farrington, Randolph Industrial Park, Randolph, Mass. 02368.

■

Calcomp, Inc. has announced enhancements for its 1040 series of cut-sheet and dual-mode pen plotters. The **1040GT series** will include three plotter models and come standard with the Plot Manager firmware.

Plot Manager organizes plot data to minimize pen movements and pen changes.

Model 1042GT and 1044GT plotters operate in both cut-sheet and roll-feed modes. Model 1043GT operates in cut-sheet mode only. The 1040GT series features plotting speeds of 14 in./sec., an eight-pen turret with automatic pen capping and full-width plotting capability.

The integrated communications interface allows plotter compatibility with all computer-aided design systems including IBM PC-DOS, Microsoft Corp. MS-DOS and Digital Research, Inc. CP/M-based systems. It permits the 1040GT plotters to operate on-line in a local or remote environment. The 1040GT plotters are compatible with RS-232, RS-449 and IEEE 488 interfaces.

Model 1042GT costs $11,900, Model 1043GT costs $8,905 and Model 1044GT costs $13,900. Existing 1040 plotters can be upgraded with the Plot Manager for $1,995. Plot Manager for the 1070 series costs $1,995, and existing 1070 plotters can be upgraded for $2,995.

Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

Image Atlanta, Inc. has announced **Grayline Imaging System**, an Intel Corp. 8088-based digital image display and output system for medical imaging, satellite remote sensing, meteorological imaging, sonar, side-looking radar and facsimile output.

The unit is said to acquire, gray-scale digitize, display, store and output video and laser hard-copy images from any standard RS-170 and RS-330 video source including videotape recorders.

The system also can receive and output digital display data either on site with a host or at remote locations through networked communications, according to the vendor.

Digital inputs come from the host computer through an IEEE 48 bus. Once the video frames are digitally stored, the Grayline Imaging System can display up to four 256-gray-scale images on its 512- by 480-pixel mono-

Continued on page 132

Introducing the TI 880 AT Printer. Because you need a multi-user printer that works overtime.

The last thing you need is the wrong printer. A printer that quits when your work is nonstop. Or one that burns out from overwork.

Let's say you have a typical multi-user environment or a local area network. It includes IBM Personal Computer ATs, PC/XTs or compatibles. What you need now is a printer that can handle your system's entire workload. A printer you can trust your business to.

You need a high-speed printer that's software compatible with PC industry standards and capable of sustaining 300cps. It should have straight paper paths to eliminate jams, changeable fonts and enhanced print modes to take care of draft, correspondence and graphics. Its design should be rugged, durable and as reliable as you've come to expect from TI printers.

The OMNI 800™ Model 880 AT Printer from TI fits this description.

The printer that works overtime.

Because business doesn't stop just because your printer did.

Find out about the new TI 880 AT Printer and how it can help solve your multi-user printing problems. Call 1-800-527-3500 ext. 809, in Canada 416-884-9181.

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Leaving your hands free to go about their business.

You'll also find an extremely economical 3270 emulation option.

And our optional Integrated Graphics Adapter that displays virtually any program on the market—color or monochrome—on one monitor.

[illegible] ITT Systems, Inc.
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NEW PRODUCTS

Continued from page 131

chrome screen.

A digital laser printer is said to produce a 128-gray-scale high resolution. Output media require no wet chemical processing. Cassette-loadable dry silver paper and transparency film are available in 200- and 300-ft rolls.

A basic unit, which includes a server system, printer and acquisition station for one scanner, sells for $49,500.

Image Atlanta, P.O. Box 249, 1175 Old Ellis Road, Roswell, Ga. 30077.

Graphics systems

Versatec, Inc., a Xerox Corp. company, has announced an enhanced simulation capability for its **Expert Engineer** computer-aided engineering workstation.

Expert Engineer is a design automation system said to offer logic design aids such as expert schematics and expert design description language, libraries describing transistor-transistor logic, emitter-coupled logic and metallic oxide semiconductor components as well as microprocessors and multiwindow interfacing to other workstations and host computers.

The Expert Engineer's enhanced simulation capability reportedly provides increased logic simulation. The simulator is now driven directly from the schematic's in-core data structures, and it provides unit-delay and assigned-delay simulation.

According to the company, all workstations offer high-resolution density, local disk storage, display window management, optical mouse pointing device and full keyboard with function keys and Ethernet network capability.

The Expert Engineer workstation is available in configurations that range in price from $11,695 for a monochrome workstation to $55,000 for a full-featured color workstation.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

■

A Tektronix, Inc. graphics-compatible **2020-4220** that provides 1,280- by 1,024-pixel resolution for two-dimensional graphics applications is available from **Ramtek Corp.**

The unbundled display controller is said to run Ramtek graphics with Digital Equipment Corp. VT100 alphanumerics or can be configured to run Graphics Kernel System and Tektronix-compatible graphics including computer-aided design and manufacturing and mapping applications.

In its basic configuration, the controller can display four colors simultaneously from a 16.7 million-color palette. Optional memory provides up to 256 colors. The 2020-4220 can drive a 30Hz interlaced or 60Hz noninterlaced display, according to the vendor.

Options include an RS-232C serial host interface for asynchronous communications up to 19.2K bit/sec. Optional parallel host interfaces for direct memory access communications are available for DEC VAX and Microvax, Control Data Corp.'s Cyber, Apollo Computer, Inc. and Perkin-Elmer Corp. computers and the IBM Personal Computer AT.

Priced from $6,995, the controller contains a single Motorola, Inc. MC 68010-based motherboard that is said to perform internal processing at 12 MHz. The Ramtek graphics instruction set is supplied as firmware on programmable read-only memory devices, the vendor said.

Ramtek, 2211 Lawson Lane, Santa Clara, Calif. 95050.

Chancellor Computer Corp. has unwrapped the **STL-ONE**, a stand-alone computer-aided engineering workstation that uses the AT&T PC 6300 to create integrated circuit and printed-circuit board designs.

STL-ONE performs schematic capture and physical layout in one graphics editor, the vendor said.

The workstation is said to provide layering capacity up to 50 layers, a menu-driven, two-letter mnemonic command structure and libraries containing as many as 5,400 parts.

Priced at less than $10,000, the STL-ONE comes with 640K bytes of random-access memory, a 10M-byte hard disk, 360K-byte floppy disk, 8086 and 8087 math coprocessors, 640- by 400-pixel graphics interface and 16 colors from a palette of 4,096.

Chancellor Computer, 1101 San Antonio Road, Mountain View, Calif. 94043.

TI announces the portable sales tool for General Electric Plastics' field communications.

Instant access with their technical data base and 24-hour communications with headquarters. That's what the SILENT 700™ Model 707 with its easy access module means to GE Company's Plastics Sales Division. Regardless of time zones and sheer distance from the home office, GE Senior Sales Representative Ray Forester can get the latest product data and cost analysis information he needs to prepare for and close a sale. All he needs is his TI 707 portable data terminal and a telephone.

"With the terminal, I can tap into GE Plastics' data base. When ERIS (Engineering Resins Information System) is accessed by my TI 707, I can provide a customer with technical information and product specifications on the spot and leave him with a printout to review.

"The terminal also acts as my message center when I'm in the field. I transfer messages through the GE Crossfile (electronic mail), and the individuals receive them in written format when they pick up their messages. They seem to respond more promptly with accurate, hard copy in front of them. And since I can receive messages anytime, anywhere, the TI 707 all but eliminates 'telephone tag.'"

Ray Forester believes that the TI 707 is ideal for the salesman on the go. It's lightweight and rugged, takes up approximately one half of a briefcase, and is quiet even at peak operation. "It's exactly the productivity tool we needed for our division's field communications," he concluded.

Find out about the Model 707 SILENT 700 Portable Data Terminal from TI and how it can solve your communications problems. Call 1-800-527-3500, ext. 709; in Canada, 416-884-9181. For more information write TI, P.O. Box 809063, Dept. DTB 1930W, Dallas, Texas 75380-9063.

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With our software support, you're never in over your head.

When you install NOMAD2, even on a trial basis, you'll quickly see the difference between inflated promises and support programs that give you and your users a real lift.

Because in the world of 4GL/DBMS products, no one provides a level of support comparable to NOMAD2.

For both your end users and programming staff, we offer some of the most comprehensive and flexible education in the industry—including computer-based courses and on-site training classes.

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COMPUTER INDUSTRY

Mostek closing doors

Victim of depressed prices, foreign competition

By Clinton Wilder

HARTFORD, Conn. — The U.S. semiconductor industry's losing battle against depressed prices and Japanese competition claimed its largest victim recently when United Technologies Corp. announced the closing of its Mostek Corp. chip making subsidiary.

The closing will eventually affect 3,200 workers at Mostek's Carrollton, Texas, headquarters, which was temporarily shut down Oct. 18. A handful of employees were expected to return to work today for a "phasedown period" of undetermined length, according to a United Technologies spokesman.

The Mostek closing placed in sharp focus the fate of U.S. chip makers in the memory chip market, in which overcapacity, commodity pricing and alleged Japanese dumping, or selling below cost, have made 1985 a year of losses and layoffs. While most leading vendors are running in the red, Mostek is the first major firm to shut its doors.

"The one-product companies are in dire straits," industry analyst Jack Beedle said of Mostek's concentration in the memory chip sector. "When prices were high, they did very well, but they aren't high anymore. Most of the other big companies, like [National Semiconductor Corp. and Texas Instruments, Inc.] are more broad based."

Beedle, president of In-Stat, Inc., a market research firm in Scottsdale, Ariz., said even Japanese firms have abandoned the low-end memory market. "There are no more 64K [random-access memory chips] in production," he said. "There are enough in inventory to supply the world for eons."

Mostek had been in severe financial

Continued on page 143

INDUSTRY INSIGHT
Clinton Wilder
CW Senior Writer

Opinions on slump abound

The computer industry slowdown weighed heavily on everyone's mind at the sixth annual Alex Brown & Sons, Inc. Computer Services Seminar held in Baltimore earlier this month.

While the extent of the computer slump in the software industry is a matter of debate, most chief executives speaking to the financial community found it necessary to address the issue, even if their particular firm continues to be successful. It's not surprising that one's opinion on the existence of a software slump depends heavily on what's going on at the bottom line.

Management Science America, Inc. (MSA) President William Graves, for example, said the decline in capital spending has sharply cut into MSA's IBM applications software sales. "Our sales to the oil and high-tech industries are just not making it," he said. "The economy is very hard at this time."

Graves said part of MSA's strategy to reverse its current series of losses is a new focus on "full-solution contracts" with its Information Expert line, particularly in vertical markets such as manufacturing, health care and the legislative/public sector. "Eighty percent of the software running today is old and archaic," Graves said. "We're providing the tools [for users] to change that."

VM Software, Inc. Chairman Robert E. Cook spoke of his firm's growth in the "exploding" IBM VM-based applications market, but he candidly noted, "If we weren't $800,000 and 19 people below last year's expense level, we'd be in trouble. We don't see a slowdown in the VM arena, but we're watching expenses carefully."

Continued on page 144

Third-quarter results released

Stratus profits nearly double, Compaq posts 50% revenue increase

By Clinton Wilder

Stratus Computer, Inc. and Compaq Computer Corp. were among the big winners in third-quarter results announced recently. Finding the right growth niches during a down year for the industry, Stratus and Compaq reported significant gains over their year-earlier period results.

Stratus, the No. 2 maker of fault-tolerant systems, nearly doubled its profits from $1.21 million, or 6 cents per share, to $2.25 million, or 12 cents per share. The 1984 figure did not include a $300,000 tax credit. Sales jumped 90% from $11.1 million to $21.1 million.

Compaq, king of the hill in the crowded IBM-compatible microcomputer market, reported earnings of $6.3 million, or 21

Continued on page 143

Earnings at Honeywell, Burroughs down despite slight revenue increase

By Clinton Wilder

Evidence of the lingering slowdown in computer hardware continued to surface in the third-quarter results of several leading systems vendors, most of which followed a pattern set by IBM's lackluster performance during the period [CW, Oct. 21].

Like Big Blue, both Honeywell, Inc. and Burroughs Corp. reported single-figure revenue increases but declines in earnings from continuing operations compared with the third quarter of 1984. Burroughs, hit harder than its competitors by a significant loss in its Memorex, Inc. peripherals business, saw profits sag 35.9% from the year-earlier quarter. Burroughs Chairman W. Michael Blumenthal called the Detroit

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INSIDE

CW's legal issues series concludes with a discussion of the regulation of software acquisition by the federal government **136**

A Spanish firm pleaded guilty to illegally diverting semiconductor production and test equipment to the Soviet bloc/**136**

INSTANT ANALYSIS

"No one has reached maturity in automation, no matter what he claims. We are a far cry from becoming a mature industry."

— Francis G. Rodgers, former IBM marketing director

MCI moves closer to SBS buyout

By Bryan Wilkins

WASHINGTON, D.C. — IBM and MCI Communications Corp. said recently that they signed a definitive agreement whereby MCI will acquire virtually all of Satellite Business Systems' (SBS) assets in exchange for approximately 46.7 million shares, or 16.6%, of MCI common stock.

The initial agreement in principle, which was announced June 25, called for IBM to acquire 45 million shares of MCI stock plus warrants for an additional seven million shares priced at $15 a share. However, MCI said it eliminated the warrant option in return for increasing the number of shares it will issue to IBM. The value of the transaction, based on MCI's stock price at the time of the agreement, is approximately $357 million and did not change as a result of the elimination of the warrants.

Continued on page 139

Out of money, Denelcor seeks buyer

By Maura McEnaney

AURORA, Colo. — Unable to gain a foothold in the narrow supercomputer market, Denelcor, Inc. has closed its facilities in Aurora and is actively seeking a buyer.

Telephones at the company went unanswered last week. "They ran out of money two months ago," said analyst Robert Brown of the firm Pemberton, Houston, Willoughby, Inc. in Vancouver, B.C. The company has reportedly not paid its 300 employees since July.

Denelcor manufactured a brand of supercomputer known as the Heterogeneous Element Processor, or HEP-1. The product sold for about $2 million and was capable of processing up to 160 million instructions per second (Mips) by putting together 16 10-Mips units, Brown noted.

Sold to military installations

Several HEP-1s were sold to U.S. military installations, including facilities at the Pentagon and Los Alamos Laboratories in New Mexico. Maintenance contracts for several of those machines have been picked up by Denserve, Inc., a maintenance company in Denver.

Denelcor was also in the process of developing a HEP-2 machine, said to be capable of processing 12,000 Mips, Brown said.

The majority of Denelcor's financial backing came from a group of British investors, according to Brown. "The investors in the UK were supporting them up to a point, then, I believe, the investors realized the company needed two years and 20 million more dollars" before it could support the second project, he said.

Denelcor board member King Shwayder told *Computerworld* that the company had been struggling for more than a year and could not compete with supercomputer manufacturer Cray Research, Inc. Shwayder said President David Miller opted against filing for protection under Chapter 11 of the Federal Bankruptcy Act. "He felt it would eliminate any values remaining for the shareholders," Shwayder said.

Regulation determines government use of software

NINTH IN A SERIES

By Jerome J. Roberts
and Michael P. Brownell
Special to CW

Specific sections of the Federal Acquisition Regulation govern federal government software acquisition. Failure to comply with the regulation may enable the government to receive very broad usage rights regarding a contractor's software and related documentation.

The application of the regulation's provisions regarding software procurement often differ depending on the type of software, the nature of the procurement and the government entity involved. Different branches of the government have specific regulations under the Federal Acquisition Regulation.

RESTRICTED, LIMITED AND UNLIMITED RIGHTS

The government's rights in software and documentation fall into three categories: restricted rights, limited rights and unlimited rights. These categories establish both the government's rights to use software and documentation and its obligations to protect such assets.

In general, restricted rights provide the greatest proprietary protection and are available only for software, not for documentation. Limited rights provide less protection than restricted rights and are available only for documentation. Unlimited rights provide very little if any protection and may apply to both software and documentation.

RESTRICTED RIGHTS

Only software developed at private expense not in the public domain and not previously provided to the government with unlimited rights is eligible for restricted rights. Software developed initially at private expense but subsequently completed or modified under government funding will be ineligible for restricted rights treatment with respect to the portions completed or modified under such funding — and possibly the entire software. Except for one instance discussed below, documentation is never eligible for restricted rights.

Under restricted rights, the government receives a minimum of four rights: the right to use the software with a designated computer; the right to use the software on a backup computer if the designated computer becomes inoperative; the right to copy the software for backup and archive purposes; and the right to modify the software provided that certain portions of the modified software remain subject to restricted rights. A contractor may not deny the government any of these rights.

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The parties may, however, agree upon restrictions regarding the exercise of such rights.

LIMITED RIGHTS

Subject to several statutory exclusions, unpublished documentation, as defined under the Federal Acquisition Regulation, that relates to restricted rights software is automatically eligible for limited rights. All other documentation must be identified and agreed to in the pertinent government contract as being subject to limited rights to receive such a classification.

In general, limited rights documentation may be used, duplicated or disclosed by or for the government so long as the documentation is not, without the contractor's written permission, used to prepare similar software, released outside the government or used by a party other than the government. Because limited rights provide less protection than restricted rights, a contractor should be very cautious about placing trade secrets, particularly source code, in its documentation.

UNLIMITED RIGHTS

Unlimited rights can apply to either software or documentation and will apply whenever a contractor fails to comply with the regulation's requirements relating to perfecting limited or restricted rights or whenever software or documentation is ineligible for restricted or limited rights.

Unlimited rights normally attach to all documentation or software prepared under government funding. Note, however, that government-funded software and documentation developed by small businesses under small business innovation research programs may receive a hybrid form of proprietary protection falling in between restricted rights and unlimited rights.

The government may use, duplicate or disclose unlimited rights software or documentation in any manner, for any purpose, and permit others to do so. Once the government receives unlimited rights to software or documentation, it cannot be charged an additional license fee for subsequent copies of the software. In short, granting the government unlimited rights to software or documentation shows an apparent abandonment of any trade secrets contained within and may serve to erode the overall commercial value of the product.

PERFECTING RESTRICTED OR LIMITED RIGHTS

Even though software and documentation may satisfy the requirements for receiving restricted and limited rights, a contractor is required by the Federal Acquisition Regulation to take certain steps to ensure that such protection attaches to its product. Failure to take such steps may confer unlimited rights upon the government regarding the software or documentation.

To ensure the government receives only restricted rights to software, the attendant government contract, or a separate license agreement incorporated therein, must expressly identify the software subject to restricted rights.

The software must be marked with the following legend prior to delivery to the government:

"RESTRICTED RIGHTS LEGEND

Use, duplication or disclosure is subject to restrictions stated in Contract No. [number] with [name of contractor]."

The software's attendant documentation must contain a prominent statement of the restrictions applicable to the software as such restrictions appear in the contract. The statement must not contain any restrictions not appearing in the contract,

> ***"Failure to comply with the regulation may enable the government to receive broad rights regarding software.***

To ensure that the government receives only limited rights in documentation, the contractor must list in the government contract all documentation that has been published or does not pertain to restricted rights software.

The Federal Acquisition Regulation requires that a contractor must identify, by circling, underscoring or so on, each individual portion of its documentation that is to be subject to limited rights.

The method used to so identify such portions must be explained in the following legend, which must be affixed to the software documentation:

"LIMITED RIGHTS LEGEND

Contract No. ________
Contractor ________
Explanation of Limited Rights Data Identification Method Used ______ "

COMMERCIAL COMPUTER SOFTWARE

The Federal Acquisition Regulation provides a modified form of restricted rights protection for "commercial computer software and related documentation" that is privately developed and not in the public domain.

Commercial software includes software used for other than government purposes and that is distributed to the public in significant quantities at market prices.

Characteristics of this protection are that documentation receives protection greater than limited rights; fewer markings are required (a modified form of restricted rights legend must be applied to software and documentation); and the software and documentation need not be identified in the contract as previously discussed.

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Firm guilty of illegal export

By Mitch Betts

WASHINGTON, D.C. — A Spanish electronics firm has been fined $1 million, given five years of probation and temporarily denied its U.S. export privileges for illegally diverting U.S. electronics equipment to the Soviet Union and Cuba, the U.S. Department of Commerce said earlier this month.

The firm, Piher Semiconductores, S.A. of Barcelona, Spain, pleaded guilty to what the government called an "elaborate deception scheme." The fine was levied by Judge Thomas P. Jackson in U.S. District Court.

The department's investigation revealed that from 1979 to 1982, Piher illegally reexported semiconductor manufacturing and electronic test equipment to Cuba and the Soviet Union. Reexporting sensitive equipment requires the department's authorization. The government charged that Piher deliberately falsified its export license application by claiming the equipment was for Piher's use only and would not be reexported.

The firm was stripped of its export privileges in 1982 when the probe began, according to Theodore W. Wu, deputy assistant secretary for export enforcement. "We stopped more than $1.2 million of semiconductor manufacturing equipment from getting to the [Soviet Union] by intercepting shipments poised for illegal export," Wu added.

Electronic publishing systems show hosts myriad exhibitors

NEW YORK — The second Corporate Electronic Publishing Systems show held recently brought together exhibitors of all manners of publishing equipment, from full-scale electronic publishing systems to laser printers.

It was difficult at times in the crowd of vendors to find attendees on the exhibit floor.

Showgoers were investigating the possibilities that in-house publishing offers. "Cataloging is very expensive," said Anthony Damiano, controller of Alpha Wire Corp. in Elizabeth, N.J. Damiano does not use in-house publishing and doubts that it will become a reality for his firm in the next couple of years, but he is "thinking about it," he said.

Technical documentation needs prompted a Wang Laboratories, Inc. graphics and imaging systems product manager to check out the show. In three months, Wang will implement a system for in-house publishing, he said. The manager is looking for the proper way to approach publishing and is trying to see where the market is going with an eye toward not only using a system in-house but perhaps selling such publishing equipment for Wang systems.

"We are contemplating [buying] publishing equipment," said V. J. Bruno, manager of security for Grumman Aerospace Corp. in Bethpage, N.Y. When the company goes to electronic publishing in about a year, he will be responsible for the security of system software and hardware.

— Donna Raimondi

IBM requests arbiter to settle Fujitsu dispute

By Takehiko Kondoh and Ed Warner

WASHINGTON, D.C. (CWN) — IBM has asked the American Arbitration Association to determine whether Fujitsu Ltd. has violated the terms of its 1983 out-of-court settlement with IBM over software.

That settlement resulted in a agreement that, though secret, reportedly required Fujitsu to permit IBM to examine new Fujitsu products for possible IBM copyright violations prior to each product's introduction.

Neither the association, a nonprofit group dealing in dispute settlement, nor IBM would discuss the IBM appeal. A Fujitsu spokesman in Tokyo, however, said the dispute centers on similarities IBM found between its MVS/XA mainframe operating system and Fujitsu's MSP operating system. Fujitsu, Japan's top computer vendor, uses the MSP on its M-340 and M-360 series mainframes.

The Fujitsu spokesman said IBM is demanding Fujitsu pay it an unspecified sum and rewrite some of the existing software. He called IBM's appeal groundless and one-sided.

IBM's Japanese subsidiary, IBM Japan Ltd., declined to comment.

Kondoh is international editor/Asia for CW Network. Warner is editor, CW International News Services.

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From page 135

Earning at Honeywell, Burroughs down

firm's results "below our expectations and a disappointment."

Among other major systems vendors, Wang Laboratories, Inc. posted a small profit after its record second-quarter loss; earnings at Cray Research, Inc. declined slightly although sales grew by 38%, and the slump at Gould, Inc. continued with a 29% drop in its third- quarter net.

■ **Honeywell.** Edson Spencer, chairman and chief executive officer of the Minneapolis-based vendor, said a 6.7% drop in earnings from continuing operations was partially attributable to falling orders in Honeywell's computer business, the Information Systems Division. Spencer said large systems orders remained ahead of 1984 for the first nine months of 1985, but the volume of small systems orders "continued to be weak."

Honeywell earned $55.7 million, or $1.24 per share, during the quarter, down from $59.7 million, or $1.28 per share, from continuing operations a year ago. The 1984 figure excludes a nonrecurring $40 million gain from tax law changes. Third-quarter revenue was $1.35 billion, up 6.1% from $1.26 billion in the year-earlier quarter. Profits for the first nine months of 1985 lagged 1984 by 25.5%, with revenue 6.3% ahead of last year.

■ **Burroughs.** While sales edged up 2% to $1.15 billion, profits dropped from $50.2 million, or $1.11 per share, in the third quarter last year to $32.2 million, or 71 cents per share.

Blumenthal said half of the drop came within Memorex, owing to 3680 disk drive cost overruns, lower than expected disk storage volume and falling prices on IBM plug-compatible peripherals.

Blumenthal said domestic computer hardware sales continued to be sluggish, noting an "unexpected volume shortfall" in September.

For the first three quarters, Burroughs was 7.8% ahead of 1984's pace in revenue and 11.7% behind in earnings. Nine-month profits have fallen from $3.32 per share to $2.93.

■ **Wang.** As reported in its preliminary announcement [CW, Oct. 14], the Lowell, Mass., office automation leader returned to the black after its disastrous June-ending quarter, in which the firm lost $109 million and laid off more than 1,600 workers.

For the first quarter of its fiscal year 1986, Wang earned $7 million, or 5 cents per share, on $560.9 million in revenue. The revenue constituted a 1.3% increase from $553.8 million a year ago, when the company made a profit of $51.2 million, or 36 cents per share.

A spokesman said Wang received $699 million in new orders, a company record for one quarter, but that profit margins continued to be depressed by falling hardware prices.

■ **Cray Research.** The Minneapolis supercomputer maker posted a 2.5% drop in earnings to $19.1 million from $19.6 million a year ago, despite a 38.9% revenue increase. Per-share earnings slipped from 66 cents last year to 63 cents.

The 1984 figure, however, included a $5.9 million, 20 cent per share deferred income tax credit. Cray's year-to-year pretax profit growth was 50.7%, from $23.6 million to $35.6 million.

Cray Chairman John A. Rollwagen said customers purchased five Cray supercomputers in the quarter, compared with two systems sold and one leased in the year-earlier quarter. He predicted the firm will sell five systems and lease five others in the fourth quarter.

■ **Gould.** The Rolling Meadows, Ill., vendor of chips, computers, defense systems and other electronic products reported a 29% decline in profits, from $22.5 million, or 50 cents per share, a year ago to $16 million, or 36 cents per share. Revenue dropped from $390.3 million to $361.6 million.

From page 135

MCI moves closer to SBS buyout

IBM also has the right to acquire additional MCI shares up to 30% of the common stock without MCI board approval.

MCI said IBM has also agreed under certain conditions to invest an additional $400 million in MCI between Sept. 1, 1986 and Dec. 31, 1988. An MCI spokesman said the conditions stated that MCI would ask IBM to invest the money at a time of its own choosing.

The proposed takeover of SBS' assets by MCI will now be submitted to the Federal Communications Commission for approval.

MERGERS AND ACQUISITIONS

Bell & Howell Co. announced that it has acquired a 48% share in **Quintar Corp.** for $1.4 million. Bell & Howell purchased its shares from Matrix Corp. and the remainder from Quintar Corp.

■

Decision Data Computer Corp.'s wholly owned subsidiary Decision Data Service, Inc. has announced it has acquired the field service business of **Twentieth Century Computer Maintenance, Inc.**

■

Anacomp, Inc. has announced its acquisition of the customer base of three micrographics processing centers from **Kalvar, Inc.** In exchange for the centers, Anacomp delivered securities and a note held by Anacomp to Kalvar.

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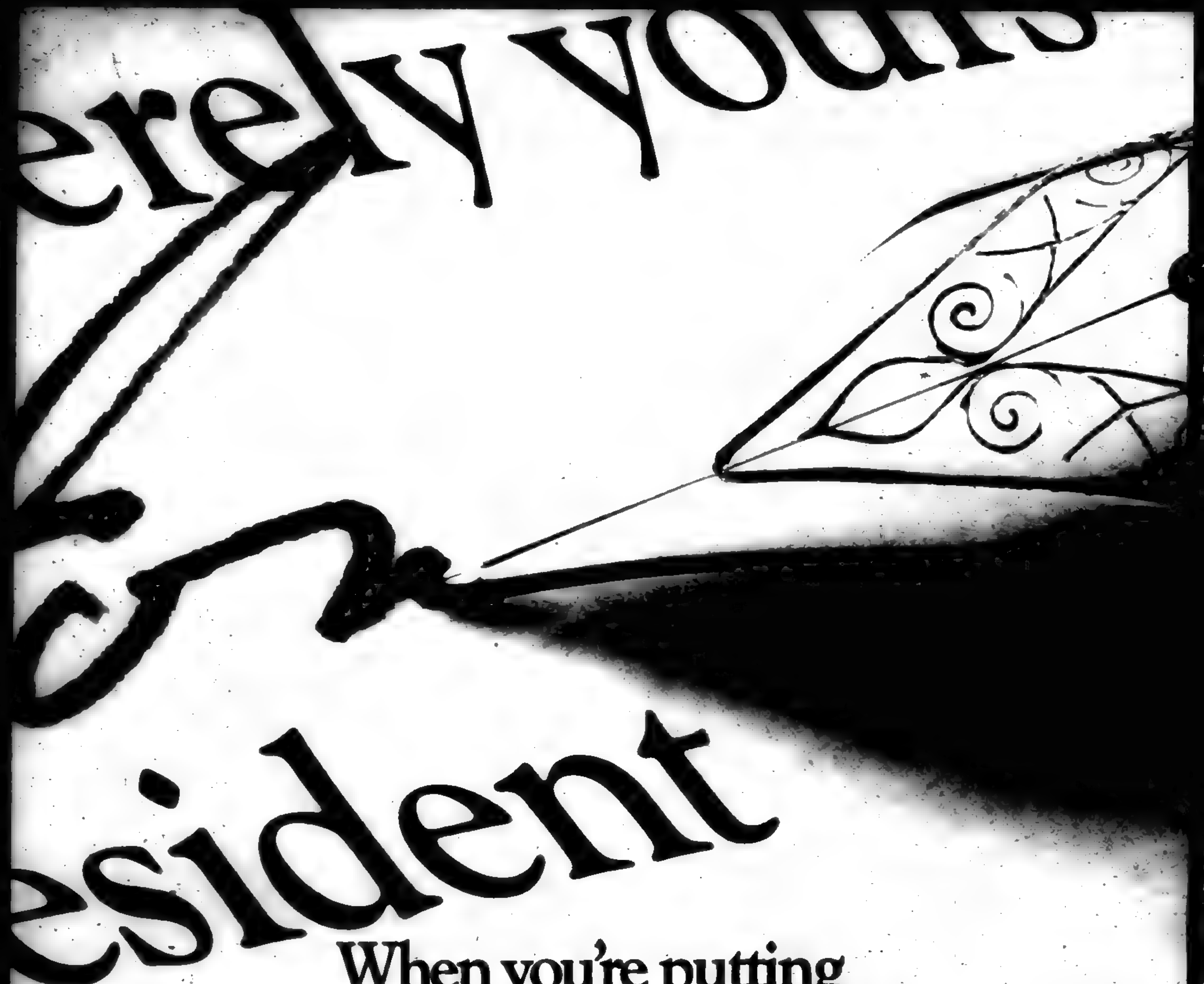

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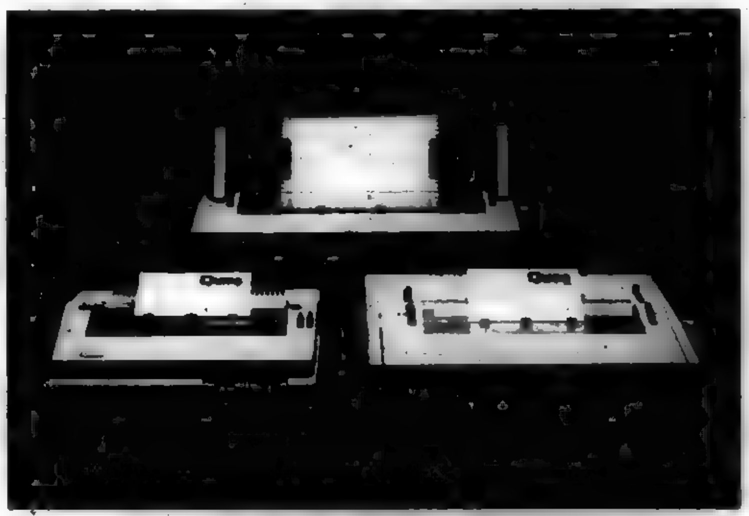

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From page 135

Stratus, Compaq post revenue increases

cents per share, compared with $1.9 million, or 7 cents per share, a year ago. Revenue grew 50% from $87.6 million to $131.7 million.

As expected, Compaq President Rod Canion attributed much of the growth to the success of the Compaq Deskpro 286 and Portable 286, which are compatible with and lower priced than the IBM Personal Computer AT.

Other third-quarter results announced recently include the following:

■ **Tandy Corp.** The micro and laptop computer vendor posted a 12% gain in profits on 16% revenue growth for its first quarter ended Sept. 30. Tandy earned $41.7 million, or 47 cents per share, on $699.5 million in sales.

■ **Computer Consoles, Inc.** Former Wang Laboratories, Inc. President John Cunningham has not turned the Rochester, N.Y., minicomputer vendor around yet. The firm posted another losing quarter with a loss of $4.2 million, or 37 cents per share, on revenue of 25.4 million. A year earlier, the company earned $1.4 million, or 12 cents per share, on $33.3 million in sales.

■ **Intecom, Inc.** The Wang data communications partner posted a steep decline in profits from $4.9 million, or 15 cents per share, a year ago to $832,000, or 3 cents per share. Sales fell from $40 million to $32.7 million.

■ **Ungermann-Bass, Inc.** The Santa Clara, Calif., local-area network leader saw its earnings drop despite a 43% rise in revenue from $13.3 million to $19 million. Expenses kept pace with sales, jumping from $11.3 million to $18.3 million. Ungermann-Bass earned $1.3 million, or 8 cents per share, compared with $1.7 million, or 11 cents per share, a year ago.

■ **Computer Sciences Corp.** The El Segundo, Calif., vendor of systems and services posted a profit gain of 43% from $3.4 million, or 25 cents per share, to $4.9 million, or 34 cents per share. Revenue increased to $209.3 million from $172 million in the year-earlier quarter.

■ **Compugraphic Corp.** The Wilmington, Mass., vendor of automated publishing systems attributed a third-quarter drop in profits and earnings to slowed capital spending in the U.S. and no pickup in overseas orders to accompany the weakened dollar. Compugraphic earned $4.1 million, or 50 cents per share, on $94 million in revenue, compared with $6.5 million, or 79 cents per share, on $101.3 million in sales a year ago. The firm laid off 5% of its work force last month.

■ **Seagate Technology, Inc.** Bucking the downward trend in the peripherals market, the Scotts Valley, Calif., Winchester disk drive maker boosted its revenue 78% from the year-earlier quarter and posted a modest profit. Seagate earned $1.6 million, or 4 cents per share, compared with a $423,000, 1 cent per share, loss in the year-earlier period. With 49% of its sales going to IBM, Seagate increased its revenue from $50.6 million a year ago to $90.3 million.

■ **Daisy Systems Corp.** The Mountain View, Calif., computer-aided design workstation vendor said fourth-quarter profits increased from $3.5 million, or 23 cents per share, to $5.9 million, or 33 cents per share. Revenue increased 63% to $35.5 million.

For the fiscal year ended Sept. 30, Daisy Systems posted a 77% revenue increase from $69.1 million in the prior year to $122.5 million. Profits jumped from $11.4 million, or 76 cents per share, to $20.5 million, or $1.18 per share.

From page 135

Mostek closing its doors

trouble since the beginning of the year, losing approximately $330 million and laying off two-thirds of its 10,000 employees. Susan Kelly of Dataquest, Inc. said only the financial backing of United Technologies, one of the nation's largest defense contractors, kept Mostek from closing sooner.

Kelly predicted two companies in California's Silicon Valley, Vitelic Corp. and Zilog, Inc., would attempt to contract for production that had been done by Mostek.

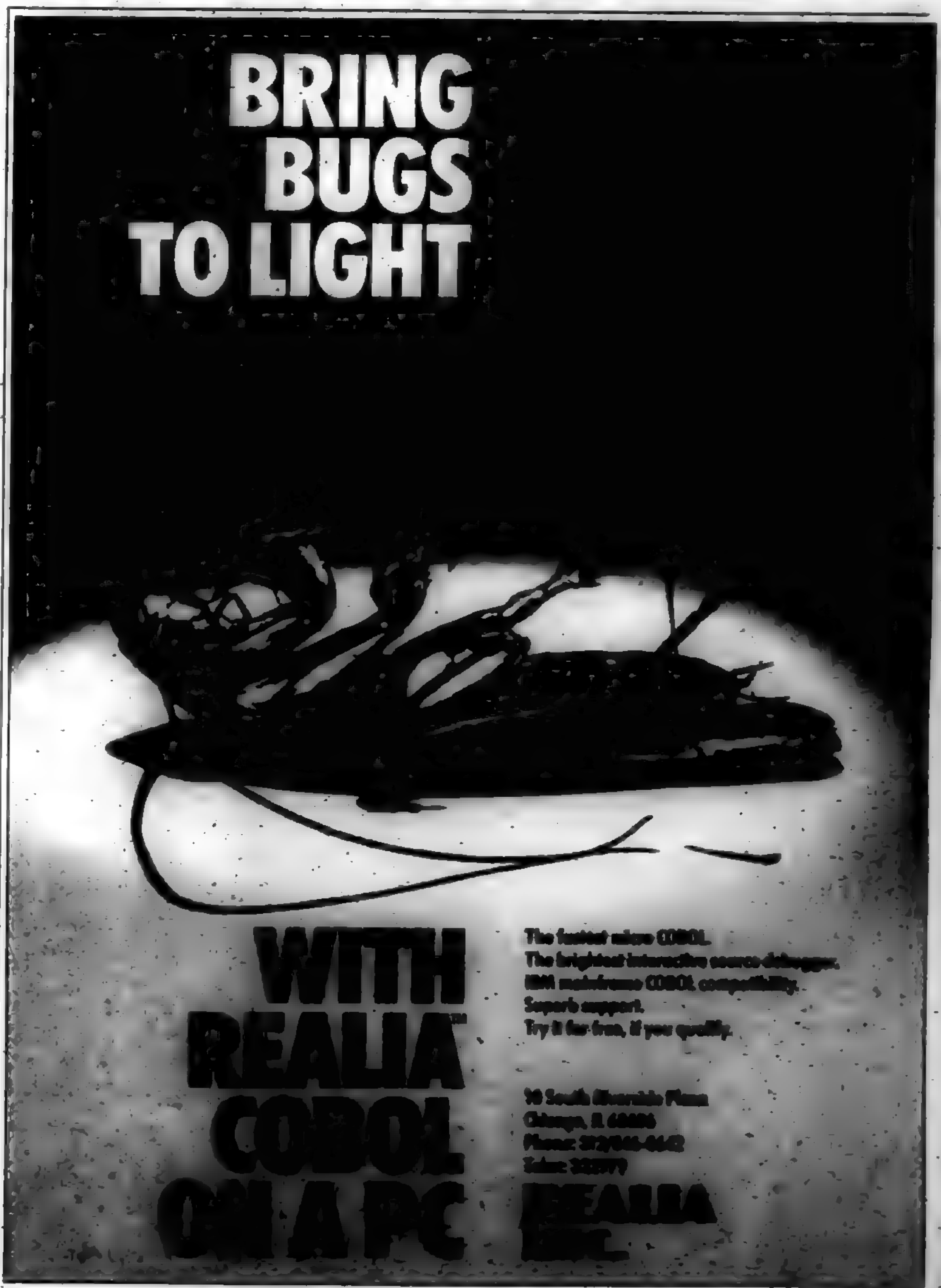
In conjunction with the closing, United Technologies also announced that it will sell its telecommunications business, which focused on the private branch exchange market. The combined effect of the two moves cost the firm $423.7 million, resulting in a net loss of $45.6 million in the third quarter. United Technologies earned $192.7 million in the third quarter a year ago.

Elsewhere in the semiconductor industry, the pattern of generally dismal results continued. Seeq Technology, Inc. of San Jose, Calif., announced the layoff of 75 of its 450 employees.

Seeq posted a loss of $6.3 million for the quarter and $10 million for the year ended Sept. 30. This marked the second straight losing year for Seeq, which finished $3.7 million in the red in fiscal 1984. Year-to-year revenue declined from $42.9 million to $40.3 million.

Separately, chip maker Exar Corp. of Sunnyvale, Calif., dismissed 60 of its 500 employees and LTX Corp. of Westwood, Mass., a maker of semiconductor test equipment, announced the layoff of 250 employees.

Illustrating another industrial sector that has been hit hard by the technology slowdown, LTX President Graham Miller said the test equipment firm's orders for the three-month period ending this week were running 20% to 30% behind the previous quarter.



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From page 135

Opinions on slump abound

Applied Data Research, Inc. (ADR) Chairman and Chief Executive Officer John R. Bennett predicted a fourth-quarter pickup in ADR sales. "Many of our large accounts say they haven't bought yet but will before the year is out," he said. "There is a lot of uncertainty right now."

Despite a slight profit in the third quarter [CW, Oct. 21] thanks to a $6.5 million contract from the U.S. Army, ADR has lost $2.3 million in the first nine months this year. "After last year we decided to budget for 45% growth, and our expenses were right on target," Bennett said. "We are planning for no expense growth in 1986." ADR instituted a hiring freeze last July.

Bennett said all independent software companies are allies in the market share battle against IBM's DB2 and its monthly license fee structure. "Competing against that 30-day trial option, our [relational data base management system] is $300,000, and we're still selling it," he said. "But we have to look at making our software easier to buy."

Bennett predicted that the adverse effect of the New Jersey State Department of Motor Vehicles' problems with ADR's Ideal software [CW, Sept. 30] would be temporary, but thought that perhaps the whole snafu may serve an educational purpose in the end. "The discussion needs to be elevated to an examination of fourth-generation languages in general," he said.

Bennett claimed ADR users still stand behind Ideal. "When we talked about the New Jersey situation at our users group meeting, it was like bad-mouthing Jesus Christ at a religious revival," Bennett said.

Over on New York's Long Island, things are still swimming for Computer Associates International, Inc. Chairman Charles Wang's biggest worry is that analyst/investor types will shy away from the Jericho, N.Y., vendor because the overall industry has slowed down.

What are Computer Associates' secrets of success? According to Wang, they are a favorable product mix (including Sorcim/IUS micro offerings), fixed term licenses (for a recurring revenue based on a 90% renewal rate) and competitive pricing.

Another success story in attendance at Alex Brown was Software Publishing Corp.'s youthful president, Fred Gibbons. Software Publishing's first venture into the high-ticket micro software market with its recent acquisition of Harvard Software, Inc. will be interesting to watch. Software Publishing, incidentally, jettisoned virtually all of the Littleton, Mass., firm's employees, except very top management, after the buyout.

> ”
>
> *'If [VM Software] weren't $800,000 and 19 people below last year's expense level, we'd be in trouble.'*
>
> **— Robert E. Cook**
> **VM Software, Inc.**

Gibbons said that Software Publishing's trademark PFS series will show a sales breakdown of 70% IBM to 30% Apple Computer, Inc. versions in the current year and predicted that the mix will shift to 90%-10%, respectively, in fiscal 1986. Just one more plug for Apple as "the educational computer company."

AGS Computers, Inc., the 18-year-old Mountainside, N.J., firm offering a mixed bag of systems integration, distribution and consulting, reported that IBM is now its second largest customer, behind AT&T. In the past year, Big Blue vaulted over Digital Equipment Corp. and Wang Laboratories, Inc. to earn that position.

As for IBM itself, well, some things never change. John E. Steuri, boss of IBM's Information Services Division, had just wrapped up an extensive presentation on the division's offerings and directions to a large Alex Brown audience when an analyst asked the $64 million (this is IBM we're talking about) question. Could Steuri break out the division's current revenue?

Steuri paused for a moment and replied, "Are you from the trade press?"

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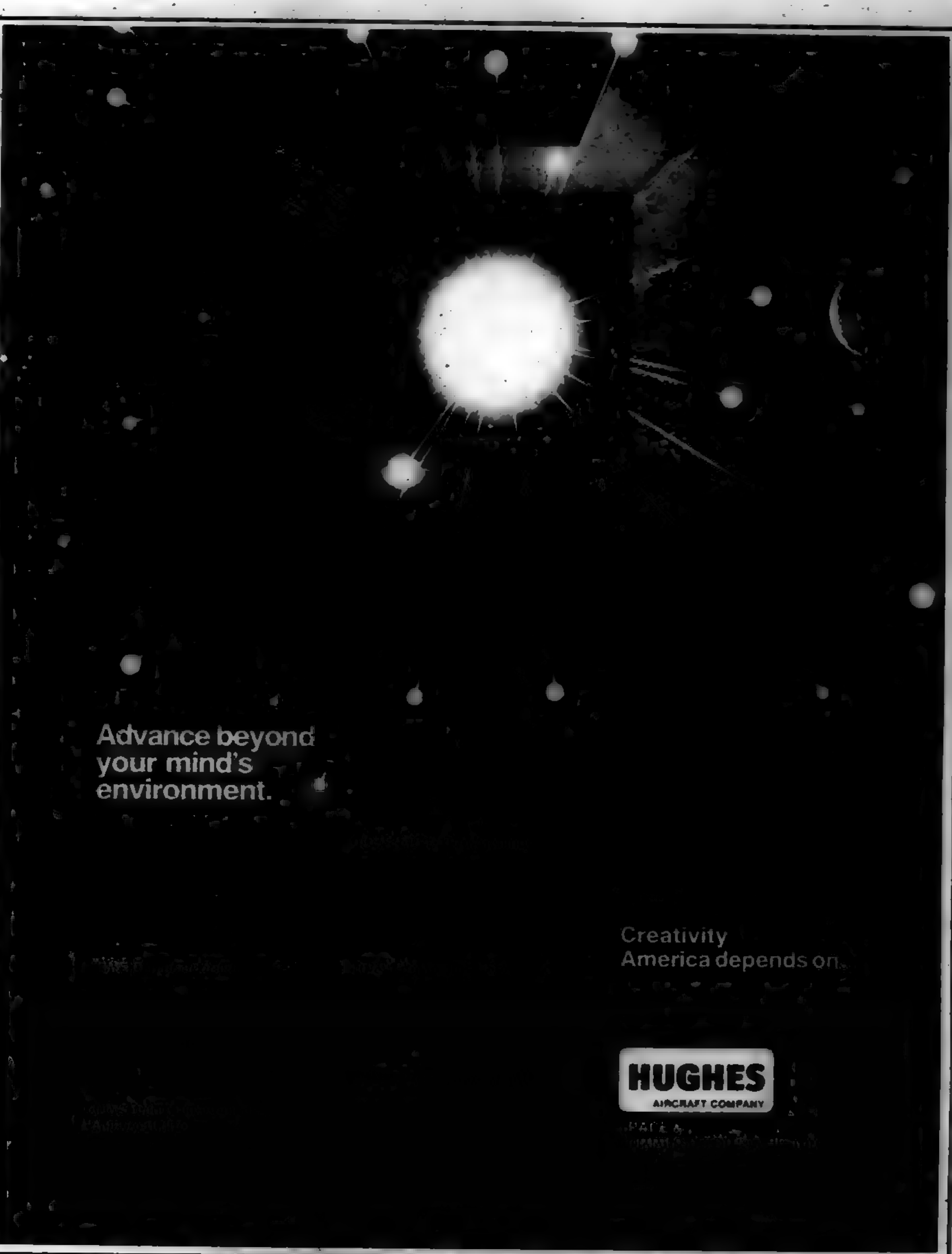

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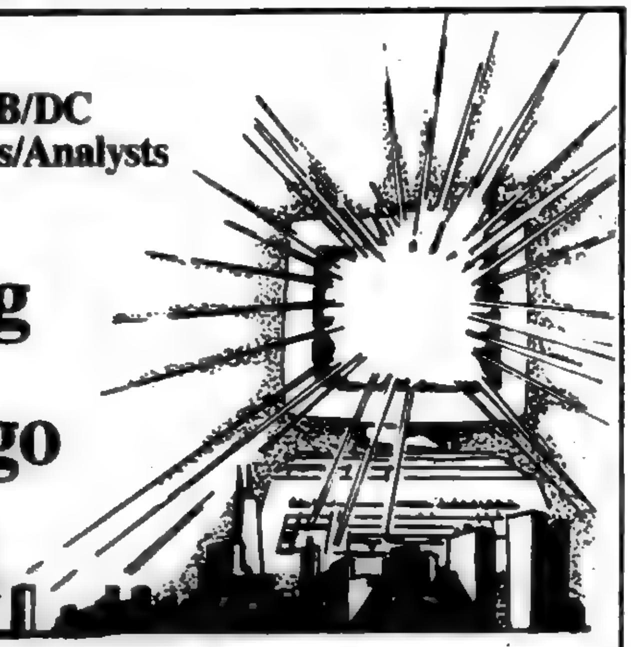

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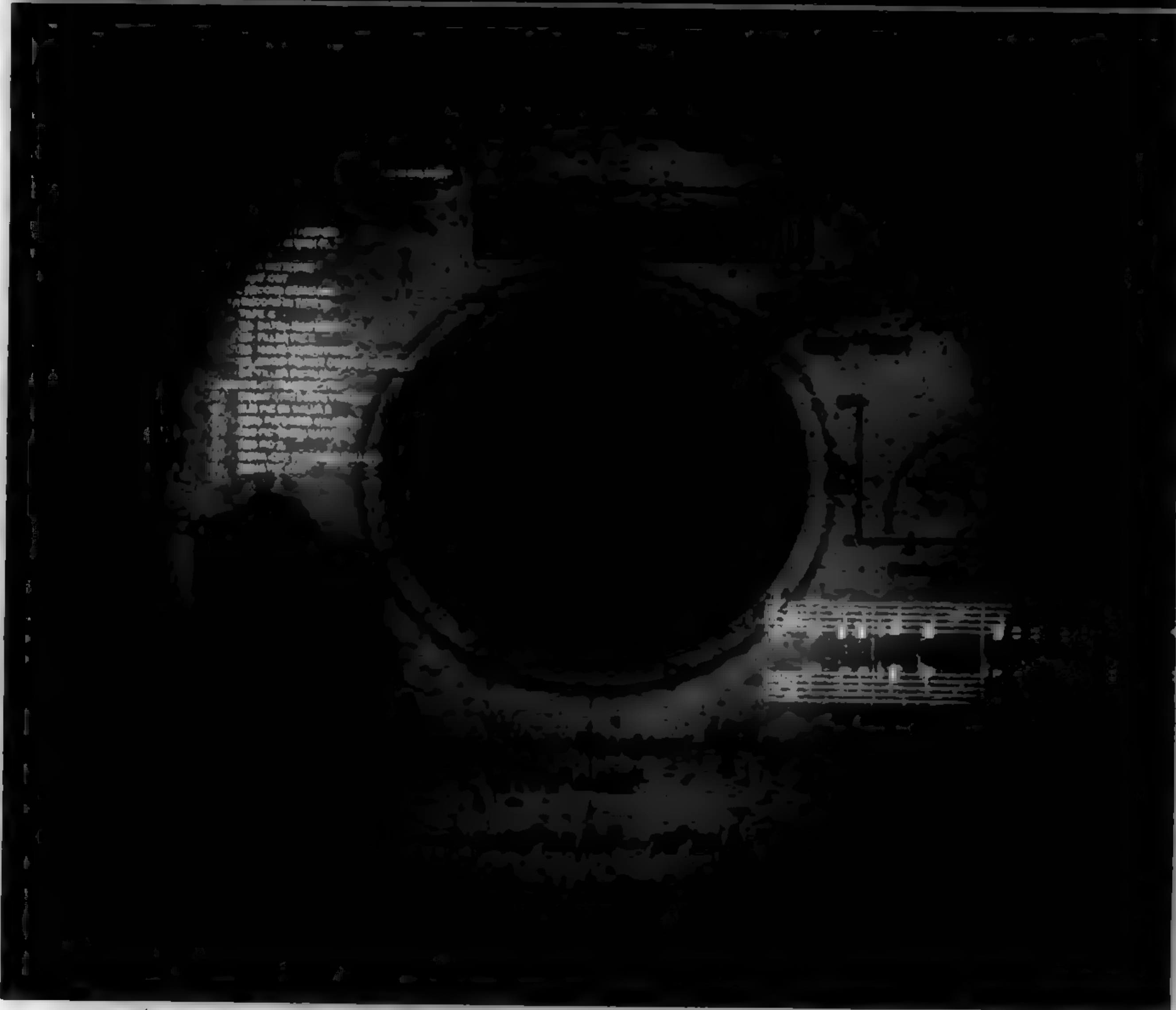

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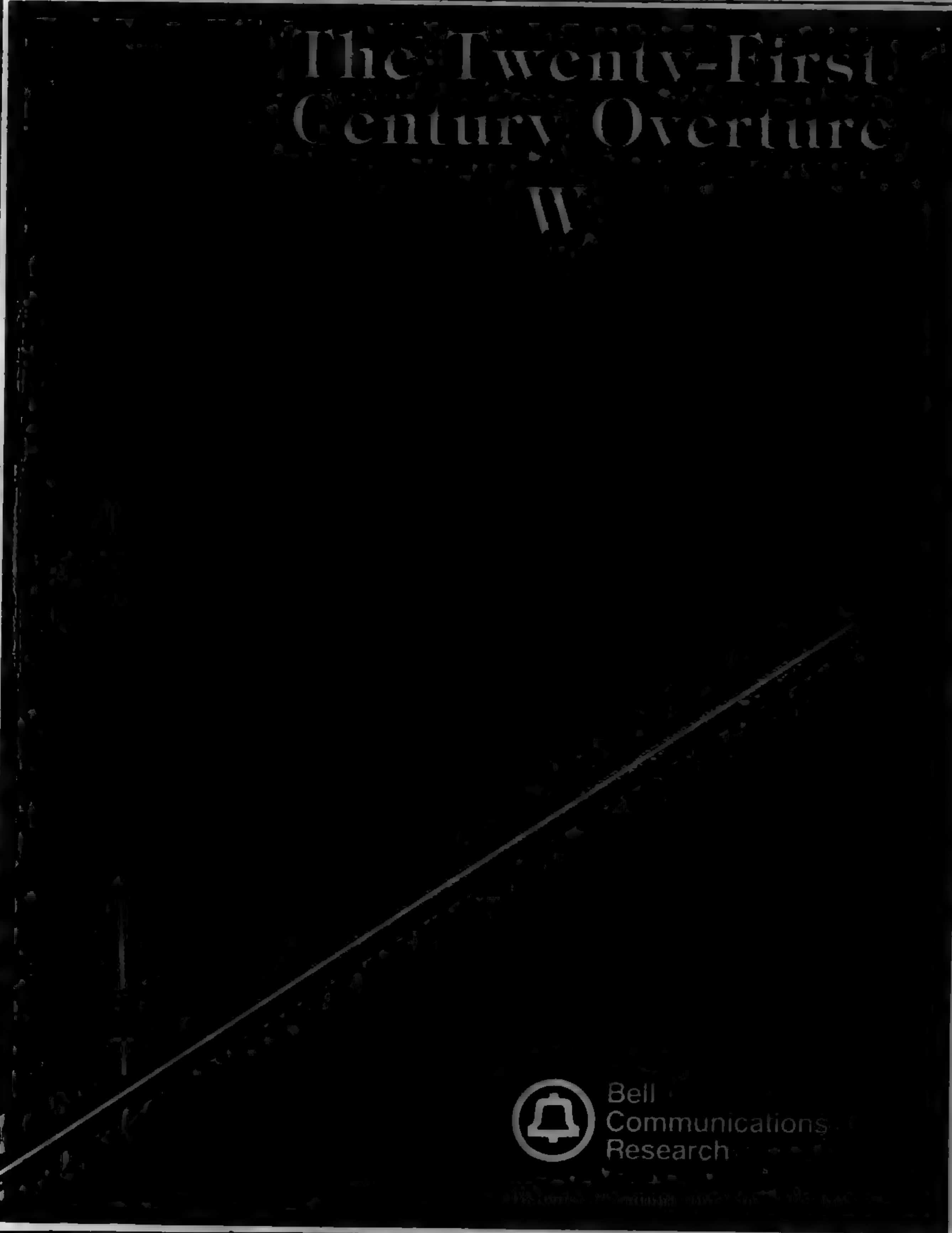
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Pioneering in any field demands inquiring technical minds—people capable of applying present technology to the future. Of looking forward. Pushing limits. Creating ways to apply new hardware and software. Central to our success is our ability to integrate new developments in the rapidly evolving science of communications. The following positions represent an opportunity to play a key role in the development of our services—ways you can become one of the bold pioneers creating new boundaries of networking technology.

TELECOMMUNICATIONS SPECIALISTS

Openings are available for this position throughout the United States to install and maintain sophisticated telecommunications equipment. You must have an AS degree or equivalent in Computer Technology or Electronics, a knowledge of earth stations and switching nodes (Tandem and/or Rockwell/Collins equipment preferred), and familiarity with communications protocols such as X.25 and HDLC. Practical knowledge of voice grade and DDS data circuits is also required.

SR. TELECOMMUNICATIONS ANALYST

You will coordinate installations of major telecommunications systems and provide expertise in evaluating telecommunications problems and isolate specific hardware, software or transmission component problems. You must have a Bachelor's degree or equivalent in Business, Math or Engineering with four years professional experience in the design and development of major telecommunications projects. Knowledge or experience in circuit administration, CCITT standards and practices, business/strategic planning, tariff and regulatory affairs and/or traffic accounting and settlements required along with frequent international travel.

SR. TELECOMMUNICATIONS ENGINEER

You will design programmable communications interfaces for various protocols (i.e. X.25, mobile satellite, SDLC/SNA, etc.). A Bachelor's degree or equivalent in Electrical Engineering or Computer Science and four years professional experience in communications or computer systems engineering and training are required. You must have a thorough knowledge of microcomputer hardware and software and good communication skills. Experience in computer hardware, programming or data transmission is preferred.

TELECOMMUNICATIONS ENGINEER/RADIO

You will design and maintain corporate/field radio communications network, assuring user requirements and operational efficiency are met. A Bachelor's degree in Electrical Engineering plus 2nd class commercial radio telephone license or equivalent is required. You must have two years professional experience in the area of business band FM radio communications and Digital Systems, and be able to travel to field stations.

CHIEF ENGINEER/NETWORK DEVELOPMENT

You will provide unique technical expertise in performing design and development of advanced telecommunications systems; develop telecommunications strategies to support corporate objectives; and ensure cost effective network systems. A Bachelor's degree or equivalent in Engineering, Computer Science or related field is required; Master's degree is preferred. You must have eight years professional data communications or computer systems experience, including five years experience in data communications planning, development or engineering. Knowledge of communications transport protocols and interfaces is required along with the demonstrated ability to work with broadly defined goals.

CHIEF ENGINEER/ GROUND SEGMENT ENGINEERING

You will ensure the design and development of all earth stations, control centers, and related programs as part of the space-based communication system for voice, data, video and image traffic. You must have seven years engineering experience, including design and development of space-based communications systems, and experience in program management/leadership of space-based systems from design to operation.

PROJECT ENGINEER/ NETWORK DEVELOPMENT

You will design and develop advanced telecommunications systems and develop telecommunications strategies to support corporate objectives and to ensure cost-effective network systems. A Bachelor's degree in Engineering, Computer Science or a related field is required; Master's degree is preferred. You must bave six years professional experience in data communications or computer systems, including three years in data communications planning, development or engineering. Knowledge of communications transport protocols and interfaces is required along with the demonstrated ability to work with broadly defined goals.

SR. OPERATIONS ANALYST

You will analyze ZapMail operations in order to recommend resource and procedural changes; develop and implement computer-based management decision systems; and analyze and make recommendations for ZapMail network expansion. You must have a Bachelor's degree or equivalent in Math, Computer Science, Engineering or a related discipline. MBA is preferred. Four years professional experience in financial/operational analysis and/or design of computer-based decision systems is required along with knowledge of computer modeling using scientific or statistical programming languages.

SR. ENGINEER/SOFTWARE

You will plan, design, code, test and implement software and firmware for use in electronic mail applications. A Bachelor's degree or equivalent in Electrical Engineering, Computer Science, Math or Physics is required along with five years systems programming experience with microcomputers or microprocessors. A Master's degree is preferred. You must be proficient in real-time assembly language programming as well as high level (BASIC, PL-1, FORTRAN, PASCAL) language programming.

Ours is a unique and creative environment for achievement. Technical resources are superior. Salaries are competitive. And our corporate benefit program is comprehensive. If you are eager to create new boundaries of networking technology, **please call toll-free, 1-800-435-2222, between 8:30 AM and 12:30 PM (CDT), Wednesday or Thursday, ONLY,** or forward a letter or resume indicating your experience and salary history, in confidence, to the address below.

TO EXPEDITE CONSIDERATION, PLEASE INDICATE THE POSITION FOR WHICH YOU ARE APPLYING ON YOUR REPLY ENVELOPE.

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UNIX† Development

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Positions in these areas are for development professionals who can define and control, as well as participate in, complex operating system projects. Significant UNIX operating system development experience is required, with concentrations on compilers, device drivers, and/or testing and maintenance methodologies. Knowledge of IBM or compatible mainframe system software is highly desirable. Excellent verbal and written communications skills are required.

Operating System Development

Design, implement, test, and maintain portions of the UTS base system, including the kernel, device drivers, compilers, and system utilities. Participate in project architectural planning, analyze and enhance system performance. Experience in porting UNIX System V and familiarity with mainframe environments are desirable.

Operating System Support

Develop tools to support the UTS product; design and implement test suites and debugging tools; participate in planning for quality assurance and configuration management requirements; and assist Field Engineering with debugging and correction of high severity system problems.

Management positions are also available.

To find out more about these opportunities in UNIX Development, contact Kim Hawley TOLL FREE at (800) 538-8460, extension 7171. In California, call COLLECT at (408) 746-7171. Or, send your resume to Kim Hawley, Amdahl Corporation, Dept. 10-5, MS/300, P.O. Box 3470, Sunnyvale, CA 94088-3470. We are an equal opportunity employer through affirmative action.

Corporate Computer Center

When you join Amdahl's progressive Corporate Computer Center in Sunnyvale, California, you will enjoy advantages reserved for the most select team in large-scale systems:

- Work in one of the largest data centers in the United States
- Leading-edge software including VM/SP HPO, MVS/XA, ACF/NCP, ACF/VTAM and MSNF, IMS/ DB/DC
- A hardware configuration that consists of one 5870, six 5860s, two 470/V8s, ten 4705s, over 600 spindles of DASD and over 2500 terminals
- An extensive training and education program

Sr. VM System Programmer

You will support VM/SP, HPO and related software running on three Amdahl 5860s and two 470/V8s. Must have a minimum of 4 years VM programming experience, including installation, maintenance, VM internals, and senior diagnostic skills, plus experience in Assembler language coding.

VM/UTS* Manager

You will manage five Systems Programmers responsible for supporting VM and UTS software running on two Amdahl 470/V8s and three 5860s. Your responsibilities will include the management of system software maintenance, user interface, planning, project management and budgeting. At least one year's technical management experience including personnel responsibility, and 3 years' prior experience in VM system programming required. A degree in computer science, or equivalent, desired.

EDP Capacity Planner

Our Resource Planning group is closely integrated with Telecommunications, Storage and Information Systems Planning and is seeking an individual to analyze current and projected requirements for computer capacity. In our complex environment of multiple CPUs and operating systems, your responsibilities will include user requirements analysis, workload and configuration modeling, development of service level proposals, and capacity analysis and forecasting. Requires 3+ years' experience in capacity planning, and knowledge of appropriate tools and techniques.

Systems and applications programming positions also available.

To explore one of these opportunities in our Corporate Computer Center, contact Carmen Cortez-Menor TOLL FREE at (800) 538-8460, extension 7686. In California, call COLLECT at (408) 746-7686. Or, send your resume to Carmen Cortez-Menor, Amdahl Corporation, Dept. 10-5, MS/300, P.O. Box 3470, Sunnyvale, CA 94088-3470. We are an equal opportunity employer through affirmative action.

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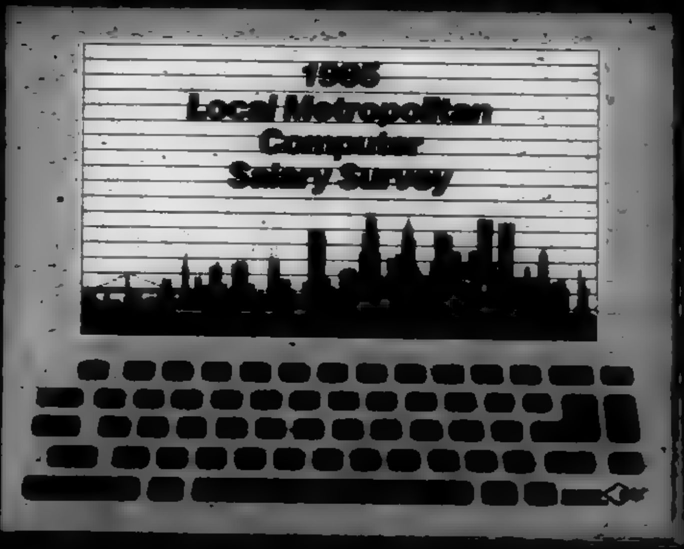

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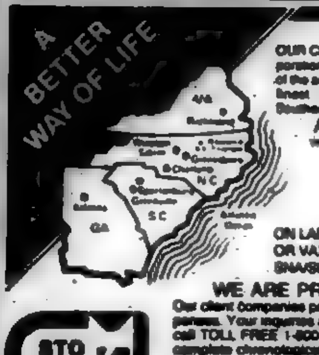

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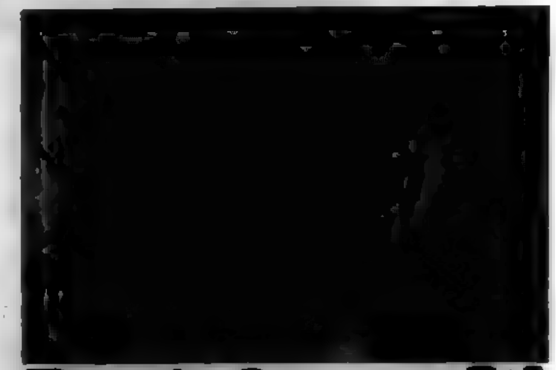

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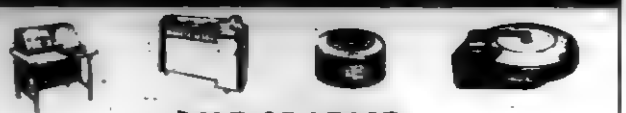

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General Request for Proposal No. 1041, due Tuesday, December 10, 1985, for the acquisition of consulting services to address upcoming project needs in the areas of feasibility study, systems analysis and design, and systems development and implementation. This is a general RFP to be used to select consulting services for the State of Mississippi during 1986.

General Request for Proposal No. 1042, due Tuesday, December 10, 1985, for the acquisition of Datapoint 6600/6600 series compatible equipment. This is a general RFP to be used for the State of Mississippi during 1986.

General Request for Proposal No. 1043, due Tuesday, December 10, 1985, for the acquisition of data entry services for State Agencies and Institutions. This is a general RFP to be used to select data entry services for the State of Mississippi during 1986.

General Request for Proposal No. 1044, due Tuesday, December 10, 1985, for the acquisition of IBM 3270 compatible CRT's, printers, and controllers. This is a general RFP to be used to select terminals for the State of Mississippi through 1986.

General Request for Proposal No. 1045, due Tuesday, December 10, 1985, for the acquisition of microcomputers, peripherals and software. This is a general RFP to be used for acquiring micros for teaching, data acquisition and a variety of other purposes for the State of Mississippi during 1986.

General Request for Proposal No. 1046, due Tuesday, December 10, 1985, for the acquisition of small, microcomputer-based CAD systems, graphics terminals, plotters and related peripherals. This is a general RFP to be used to select graphics equipment for the State of Mississippi during 1986.

General Request for Proposal No. 1047, due Tuesday, December 10, 1985, for the acquisition of ASR and KSR hardcopy terminals. This is a general RFP to be used to select terminals for the State of Mississippi during 1986.

General Request for Proposal No. 1048, due Tuesday, December 10, 1985, for the acquisition of receive-only printers to attach to TTY compatible CRT's. This is a general RFP to be used to select printers for the State of Mississippi during 1986.

General Request for Proposal No. 1049, due Tuesday, December 10, 1985, for the acquisition of TTY compatible CRT's. This is a general RFP to be used to select CRT's for the State of Mississippi during 1986.

General Request for Proposal No. 1050, due Tuesday, December 10, 1985, for the acquisition of acoustic couplers. This is a general RFP to be used to select couplers for the State of Mississippi during 1986.

General Request for Proposal No. 1051, due Tuesday, December 10, 1985, for the acquisition of low to medium speed synchronous and asynchronous modems ranging in speed up to 9600 baud. This is a general RFP to be used to select modems for the State of Mississippi during 1986.

General Request for Proposal No. 1052, due Tuesday, December 10, 1985, for the acquisition of medium, high, and wideband modems ranging in speed from 4800 through 56K baud. This is a general RFP to be used to select modems for the State of Mississippi during 1986.

General Request for Proposal No. 1053, due Tuesday, December 10, 1985, for the acquisition of short haul modems, line drivers and modem eliminators. This is a general RFP to be used to select special purpose modems for the State of Mississippi during 1986.

Request for Proposal No. 1057, due Tuesday, November 19, 1985 at 3:30 p.m. for the acquisition of a distributed processing system for the Office of the Secretary of State.

Request for Proposal No. 1058, due Friday, November 15, 1985 at 3:30 p.m. for the acquisition of an automated disk copying machine for the Mississippi Cooperative Extension Service at Mississippi State University.

Request for Proposal No. 1059, due Monday, November 18, 1985 at 3:30 p.m. for the acquisition of an update to the time sharing option operating system running on the IBM 370/158 under OS/VS2 at Jackson State University.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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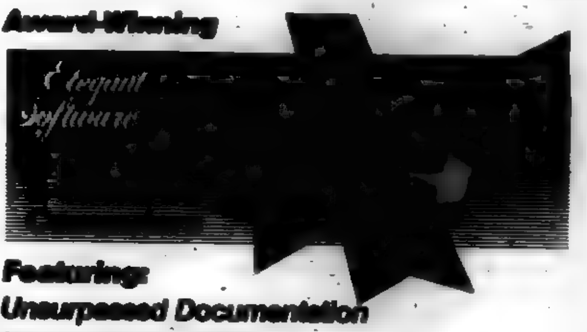

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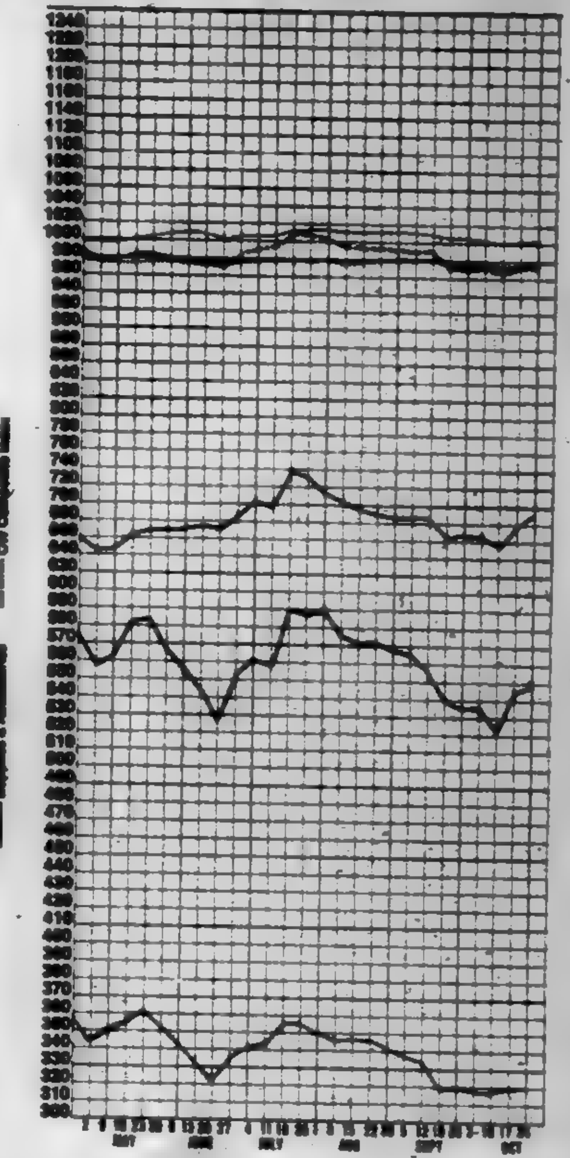

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 22, 1986

All statistics compiled
computed and formatted
by
TRADE QUOTES, INC
Cambridge Mass 02139

EXCH		1986 RANGE (1)	CLOSE OCT 22 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	3- 12	3	- 1/8	-4.0
O	ALTOS COMPUTER SYST	7- 16	10 7/8	+1 1/8	+11.5
A	AMDAHL CORP	10- 30	11 3/8	- 3/4	-6.0
O	APPLE COMPUTER INC	14- 28	33	0	0.0
N	AT&T	19- 28	20 5/8	- 1/2	-2.3
N	BURROUGHS CORP	51- 80	66 3/4	+2 1/8	+3.0
O	COMPAQ COMPUTER CP	6- 12	11	+ 3/8	+3.5
O	COMPUTER AUTOMATION	3- 8	5 7/8	-1	-14.5
A	COMPUTER CONSOLES	3- 10	5 3/8	- 3/8	-6.5
N	CONTROL DATA CORP	16- 38	17 3/4	-1 1/8	-6.0
O	CONVERGENT TECHNOL	5- 17	7 5/8	+ 1/8	+1.7
O	CPT CORP	3- 12	5 7/8	+ 5/8	+11.8
A	CRAY RESEARCH INC	23- 88	80 7/8	+4 1/8	+5.1
O	DAISY SYSTEMS CORP	21- 38	25	+1	+4.1
N	DATA GENERAL CORP	21- 70	40 3/4	+4 3/8	+12.0
N	DATAPOINT CORP	3- 23	5	+ 1/8	+2.5
N	DIGITAL EQUIPMENT	89-128	111 3/8	+4 1/2	+4.1
A	ESCO INC	12- 16	15 1/8	+ 3/4	+5.2
N	ELECTRONIC ASSOC.	3- 6	4	- 1/8	-3.0
O	FLOATING POINT SYST	15- 25	20 1/4	+1 3/8	+6.5
N	[illegible]	24- 36	35 1/4	- 3/8	-1.4
N	GOULD INC	20- 34	22 1/8	-1 7/8	-6.9
N	HARRIS CORP	23- 35	30	+2 1/8	+6.8
N	HEWLETT-PACKARD CO	36- 46	41 3/8	+1 1/4	+4.1
N	HONEYWELL INC	53- 87	61 1/8	+ 1/8	+0.2
N	IBM	118-162	126 1/2	+1 1/8	+0.9
O	IPL SYSTEMS INC	1- 4	1 1/2	0	0.0
N	ITT CORP	34- 57	55 3/8	+ 1/2	+1.0
N	M/A-COM INC	10- 24	12	- 1/8	-1.4
O	MANAGEMENT ASSIST	2- 5	3 1/8	0	0.0
N	MATSUSHITA ELEC(ADR)	40- 55	55	+ 1/2	+0.9
O	MODULAR COMPUTER SYS	6- 10	6	- 1/2	-7.6
N	MOHAWK DATA SCI	3- 12	1 3/4	- 1/4	-12.5
N	MOTOROLA INC	30- 46	32	- 7/8	-2.6
N	NAT'L SEMICONDUCTOR	10- 17	11 3/8	+ 1/4	+2.1
N	NBI INC	11- 21	13 1/8	-1 3/8	-10.0
N	NCR	39- 55	50 1/8	+ 1/8	+0.2
N	PERKIN-ELMER	18- 32	23 7/8	- 1/2	-2.0
N	PRIME COMPUTER INC	15- 26	18 5/8	+2	+12.2
N	SPERRY CORP	39- 78	77 3/4	+ 7/8	+1.1
O	STRATUS COMPUTER INC	9- 19	18 1/4	+ 1/2	+2.8
N	TANDEM COMPUTERS INC	16- 38	30 1/2	+1	+3.4
N	TANDY CORP	26- 37	34 5/8	- 3/8	-1.0
O	TELEVIDEO SYSTEMS	1- 7	1 7/8	- 1/8	-6.2
O	TELXON CORP	7- 18	16 1/4	+ 1/2	+3.1
N	TEXAS INSTRUMENTS	98-149	108 1/2	+ 1/8	+0.1
A	ULTIMATE CORP	9- 24	12 1/2	+ 1/8	+1.0
O	VECTOR GRAPHICS INC	0- 1	1/8	- 1/16	-14.1
A	WANG LABS "B"	13- 38	18 1/2	+2 3/4	+17.6
A	WANG LABS "C"	13- 38	18 1/8	+2	+12.4
N	XEROX CORP	47- 66	48	- 1/4	-0.5
	LEASING COMPANIES				
O	COMDISCO INC	9- 21	20 5/8	+ 1/4	+1.2
O	CONTINENTAL INFO SYS	6- 12	10 1/2	- 1/8	-1.1
N	FINALCO GROUP INC	3- 7	4	0	0.0
O	PHOENIX AMERICAN INC	2- 5	2 1/8	0	0.0
O	SELECTERM INC	7- 16	7 1/4	- 1/2	-6.4
N	U.S. LEASING	30- 41	32 1/2	+ 3/8	+1.1
	COMPONENTS				
N	ADVANCED MICRO DEV	22- 41	24 3/8	- 7/8	-3.5
O	[illegible]	7- 20	10 1/2	0	0.0
N	ANALOG DEVICES INC	18- 27	20	+ 1/4	+1.2
O	ANALOGIC CORP	8- 15	11 3/4	- 7/8	-6.9
O	APPLIED MAGNETICS CP	8- 16	12 1/2	+ 1/8	+1.0
O	[illegible]	2- 10	4 1/8	- 1/8	-2.9
O	MICRO MASK INC	6- 16	9 7/8	0	0.0
N	TERADYNE	18- 30	18 7/8	- 5/8	-3.2

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EXCH		1986 RANGE (1)	CLOSE OCT 22 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 4	3 1/2	0	0.0
O	ADVANCED SYSTEMS INC	8- 20	13 7/8	- 7/8	-5.9
O	AGS COMPUTERS INC	10- 17	10 1/4	- 7/8	-8.0
O	AMERICAN SOFTWARE	7- 18	8 3/8	+ 1/8	+1.2
O	ANACOMP INC	1- 4	3	+ 1/8	+4.3
O	ANALYSTS INTL CORP	8- 16	8 1/8	- 1/8	-1.3
O	APPLIED DATA RES	17- 40	30	+5 1/2	+21.5
O	ASHTON TATE	8- 15	10 5/8	- 1/8	-1.1
O	ASK COMPUTER SYSTEMS	8- 24	8 7/8	- 1/4	-2.7
O	[illegible]	1- 7	1 3/4	0	0.0
N	AUTOMATIC DATA PROC	36- 45	40 1/4	+2	+5.0
O	COMPUTER ASSOC INT'L	16- 30	24 1/8	+ 3/8	+1.6
O	COMPUTER HORIZONS	3- 12	12	- 1/8	-1.0
O	COMPUTER NETWORK	3- 10	7 1/8	0	0.0
N	COMPUTER SCIENCES	13- 28	28	+ 1/4	+0.9
O	COMPUTER TASK GROUP	10- 20	10 3/4	+ 3/4	+7.5
O	COMPUTER USAGE	1- 3	2 1/8	0	0.0
O	COMPUTONE SYSTEMS	0- 11	5	- 1/2	-9.0
O	COMSERV CORP	1- 4	2 7/8	0	0.0
O	COMSHARE	6- 10	7	- 1/8	-1.3
O	CULLINET SOFTWARE	14- 23	18 3/8	+ 3/8	+2.0
O	CYCARE SYSTEMS INC	16- 27	20	- 1/2	-2.4
O	[illegible]	4- 10	9 5/8	+ 1/4	+2.6
N	GENERAL ELECTRIC CO	66- 88	70 1/2	-2 1/4	-3.0
N	GEN. MOTORS E (EDS)	17- 47	39 3/8	+2 1/4	+6.1
N	GTE CORP	39- 60	60	+ 3/4	+1.2
O	INFORMATION SCIENCE	1- 3	2	+ 1/4	+14.2
O	[illegible] SYSTEMS CP	10- 20	10 7/8	+ 3/8	+3.5
O	KEANE ASSOCIATES	8- 15	13 1/8	0	0.0
O	LOGICON	24- 30	20 1/2	- 1/4	-0.9
O	LOTUS DEVELOPMENT CP	20- 36	27 3/8	- 3/8	-1.3
O	MCI COMMUNICATIONS	7- 11	8 1/8	- 3/8	-4.4
O	MGMT SCI AMER INC	8- 16	8 3/8	+ 1/8	+1.5
O	MATHEMATICAL APP GRP	2- 3	2 1/8	+ 1/4	+13.3
O	MICOM SYSTEMS INC	10- 22	15 1/2	+1 1/4	+8.7
O	MICROPRO INT'L CP	3- 6	2 1/8	- 1/8	-5.1
O	NATIONAL DATA CORP	7- 18	15 1/2	+ 1/2	+3.3
O	ON-LINE SOFTWARE INT	4- 7	6	0	0.0
O	PANSOPHIC SYSTEMS	11- 22	21 7/8	0	0.0
O	PLANNING RESEARCH	8- 18	17 1/8	- 7/8	-4.8
O	POLICY MGMT SYSTS CP	16- 30	30	+ 3/4	+2.5
O	PROGRAMMING & SYS	4- 6	3 3/8	0	0.0
N	REYNOLDS & REYNOLDS	30- 44	38 1/8	+1 3/8	+3.7
O	SEI CORP	11- 20	19	-1 1/8	-5.5
O	SHARED MEDICAL SYST	24- 39	35 1/4	+1 1/8	+3.2
O	SCIENTIFIC COMPUTERS	5- 12	3 5/8	0	0.0
O	SOFTWARE AG	11- 22	14 3/8	- 3/4	-4.9
O	URS CORP	10- 14	11	- 1/8	-1.1
N	UCCEL	5- 17	15	- 3/8	-2.4
	PERIPHERALS & SUBSYSTEMS				
O	AM INTERNATIONAL	3- 8	6 1/8	+ 1/8	+2.1
O	ANDERSEN JACOBSON	2- 11	2 3/8	0	0.0
O	AST RESEARCH INC	7- 23	10	+1 7/8	+17.6
O	AUTO-TROL TECHNOLOGY	5- 15	5 3/8	0	0.0
O	AVANT-GARDE COMPUTING	5- 20	7	- 1/4	-3.4
O	BANCTEC INC	8- 12	8 1/2	+ 1/8	+1.5
O	BEEHIVE INT'L	1- 2	3/8	0	0.0
N	BOLT, BERANEK & NEW	30- 31	31 3/8	+1 1/8	+3.7
O	CAMBEX CORP	1- 3	3/4		+0.3
O	CENTRONICS DATA COMP	3- 12	4 5/8	- 1/8	-2.6
O	CETEC CORP	5- 10	7 1/8	0	0.0
A	COGNITRONICS	5- 7	4 1/4	- 1/8	-2.8

EXCH		1986 RANGE (1)	CLOSE OCT 22 1986	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUGRAPHIC CORP	24- 37	24 5/8	- 3/8	-1.5
O	COMPUTER TRANSCEIVER	1- 4	5/8	+ 1/32	+4.3
O	COMPUTERVISION CORP	10- 40	18 5/8	+ 3/4	+7.3
O	CONRAC CORP	13- 16	14 3/4	+ 3/8	+2.6
A	DATAPRODUCTS CORP	11- 26	11 7/8	+ 1/8	+1.0
O	DATARAM CORP	3- 7	3 7/8	- 3/8	-8.8
O	DATA SWITCH CORP	4- 9	8	+ 1/8	+1.5
O	DATUM INC	3- 6	5 7/8	- 1/8	-2.0
O	DECISION DATA COMPUT	3- 13	11 7/8	- 3/8	-3.0
O	EMDATA, INC	3- 20	3	- 3/8	-11.1
O	EVANS & SUTHERLAND	3- 18	18 3/4	+ 5/8	+3.4
O	[illegible] TECHNOLOGIES	5- 20	6 3/8	+ 5/8	+10.8
N	GEN'L DATA COMM IND	3- 22	8 3/4	+ 1/2	+5.4
N	HAZELTINE CORP	5- 28	22 3/4	-1 3/4	-6.5
O	ICOT CORP	5- 17	8 1/2	- 3/8	-4.4
O	INFORMATION INTL INC	6- 13	13 1/8	- 3/8	-2.7
O	INTECOM INC	4- 20	4 5/8	- 1/2	-10.0
O	INTEL CORP	7- 30	20 1/8	0	0.0
A	LUNDY ELECTRONICS	6- 14	12 1/8	+ 3/8	+3.1
O	[illegible]	3- 13	8 1/2	+ 1/8	+7.0
O	MSI DATA CORP	8- 20	8 1/8	+ 3/8	+4.2
N	[illegible]	15- 27	22 3/4	-1 3/4	-9.0
N	NETWORK SYSTEMS CORP	10- 30	10 1/2	-1 1/4	-10.3
N	NO AMERICAN PHILIPS	30- 50	30 3/4	+1 3/4	+5.0
N	NORTHERN TELECOM LTD	30- 40	30 1/4	- 3/8	-1.1
O	[illegible]	1- 3	1/2	0	0.0
O	PARADYNE CORP	7- 14	7 3/8	- 1/8	-1.6
O	PENRIL CORP	6- 20	7 5/8	- 5/8	-7.5
N	PLESSEY CO (ADR)	6- 25	10 3/4	- 3/4	-6.5
O	PRINTRONIX INC	8- 17	11 3/4	- 1/8	-1.0
O	QMS INC	3- 11	4 1/8	- 3/8	-8.1
O	RAMTEK CORP	3- 17	2 5/8	0	0.0
O	RECOGNITION EQUIP	8- 21	8 1/2	+ 5/8	+7.9
O	SANDERS ASSOCIATES	41- 57	32 7/8	-4 1/8	-8.0
O	SCAN-TRON CORP	5- 18	10 1/2	0	0.0
O	SCIENTIFIC ATLANTA	8- 18	10 1/2	-1 1/8	-9.0
O	SEAGATE TECHNOLOGY	5- 12	5 7/8	0	0.0
N	STORAGE TECHNOLOGY	1- 3	1 7/8	0	0.0
O	SYSTEMS INDUSTRIES	2- 11	5/8	0	0.0
A	T BAR INC	5- 20	5 3/8	0	0.0
O	TAB PRODUCTS CO	8- 13	10 3/8	- 1/8	-1.2
O	TANDON CORP	3- 12	5 5/8	+ 5/8	+11.9
A	TEC INC	7- 10	7 3/8	- 1/8	-1.6
N	TEKTRONIX INC	50- 68	58 7/8	+2 3/4	+4.7
N	TELEX	7- 40	40 3/8	+1 5/8	+3.5
O	[illegible] SYSTEMS CP	1- 20	1/2	0	0.0
O	TIMEPLEX INC	9- 21	21	+1 5/8	+8.3
N	TITAN CORP	2- 8	3 1/8	+ 1/8	+3.7
O	VISUAL TECHNOLOGY	1- 10	3/8	- 1/8	-14.2
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	21- 28	22 3/4	- 1/8	-0.5
N	BARRY WRIGHT	17- 28	18 5/8	+1 1/4	+7.2
N	DUPLEX PRODUCTS INC	12- 20	17 7/8	+ 1/8	+1.6
N	ENNIS BUS. FORMS	10- 20	16 7/8	+ 3/8	+2.2
N	3M COMPANY	74- 88	77 1/2	-1	-1.2
N	MOORE CORP LTD	13- 22	18 5/8	+ 1/4	+1.3
N	STANDARD REGISTER	22- 35	32	+ 3/8	+1.7
N	WALLACE CORP SERVICES	22- 40	28 7/8	+ 3/8	+2.3

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VOL 19
ISSUE 44
NO 4 1985
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COMPUTERWORLD

$2.00 A COPY; $44/YEAR NOVEMBER 4, 1985 VOL. XIX, NO. 44

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IBM users confused by net reversal

By John Dix

IBM's policy reversal in conceding that twisted-pair telephone wiring is adequate for data transmission has surprised and confused a sampling of users interviewed by *Computerworld*. These users have installed or are planning to install IBM's Cabling System with more expensive shielded wire.

[illegible]

The mainframe maker has told users, since the introduction of the building wiring scheme in May 1984, that it was necessary to use a shielded-type wire to support data devices and future IBM local-network products.

"IBM kept telling us we had to go with shielded wire if we were going to use the IBM local network," said Greg Burns, senior communications administrator with Bergen Brunswig, a Carson, Calif.-based medical and surgical supply distributor.

That is no longer true. IBM announced a new type of nonshielded cable for the Cabling System three weeks ago with the introduction of its Token-Ring network. This standard twisted-pair wire can be used for the new local network or for the support of data devices.

The Cabling System is a building wiring scheme that specifies how and with what a building can be cabled to provide outlets like electrical sockets for data devices. Use of the system obviates the need to pull new wires every time peripherals are moved.

Continued on page 10

'Get tough,' DPers urged

By James Connolly

HOUSTON — The president of a major mainframe software company has taken his campaign for applications standards to the general user community.

"Ask the tough questions," urged Software International Corp. President Jeffrey S. Goodman, encouraging DP managers to be demanding in dealing with companies such as his own. "The chasm has never been wider" between what users need and what vendors provide, Goodman told members of the Data Processing Management Association last week.

In recent months, Goodman has prodded vendors to adopt such standards. Last week's appearance, at the annual DPMA

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TOP OF THE NEWS

Ask Computer Systems, Inc. this week will introduce versions of its Manman manufacturing information software for Digital Equipment's Microvax II. The software was previously available only on Hewlett-Packard's HP 3000 series. A Manman/Microvax II turnkey system with four terminals will be priced at $149,000.

■

Convergent Technologies suffered a mass exodus of top management last week as founder and Chairman Allen H. Michels resigned to form a new company, taking four top officers with him. Although Michels told Convergent that the new venture will not be a direct competitor, the episode raises the po-

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Apple push on for more system links

Improved Mac, IBM, DEC compatibility is targeted

By James A. Martin

IRVING, Texas — Apple Computer, Inc. will focus on networking solutions to address compatibility problems between its Macintosh and IBM's mainframes and Digital Equipment Corp.'s VAX system, according to company President John Sculley.

Speaking to a gathering of computer dealers sponsored by the Businessland, Inc. retail chain, Sculley briefly outlined several Apple networking projects that included systems to incorporate IBM Systems Network Architecture networking capabilities and support for LU6.2, Document Interchange Architecture and Document Content Architecture. These systems will "not penalize the user with slower response time or other limitations" and will "provide not only terminal emulation or [personal computer-like] functions but also access to complete office systems and distributed data processing functionality," Sculley said.

These efforts are aimed at giving the Macintosh a more competitive position in an office automation marketplace where IBM is the standard. Sculley said the Macintosh has "not yet been broadly accepted by business" because most end users initially preferred the computing power available from Microsoft Corp. MS-DOS processors over the Macintosh's "ease-of-

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CW EXCLUSIVE

On the job: Hartford's blueprint for a DP hire

By Paul Korzeniowski

HARTFORD, Conn. — When Frank Shaw looks at his to-do list this morning, it will be radically different from last Friday's. Locating the nearest coffee machine and unpacking his belongings will top this week's list as Shaw begins his first day as director of data processing for the city of Hartford.

Shaw comes to his new office, housed in a brick building on a quiet street on the outskirts of downtown Hartford, after serving as DP manager at Rhode Island Hospital in Providence, R.I.

The hunt for Shaw, which took only two months, could serve as a model of efficiency for other municipalities or corporations.

The search started on a sour note. Last winter, when the city decided to replace its Burroughs Corp. 6930 mainframes (see story page 6), it did not anticipate replacing its director of data processing as well. But that is what happened. In May, the former director decided to retire rather than oversee a conversion to another system. "She had talked about retirement, but we had expected her to remain here for at least one more year," noted Lee Erdmann, an assistant city manager who oversaw the hiring of Shaw.

Hartford's Shaw

A temporary director was appointed because the city did not want to hire a director of data processing before awarding a new hardware contract. In June, the city signed a contract with IBM for a 4381 Model 1, and in July a search for someone to manage the conversion and the 55-person DP staff began.

The hunt stretched far and wide as advertisements were placed in *The Boston Globe*, *Computerworld*, *The Wall Street Journal* and a number of local newspapers. Approximately 160 DP professionals answered Hartford's call for someone to oversee the operation at a salary between $35,000 and $50,000.

Erdmann, Mike Brown — another assistant city manager — and Wheeler Smith, the executive director for the Citizens Committee for More Efficient Government, sifted through the applications in search of the right candidate. That person would have managed at least a few major projects; be very familiar with IBM's offerings, especially the 4300 line, and would have

Continued on page 6

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NEWSPAPER

CDC loses big; DG has slim gain

CDC seeking loan extensions from creditor banks

By Clinton Wilder

In results even worse than a pessimistic financial community had expected, Control Data Corp. last week reported a third-quarter loss of $255.6 million, or $6.65 per share, on revenue that remained essentially flat from the year-earlier quarter.

Separately, Data General Corp. posted a meager $500,000 fourth-quarter profit on revenue that declined 12.5% from the year-earlier quarter to $290.5 million. The Westboro, Mass., minicomputer maker said its business did not pick up from its losing third quarter ended in June, but it returned to the black as a result of reduced employment levels and other cost cuts.

Putting the 1985 computer slump in sharp perspective, DG's earnings for the fiscal year ended Sept. 28 were $24.3 million, or 92 cents per share — exactly the same as in its fourth quarter in 1984. In fiscal year 1984, DG earned a record $83.3 million, or $2.60 per share, including a one-time tax gain of $3.5 million. Fiscal-year revenue edged up 6.7% from $1.16 billion in 1984 to $1.24 billion.

DG spokesman Ken Donoghue said the company earned a profit in the fourth quarter only because of cost savings resulting from the layoff of some 1,400 workers and from other retrenchment measures taken last June.

"Our employment levels are now more consistent with the level of business we have," he said. "We're really not seeing any trend for sales improvement over the third quarter in any area." He added that DG's sales to manufacturing customers have been hit the hardest, while sales of office automation and end-user-oriented equipment have remained strong.

CDC's announcement deepened the sense of financial crisis at the Minneapolis-based mainframe, peripheral and computer services vendor, which is currently attempting to negotiate extensions on loan agreements with its creditor banks. A CDC statement said that such discussions are proceeding satisfactorily, but analysts said they believe the success of the negotiations will depend on the creditors' confidence in CDC's profitability.

> *'If the banks get real nasty on the covenants, they could force the hand of [CDC] management.'*
>
> — **William Shattuck**
> **Montgomery Securities**

"If the banks get real nasty on the covenants, they could force the hand of management," said William Shattuck of Montgomery Securities, a San Francisco-based investment firm. "[CDC] would have to come up with some pretty drastic alternatives. But if the banks think [CDC] can make money again a few quarters out, they will do what they can to keep the company afloat."

The third-quarter loss included a one-time charge of $153.8 million, resulting from the anticipated sale of CDC's low-end computer tape and floppy disk businesses, restructuring of the U.S. and overseas computer operations and write-downs on some of the firm's widely diversified noncomputer businesses. The company lost $83.3 million on continuing operations in its computer business during the quarter, bringing year-to-date losses in that core division to $116 million.

"Personally, I'm not surprised about the operating results, the way things have deteriorated over the last year or so," Shattuck said. "But [CDC] just didn't say anything [during the quarter] about the decision to wind down these other businesses."

CDC's financial services business, the bulk of which consists of its Commercial Credit Co. subsidiary, was the only full division to remain profitable in both the three-month and nine-month periods ended Sept. 30.

Within computer-related businesses, CDC's Government Systems and Engineering Services divisions have reportedly remained profitable.

While CDC users contacted by *Computerworld* said they have not seen any effect on field sales and service activities during the current financial situation, one expressed concern about CDC's future direction. "We hear nothing but very black news, and we're watching it very closely," said Thomas Bohan, manager of the Scientific Computer Center at Tektronix, Inc. in Beaverton, Ore.

Tektronix was a beta test site for the CDC Cyber 170/855 mainframe, but the installation also included an IBM 3083 Model B and several Digital Equipment Corp. VAX-11/750s and VAX-11/780s. "I'm fortunate enough to have alternatives to go in other directions if necessary," Bohan said. "My main question about Control Data is, 'Where are they going to be strong in the long run?' They spun off [a supercomputer division] — ETA Systems, Inc. — but they're not very competitive in the low end with DEC and others. What is their niche? What are they going after?"

IBM installs Model 204 in its DOD site

By John Gallant

WASHINGTON, D.C. — In what could be seen as a setback for IBM's DB2 relational data base management system, which some analysts and users have faulted for poor performance, IBM's own Federal Systems Division has chosen to install Cambridge, Mass.-based Computer Corporation of America's (CCA) Model 204 relational DBMS in fulfilling its portion of a major U.S. Department of Defense contract.

An IBM spokesman confirmed that the company has purchased multiple copies of Model 204 for use in the Worldwide Information System under development for the DOD. But the spokesman denied that Model 204 had replaced DB2 as the DBMS of choice for the system.

However, a DBMS expert who asked not to be named said IBM purchased seven copies of Model 204 and has performed extensive benchmark tests in which CCA's product performed significantly better than DB2.

A CCA spokesman confirmed that IBM purchased at least three copies of Model 204 for use as "an embedded DBMS" and as a base to build a custom user interface for the Worldwide Information System, which is aimed at providing a global information net for the DOD. The spokesman would not comment on the specifics of IBM's benchmarks but said Model 204's performance was a big part of the selection criteria. He said IBM also went with CCA because it has already built a prototype DBMS written in Ada — dubbed Adaplex — and is at work on transforming that into a commercial system.

NEWS SUMMARY

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Wang Laboratories is the first company to purchase and install an AT&T 5ESS central office telephone switch/7

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Pacific Bell is testing integrated voice/data technology in a six-month project involving approximately 200 residential and small business customers/11

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National Semi lays off 500 more

By Clinton Wilder

National Semiconductor Corp. announced another round of layoffs last week, trimming its work force in the U.S. and Europe by approximately 500 employees.

Separately, Storage Technology Corp. reported a third-quarter loss of $14 million, or 40 cents per share, on sales of $170.2 million. The loss was less than the $64.7 million loss reported last year by the Louisville, Colo., disk drive maker, currently operating under Chapter 11 of the Federal Bankruptcy Act.

National Semiconductor, which laid off 1,300 workers in the U.S. and Europe last June and 400 employees at a Salt Lake City plant in March, said most of the job cuts will come at corporate headquarters in Santa Clara, Calif. The company will also return to five-day workweeks in January 1986 and will begin paying its employees deferred wage increases in April.

CORRECTIONS

Honeywell, Inc.'s Docu-Link product for the Microsystem 6/10 and DPS 6 minicomputer line will be available in December, according to the company.

The article "Read-write interface out connecting Nomad2, DB2" [CW, Oct. 21] incorrectly listed D&B Computing Services Co.'s address. D&B Computing Services is located in Wilton, Conn.

Computer Automation, Inc. of Irvine, Calif., expected to post a $12 million to $15 million loss for the fiscal year ended June 30. The firm's actual loss for the year was $12.7 million, or $6.17 per share, of which $8.7 million, or $4.26 per share, was a loss from continuing operations. In the fourth quarter, Computer Automation reported a loss of $6.4 million, or $3.13 per share, from continuing operations and an overall loss of $8.8 million, or $4.27 per share.

A spokeswoman said the company expects to report a loss of more than $3 million for its first quarter ended Sept. 30.

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CW 11/4/85

AT&T turns to Pick for applications

Unix potentially to tap 2,500 reseller packages

By Charles Babcock

NEW YORK — AT&T last week teamed up with sellers of Pick Systems' Pick-based applications in a move that could eventually make more than 2,500 applications available to users of AT&T's Unix operating system. The deal could bolster the usefulness of Unix, which has been faulted for a perceived lack of available applications software — a major stumbling block in the commercial data processing world.

The agreement with VMark Computer, Inc., a Natick, Mass., start-up, according to James D. Edwards, president of AT&T's Computer Systems division, would allow an estimated 2,500 applications to be migrated eventually under the VMark Universe system, increasing by threefold the number of Unix applications that AT&T has cited as likely to be on the market by mid-1986.

The applications would be marketed directly through 300 value-added resellers that offer Pick systems and software, said Roger Parsons, president of VMark. A value-added reseller takes a vendor's hardware and tailors software to the needs of small and medium-size customers, often concentrating on a particular industry group.

The value-added resellers will have the incentive of porting and selling their existing software to customers interested in the multiple lines of hardware capable of running AT&T's Unix System V, including AT&T's own 3B minicomputer line, Edwards said.

Edwards said the primary competitor to AT&T 3B minicomputers has been the IBM System/36. The 3B line enjoys "a price/performance advantage by a mile," he said, "but we have lacked the application software to exploit it."

The software of a small business represents a greater investment than its hardware, Edwards added, and value-added resellers are the best way to reach companies with fewer than 1,000 employees, he maintained.

A value-added reseller that wishes to migrate Pick-based applications to Unix would purchase from VMark a system combining hardware running Unix with the Universe data base management system and recompiler. The VMark software allows recompiled Pick applications to run under Unix, Parsons said.

Officials of both companies indicated that 20 of the 300 Pick value-added resellers have actually signed licensing agreements to make use of the VMark system.

However, it was not immediately evident how many applications the 20 resellers were in the process of making available under Unix, the officials said.

When asked how consistent the quality of the applications would be, Parsons said, "In general, the quality is very high," but he acknowledged the question was difficult to answer because the applications remain the property of the independent value-added resellers.

The Pick value-added resellers serve an estimated 28,000 business and education sites using Pick, an operating system that has typically been regarded as hospitable to applications development, according to Charles A. Cornell, vice-president of engineering and development at VMark.

Pick has been ported to Prime Computer, Inc. superminis under the name of Prime Information and runs under Primos; to the NCR Corp. ADDS Mentor; to the Ultimate Corp./Honeywell, Inc. DPS 6; to the IBM 4300; and to the IBM Personal Computer. The Pick value-added resellers typically serve legal, educational, professional, health care, manufacturing and distributing businesses, Parsons said.

The typical turnkey system installed by a value-added reseller ranges from $30,000 to $500,000. Since the Universe system will be bundled with hardware and applications software rather than sold alone, the company was not able to name a suggested retail price for it.

Support for Unix applications created under Universe would come primarily from the individual value-added reseller launching them, Parsons said. VMark will provide support for any problems with Universe and will maintain a maintenance agreement with AT&T over Unix System V problems, he said.

FCC approves AT&T SDN, Megacom tariff

By Bryan Wilkins

WASHINGTON, D.C. — The Federal Communications Commission last week granted AT&T Communications permission to introduce its Software Defined Network (SDN) service, which will permit large-volume long-distance customers to configure dynamically the use of their circuits from their premises.

Additionally, the FCC granted AT&T Communications approval of a new Megacom tariff whereby AT&T will provide business customers direct links to its switching facilities, bypassing the local telephone company's local switch. Both actions were expected despite vigorous opposition from the divested Bell operating companies, which have cited fears of lost revenue that will result in higher local rates.

The SDN service was originally proposed by AT&T Communications in March but was postponed by the FCC while it examined the service. The SDN will permit large-volume users to instruct remotely AT&T Communications' switch as to the type of transmission circuit desired, whether it be data, the data speed rate, voice, voice private line, WATS or regular voice-grade circuit switched.

Other long-distance carriers such as MCI Communications Corp. and GTE Sprint Communications Corp. have also offered similar services.

AT&T's Megacom service will offer customers with large communications traffic flows direct access to AT&T Communications' high-speed switch facilities within a local telephone company's exchange area. This will be done in a dialing format similar to the current 800-service feature. While the traffic in some instances may pass through the local telephone company switch, the Megacom tariff will not reflect the costs of handling the communications by the local switch, AT&T said.

The International Communications Association, representing large-volume users, said the two new services will significantly affect its membership. The association said the divested Bell operating companies' fears of bypass of their facilities were rooted in a "strategy to delay" new long-distance service until they are permitted to enter the long-distance arena. The communications group said the operating companies have the opportunity to file "optional alternative tariffs" if they want to fight bypass service offered by long-distance carriers — something that has not been done, the group said.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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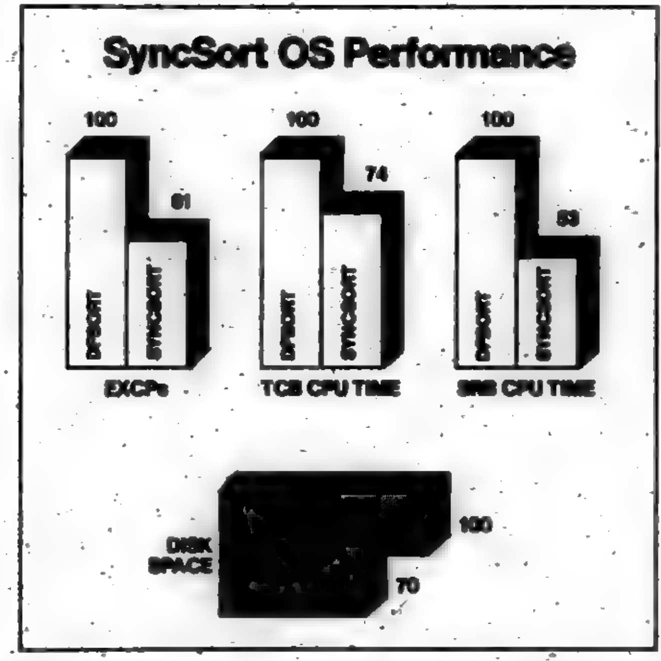

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From page 1

On the job: Hartford's blueprint for a DP hire

converted one system to another. Municipal data processing experience was preferable but not a strict requirement. From the initial pool, the list of candidates was cut to approximately 40 people.

Candidates were mailed a five-page questionnaire that asked them to describe their leadership style, management expertise, interpersonal skills and knowledge of IBM 4300 or 3080 series mainframes. Included in the package were promotional materials for the city and the department's planned information center.

Approximately three-fourths of the candidates returned their responses before the two-week deadline. Erdmann's group narrowed the list to eight candidates with a wide range of backgrounds. All eight had IBM mainframe experience; some had worked with Digital Equipment Corp. devices, and others had supervised migrations from Honeywell, Inc. equipment to IBM machines. One candidate lived in Connecticut, a second worked in the state, and the rest were from out-of-state locales as far away as California and Arkansas.

> *The search for a DP director for the city of Hartford could serve as a model of efficiency for other municipalities or corporations.*

The candidates were brought to Hartford for a question-and-answer session with a four-person panel that consisted of the acting director of DP, the deputy director of the Metropolitan District Commission and DP professionals from Travelers Insurance Corp. and Cigna Corp.

The oral questions were more challenging than those in the questionnaire. Oral questions ranged from describing the use of a project management system to listing the steps needed to take charge of an ineffective committee made up of peers.

Each candidate spent one hour with the panelists. "If a panelist thought that an answer was superficial, he could ask a follow-up question," Erdmann noted. He added that a few candidates were intimidated by the process.

After each session, candidates talked with the city manager, went on a tour of the DP facilities and those unfamiliar with Hartford were given a tour of the city.

The sessions took place over two days. On the second day, Hurricane Gloria made its East Coast tour and caused some problems. Two of the panelists never came in for their interviews, and one of the job candidates was forced to spend an extra night in Hartford. "There are just some things you can't plan for," Erdmann said.

Another unplanned circumstance was that the acting DP director, who was not considered for the permanent position, resigned after taking part in the candidate interviews.

With the interviews completed, the board compared notes and listed the top six candidates in order. "I was surprised that the ratings were as similar as they were," Erdmann noted. The two bottom candidates were dropped from further consideration because their experience looked better on paper than it did in person.

Shaw's name was etched at the top of the list. He was overseeing an IBM 4341 installation, had worked at the city of Boston's data processing center and, as a member of the National Guard, had converted some Burroughs and Honeywell machines to IBM — almost a perfect candidate.

Erdmann checked Shaw's references, which consisted of two consultants, the director of computer services at a hospital and a vice-president of information services at a hospital.

After the references were checked, Shaw was invited to lunch with the city manager. Over the first course, he was offered the job.

It had been six years since Shaw had made his last company switch and accepted a position as head of management for systems and programming at Rhode Island Hospital. When the hospital's director of DP moved to greener pastures in 1983, Shaw became director of DP.

The soft-spoken Shaw was reluctant to list the reasons for his job search. He did state that Hartford demonstrated a stronger commitment to implementing end-user computing than the hospital had. Also, the hospital had divided traditional data processing and end-user computing into two separate groups managed by two different people rather than allowing the DP director to oversee all computing functions.

For a year he had casually looked for another job and had interviewed at Bank of Boston. He began an earnest search at the beginning of the summer, and Hartford represented his first — and last — noteworthy interview. Before he finished dessert, Shaw had accepted the position.

■

City revamps DP operations

By Paul Korzeniowski

HARTFORD, Conn. — Old-time data processing professionals for the city of Hartford have noticed a recent change in management's attitude. For a long time, the city had been a proponent of a "Let's get it done tomorrow" mentality.

This outlook changed last December when Mike Brown, assistant city manager, was hired to move the city from its antiquated batch outlook to an on-line orientation. Brown, a diminutive dynamo who could find a silver lining in a black hole, has aggressively taken charge of the process, and city managers, DP professionals and local politicians are quickly working to revamp the city's hardware and software.

The first item on Brown's agenda was to decide what should replace two Burroughs Corp. 6930 mainframes, which were approaching the last of a five-year contract. The city sent out requests for proposals to approximately a dozen vendors in June.

One month later, the proposals had been evaluated, and an IBM 4381 was purchased. It was delivered at the end of August. "A lot of employees bet that the city couldn't operate as quickly as it did," Brown said.

Software packages were also needed. A new payroll system from McCormack & Dodge Corp. was chosen. The city plans to establish an information center to move data from the data center to the fingertips of city officials.

IBM's Professional Office System, Software AG's Adabas data base management package and Supernatural, a fourth-generation language; have been purchased.

The city is moving just as quickly to get the packages up and running. The hardware and its operating systems have been installed. Some payroll modules are up, and the full system should be in place by January.

Moving all applications from the Burroughs to the IBM machine will require at least four years. Some applications will migrate from the Burroughs machine. Other vendors will replace existing packages, and the city may develop a few of the systems. "Historically, we wrote most of our programs," Brown noted. "We want to break out of that mold and incorporate vendor offerings."

In the next five years, the city will spend $3.1 million — $1.1 million for hardware and $2 million for software. Even the best equipment is useless without someone who understands how to work with it.

So, training has and will continue to play a key role in the transition. "We have sent all of our technical people to the vendor training classes," Brown said. All of the city's system technicians were attending an Adabas class on the day when the city's new director of data processing was introduced to the press.

A reorganization of the city's DP department, which had grown from 40 to 55 people in the last year, coincided with the changes. "The city council agreed to fund the conversion as long as it did not mean a dramatic increase in staff," said Lee Erdmann, assistant city manager. "So, we [have] to make sure we use our existing resources wisely."

Leasing industry growth outpaces hardware sales

By Clinton Wilder

HOT SPRINGS, Va. — The growth of the computer and peripheral leasing industry will continue to outpace hardware sales this year but will not match its earlier growth rates, according to the projections of International Data Corp. (IDC) in Framingham, Mass.

The second annual IDC leasing industry survey, released at the Computer Dealers and Lessors Association (CDLA) meeting in Hot Springs, predicted that U.S. computer leasing and brokering of used equipment will generate $9.25 billion this year. The projection is a 25% increase from $7.4 billion in 1984 but less than the 30% annual growth during the next five years that IDC projected in its 1984 survey.

"Despite our revised figures, computer leasing is continuing to outpace the growth of the overall information processing industry," said survey coordinator Charles Greco of IDC. "We're talking here about a very healthy industry."

Trend away from all-IBM leasing

The IDC results further indicated a small trend away from all-IBM equipment leasing to writing leases on hardware from other computer and telecommunications vendors. The number of lessors dealing only in IBM equipment dropped from 27% in 1983 to 17% of respondents to the 1984 survey, although firms leasing primarily IBM gear rose from 69% to 76%. "This surprised us," Greco said. "What accounts for the remainder [of the increased overall market] is that lessors and dealers are diversifying their portfolios, with a big push toward the telecommunications market."

The market impact of IBM Credit Corp. — a major concern of CDLA members one year ago — appears to be significant but not overwhelming. While IDC still rates Big Blue's leasing arm as the market leader with a 4% share, third-party dealers are still thriving in the expanded overall marketplace. The number of survey respondents who said IBM Credit would have a severe or significant impact on their own businesses decreased from 53% in 1983 to 43%. That perception changed even as IBM Credit's revenue grew by a whopping 82% to $296 million in 1984.

"[IBM Credit] is a tough competitor but a welcome competitor," said CDLA President Harry Goetzmann, chairman of Continental Information Systems Corp. in Syracuse, N.Y. "In a sense, [IBM Credit has] given our industry a lot of credibility."

The IDC survey concluded that the third-party leasing industry "has sustained IBM Credit's best competitive shots and still managed to climb to record heights."

While the industry still consists mainly of small organizations, those organizations are growing. The number of respondents grossing less than $5 million in annual sales dropped from 68% in 1983 to 50% in 1984, while the number in the $5 million to $25 million range jumped from 23% to 34%.

Based on survey results, the IDC composite profile of an average U.S. computer leasing company in 1984 said the firm is 6 to 10 years old, based in the Midwest, doing $1 million to $5 million a year in sales, with its main business in computer peripherals. Approximately two-thirds of the typical firm's revenue comes from leasing and one-third from brokering computer hardware. About half of the leases written by the firm contain value-added services — such as insurance, maintenance or disaster recovery services — in addition to financing.

Switch gives user firm telephone company power

PBX coordinates voice traffic for 20 facilities

By Paul Korzeniowski

LOWELL, Mass. — A number of large corporations are installing private branch exchanges (PBX) so powerful that they rival the routing power of some independent telephone companies.

One such firm is Wang Laboratories, Inc., which has purchased and installed a 5ESS switch from AT&T. Merrill Lynch, Pierce, Fenner and Smith, Inc. also has reportedly purchased the 5ESS, and General Motors Corp. and Boeing Co. are said to be seriously considering 5ESS purchases.

Wang is using the 5ESS as a hub to coordinate voice traffic for 20 facilities located within a 20-mile radius of its Lowell, Mass., headquarters. The switch acts in tandem with PBXs in each of the remote locations.

PBXs connected with T1 link segments

Most of the PBXs are connected to the 5ESS with T1 link segments borrowed from spare capacity on a CATV broadband network that Wang runs between its buildings. Locations with smaller PBXs are connected by lease lines to satellite locations where the traffic is aggregated by channel banks into T1 links. Although the 5ESS is capable of supporting smaller bandwidths, all lines into and out of Wang's switch work with T1 bandwidth.

The network replaced a New England Telephone Co. tie line system. The broadband network enables Wang to bypass the local telephone company for all intraoffice calls and sends local calls by the least expensive route. Long-distance calls are automatically sent to the least expensive of the company's three carriers, AT&T, MCI Communications Corp. and GTE Sprint Communications Corp.

The 5ESS also supports a microwave link that connects Wang's Lowell office directly to MCI Communications and Western Union Co. offices in Boston. This bypasses New England Telephone, further reducing the cost of routing traffic to these carriers.

The microwave link also ties into a foreign exchange line that connects Wang's Boston office to a suburban facility, enabling Lowell workers to be charged as if they were calling from Boston.

Robert Uhl, director of telecommunications at Wang, would not put a price tag on the network but did state that the 5ESS installation would pay for itself in 18 months.

"In addition to the cost savings, the network supplies us with more capabilities," Uhl noted. The 5ESS routes calls between the various facilities so that an employee at any office can dial a second employee by simply entering "1" and then the person's number.

Uhl listed two reasons for purchasing the 5ESS: the need for a cohesive central office network and a desire to position the company so it would be able to use future network services such as those offered by an integrated services digital network (ISDN).

Independently, the various Wang facilities had purchased PBXs, leaving the company with equipment from AT&T, Northern Telecom, Inc., Rolm Corp. and Stromberg Carlson.

Two years ago, Wang evaluated 15 vendor offerings in search of one to tie its offices together. "AT&T shared with us its plans to incorporate ISDN capabilities into the 5ESS, and they met our long-term objectives," Uhl noted.

Installation and maintenance of the switch falls under the aegis of a 45-person telecommunications staff. "The staff is only 4 years old and has grown very rapidly," Uhl noted. Most of the staff was ferreted out from other departments, and the employees have taken a number of technical vendor seminars.

Uhl reported few problems in hooking existing PBXs to the new switch, a process that in most instances took only one or two days. Some problems were encountered because the older switches were not designed to work with T1 lines. "In the past few years, we tried to purchase products that could support T1 lines," he said. "It has been difficult to retrofit our older switches to the 5ESS," he added.

Generally, Uhl said he is satisfied with the 5ESS. Like many telecommunication managers, he would like to see better reporting capabilities from the switch. "The maintenance tools are fine, and we are usually able to quickly locate a problem on the network," he said.

Currently, no data is sent through PBXs, but there are plans to add that capability. "We are testing a dial-up 56K bit/sec. circuit on a [Northern Telecom] SL1," he said. "I expect to fully integrate that capability in January or February of next year."

Also, the 5ESS has not been used as a hub for a national voice network. "We don't have enough traffic to justify installing our own national voice network," Uhl said. He added that the company is more likely to consider a virtual private network, a software-defined network or a hybrid network.

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Seafirst Bank sets plan for mass upgrade to Fat Mac

By Peggy Watt

SEATTLE — Washington state's Seafirst Bank, the first large corporate buyer of Apple Computer, Inc.'s Macintosh computers, has decided to upgrade all of its 1,000 systems from the basic 128K-byte models to the so-called Fat Mac with 512K bytes of random-access memory (RAM) through a third-party supplier.

Approximately 200 of Seafirst's 850 installed Macintoshes have already been upgraded by Voad Systems of Los Angeles, and the rest will be upgraded in turn as they arrive from Apple, said Timothy Turnpaugh, senior vice-president of Seafirst's technology division. He expects Seafirst will order at least another 1,000 Macintoshes next year, which will probably be 512K-byte RAM machines from the start, even if they are also upgraded by a third party.

"We don't want to run a split system. It hampers transportability," Turnpaugh said. He added that the original 128K-byte Macintoshes are rapidly disappearing from the market.

Turnpaugh said he always intended to upgrade Seafirst's Macintoshes eventually, but the combined factors of price and the machines' use at the bank made initial purchase of the Fat Macs inappropriate.

"The spread in prices back in February [when the first Macintoshes arrived at Seafirst] was significantly larger than is in the market today," Turnpaugh said. "Also, we had rookie users then. It took them awhile before they started stressing the machine."

The first Macintosh software that Seafirst employees used — Macwrite, Macpaint and a terminal emulation program that allows users to tap the electronic mail system that runs through Seafirst's IBM System 3084 Model Q96 — would not have required or exploited the higher capacity computers, Turnpaugh elaborated. But now, he continued, Seafirst's users are turning to such integrated business software as Microsoft Corp.'s Excel, Lotus Development Corp.'s Jazz and the utility program Switcher, from Apple, which do take advantage of greater internal memory. The next wave of Macintoshes may bring some different programs into Seafirst's offices, Turnpaugh indicated.

Seafirst, a subsidiary of Bankamerica Corp., was the first major investor in the Macintosh office concept and has networked Macintoshes throughout its eight major Seattle-area sites as well as distributing them at 159 branches in Washington state. Ironically, Bankamerica is still evaluating the Macintosh's potential as an office computer.

By the end of next January, every Seafirst branch in the state will have at least one Macintosh, Turnpaugh said. By the time the Mac invasion ends, perhaps in early 1988, he expects 3,000 Macintoshes will be distributed among Seafirst's 6,800 employees. "If you've got a desk and a phone, you'll get one," he said.

Currently at Seafirst, the machines share Apple Imagewriter printers and are used for accounting, word processing and general computing by employees at all levels.

"We had some users who had driven their 128K machines to exhaustion" even before the upgrade started, Turnpaugh said. A real estate group got one of the first pilot upgrades because of its rigorous spreadsheet use. The bank also bought a few stand-alone Mac disk drives for users who needed that boost, he said.

The third-party upgrades by Voad were the best economic deal for Seafirst, at a price of less than $100 per machine, Turnpaugh said. Voad routes about 50 Seafirst Macs at a time through Voad's Woodinville, Wash., manufacturing facility and swaps the entire board for the upgrade.

"It's not our first corporate account, but it's one of our biggest," said Voad President Dan Praeger, who suspects the project is the single largest Mac upgrade. He said the 4-year-old company is upgrading about 300 Macs per month, since launching the service in February. It still manufactures its inital offerings, automatic dialers for telephones.

Voad offers a 120-day warranty on its upgrade work, which supplements the 90-day Apple warranty that has usually run out by the time of the upgrade, Praeger said.

For single orders, Voad ships the Mac owner a new board plus installation instructions and pays the postage to get the old 128K board, which it restocks for the next upgrade. Voad also sells heftier upgrade kits to boost a Mac's capacity to 2M bytes.

Kapor changes Lotus role

By Eric Bender

CAMBRIDGE, Mass. — Lotus Development Corp. founder Mitchell Kapor has reassumed an operational management role, taking on general manager duties at the company's core Business Products Division.

Kapor remains chairman and will continue to act as "guru for all software development," as one Lotus official put it. Edward Belove, vice-president for corporate research and development, will direct cross-divisional product development work.

The Business Products Division produces and markets 1-2-3, Symphony and Jazz. While the move raised some eyebrows outside the company, the official noted that 110 of the division's 150 employees work in product development, making a good match with Kapor's talents.

Kapor replaces Charles Digate, who returns to the international division as vice-president and general manager. Digate's move recognizes "that our international operation is the fastest growing business segment," said Lotus President Jim Manzi.

IBM exec reaffirms laptop

Discusses firm's OA plans at FOAC meet

By Mitch Betts

WASHINGTON, D.C. — Robert G. Myers, IBM's director of office and communications systems product line planning, last week reaffirmed IBM's intention to introduce a laptop microcomputer.

"I think you can anticipate . . . our company will be introducing a product in that market segment," Myers said in response to a question at the Federal Office Automation Conference (FOAC) last week. He referred to a recent statement by IBM Entry Systems Division President William Lowe that hinted at such a move [CW, Oct. 28], but Myers gave no details.

In his presentation at a FOAC session titled "Executive Perspective," Myers said IBM continues to have a strong interest in voice messaging, telephone management and speech recognition products like those unveiled last month [CW, Oct. 21].

Furthermore, Myers suggested that IBM is developing a high-resolution workstation for image processing, coupled with mass storage on optical disks. "We see image processing as the next big explosion in personal computing," Myers said, adding that IBM's goal is to make this technology more cost-effective.

Christine Hughes, an office automation market analyst at the Gartner Group, Inc. in Stamford, Conn., predicted that voice messaging, speech recognition, image processing and natural query languages are the OA technologies most likely to make inroads into U.S. offices in the next five years.

Hughes further predicted that alliances, mergers and acquisitions among OA vendors will increase in the next few years as users demand integrated OA solutions, so that the surviving vendors will be either very large or very specialized.

By 1990, personal computers in the office will use 32- or 64-bit chips, have standard random-access memory of up to 5M bytes and have a built-in high-speed modem and local network interface, added Robert E. Vernon, vice-president of office information systems for Sperry Corp.

Vernon said these personal computers will cost about the same as today's units, approximately $3,000 to $5,000 each.

Robert V. Adams, president of Xerox Corp.'s Xerox Systems Group, urged the FOAC audience of government managers to pressure vendors into adopting the Open Systems Interconnect computer networking standard, so that users can create optimal multivendor OA systems.

From page 1

Apple push on for more system links

use." In explaining Apple's commitment to develop network systems rather than compromise the Macintosh operating system, Sculley said, "Looking at compatibility only at the operating system level ignores the basic direction of the industry. That direction is toward a systems world where data files can be accessed over networks, and compatability really means whether a workstation can exchange information with other computers effectively."

As the need to tie systems together increases, operating systems will become less of a determinating factor for true compatability. "If compatibility rests at the network level, it means companies can select appropriate alternatives regardless of their operating system," he added.

Sculley cited his firm's Appleline, an IBM 3278 terminal emulator, as an example of Apple's plans, saying that future enhancements for Appleline would enable the Macintosh user to transfer text or binary files to and from the mainframe.

In addition, Apple is beta testing an application that allows users of the Macwrite word processing program to send and receive files from an IBM mainframe through the Revisable Form Text DCA link.

Apple is also planning "support for IBM's Token-Ring network," Sculley said. However, he did not elaborate.

Sculley also said Apple is developing software systems with third-party vendors that will "fully integrate" the Macintosh with the DEC VAX/All-In-One and Ethernet environments. "A Macintosh front end on All-In-One is what we want for our own use at Apple, and I believe so will a lot of their DEC corporate customers."

As private branch exchange systems are becoming increasingly important in data communications, Apple will "attempt to work directly with individual vendors in co-development relationships to provide Macintosh connections to their systems," according to Sculley. Among products from communications vendors, Northern Telecom, Inc.'s Lanstar and AT&T's Starlan were said to be "particularly important."

Apple is also working with such on-line information services as Dow Jones News/Retrieval Service to create a Macintosh front end for the services, Sculley added.

Apple has been preaching more or less peaceful coexistence with IBM for well over a year but has been slow to deliver communications products. As one example, the long-promised file server for the Appletalk local-area network has yet to appear.

The company has increasingly emphasized cooperative work with independent vendors. But many third-party products also have been delayed, among them Appletalk-compatible offerings from local-area network suppliers.

"We're waiting for Apple to define the direction they are going to take with a multiuser operating system," said a spokeswoman for Novell, Inc. of Orem, Utah.

However, developing products to emerging IBM standards such as the Token-Ring and LU6.2 may give Apple a chance to play catch-up in communications offerings, other suppliers said.

"LU6.2 is a key piece," said Paul Rampel, president of the Orion Group in Berkeley, Calif., a communications software vendor. "LU6.2 support would be a nice way to try to catapult over the whole past history of SNA."

ORACLE: The portable version of IBM's DB2 and SQL/DS.

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ORACLE Seminar Schedule

Albuquerque	Nov 26
Austin	Oct 3
Boston	Oct 15, Nov 12, Dec 11
Chicago	Oct 16, Dec 12
Cleveland	Nov 5
Columbus	Oct 8
Dallas	Oct 8, Nov 13
Dayton	Oct 9
Denver	Oct 29, Nov 20
Detroit	Oct 22, Nov 12
Houston	Oct 31, Nov 21
Kansas City	Nov 6
Los Angeles	Oct 22, Nov 19
Minneapolis	Oct 10
New Orleans	Nov 19
New York City	Oct 10, 25, Nov 6, Dec 12
Newport Beach	Oct 17
Oklahoma City	Nov 7
Omaha	Oct 24
Orlando	Oct 15
Phoenix	Oct 9
Portland	Oct 10
Rochester	Oct 10, Dec 5
Sacramento	Oct 8
St. Louis	Nov 14
Salt Lake City	Nov 14
San Antonio	Oct 23
San Diego	Nov 7
San Francisco	Nov 5
San Jose	Oct 24
Seattle	Oct 2, Nov 26
Syracuse	Nov 7
Tulsa	Oct 29
Washington	Oct 10,24, Nov 7, Dec 10
Wichita	Oct 3

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From page 1

IBM users confused by net reversal

The new Type 3 cable costs roughly one-sixth as much as the Type 2 cable typically used today. Type 3 cable is available with two, four or six pairs of nonshielded wire. The older Type 2 cable contains two pairs of shielded twisted-pair wire for data and four pairs of telephone-type wire for use with private branch exchanges.

According to Frank Mitchell, IBM Cabling System product manager for Anixter, Inc., an authorized dealer of the system in Skokie, Ill., Type 3 cable containing six wire pairs — the same number as in Type 2 — costs $58 per 1,000 feet, compared with $400 per 1,000 feet for Type 2.

Although less expensive, Type 3 cable is also less capable. The maximum permissible wire length with Type 3 cable is specified at 330 feet, as opposed to 990 feet with Type 2 cable. Type 3 cable has been tested at data rates of up to only 4M bit/sec., compared with the 16M bit/sec. test specifications for the shielded Type 2 cable. Type 3 cable supports a maximum of two wire closets per ring, whereas Type 2 cable can support up to 12.

Specifications for the maximum permissible cable length between IBM 3270-type peripherals and controllers are less stringent because of the lower maximum speed required, roughly 2.5M bit/sec. Type 3 cable can support 3270s at up to 900 feet, and Type 2 can reach to 2,000 feet.

Even though the majority of the cost to install a Cabling System is in labor expense, wire prices can result in substantial differences in system price. Burns estimated that the Cabling System costs four times as much as a twisted-pair alternative.

'I'm a little suspicious'

Price aside, Jack Fetzer, corporate director of telecommunications at Lockheed Corp. in Burbank, Calif., is not so sure the nonshielded Type 3 cable is the way to go. Lockheed is planning to install Type 2 cable in a new three-story building. "Type 2 appears to be somewhat of an overkill after IBM's announcement [of Type 3 cable]," Fetzer said. "However, I'm a little suspicious about sending data over unshielded twisted pair."

Fetzer explored the idea of using twisted-pair wire for data at a trade conference last year. Most of the vendors supported 1M bit/sec. transmissions, and some boasted they could support 2M bit/sec. — but in a laboratory environment. "If you pinned them down," Fetzer said, "they would say the wire had to be shielded or had to be in an entirely separate cable from your voice wire. Now IBM is coming out and talking about 4M bit/sec. It makes me suspicious."

One user has found nonshielded twisted pair, while not 4M bit/sec., to be perfectly adequate to support the 2.5M bit/sec. communications traffic typical of 3270 devices.

A communications manager for a large oil company who wanted to remain anonymous, said that his firm uses a Type 2 Cabling System within some areas of his company but standard non-IBM twisted pair to support other 3270 peripherals. His company uses twisted-pair wire to connect roughly 400 3270 terminals to controllers at distances of up to 1,200 feet, almost 300 feet beyond IBM recommendations.

The manager said the twisted pair works fine, even though the links can include up to five connections or splices.

While cable choice will revolve around the user's unique requirements, Fetzer learned an interesting lesson: Shop around. Fetzer said once he decided on the system he wanted, he issued a detailed request for bids. The bids ranged from $90,000 to $360,000. "It's clear some people don't know how to price this thing."

HINTS FOR THE COMPETITION
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MICRO-TERM, INC.

3Com net software bows

Department, corporate network links targeted

By Eric Bender

MOUNTAIN VIEW, Calif. — A next-generation line of software is scheduled to debut today from 3Com Corp., a leading vendor of personal computer local-area networks. Boosting links between networks, the new 3+ software broadens 3Com's offerings "to wide-area interconnection at the departmental and corporate level," according to company Chairman Robert Metcalfe.

Among other enhancements over the company's existing Etherseries, 3+ features a file server architecture, which permits network applications to control shared multiuser access down to the file level, according to 3Com Marketing Vice-President Roselie Tobes. Additionally, 3+ offers dial-up access to all network functions, allowing diagnosis and maintenance of multiple networks to be carried out from a central site.

In addition, a naming service gives all network users and resources one fixed name and lets them be addressed simply by that name, without requiring a physical location or network address, she said. This service extends to multiple separate networks and remote stand-alone systems, tying them together completely transparently through a single-name directory, Tobes claimed.

"They're positioning themselves to handle larger nets in the corporate market," commented Harvey Freeman, vice-president at Architecture Technology Corp. in Minneapolis.

Written to support IBM's PC-DOS 3.1 and Microsoft Corp.'s MS-Net Redirector standard, 3+ will run all programs written for the IBM PC Network, Tobes said. The new 3Com software will be offered for four networks: Ethernet, the IBM Token-Ring network, AT&T's Starlan and Apple Computer, Inc.'s Appletalk.

The Ethernet version will be delivered in January, with the Token-Ring software offered in late first-quarter 1986, Tobes said. Schedules for the other networks were not released.

The 3+ line includes 3+Share, a distributed operating system; 3+Route, which links 3+ networks through asynchronous phone lines or dedicated lines; 3+Remote, which gives remote personal computers full access over phone lines; 3+Mail, which gives store-and-forward electronic mail transfer; 3+Menus, which permits users to access network resources and applications through menus and windows; and 3+3270, which permits networked micros to emulate IBM 3278 and 3279 terminals, routing communications through a network workstation emulating a 3274/3276 controller.

The software family has been priced in two ways, the first for up to five users and the second for an unlimited number of users. The 3+Share system costs $550 and $1,100, respectively, while 3+Mail is priced at $250 and $500. The 3+Menus offering (which, unlike the other products, will ship in March) costs $150 and $300. The 3+Remote product is priced at $295 per remote workstation. The 3+Route tool costs $1,250 per server.

The software supports both IBM Personal Computers and compatibles, with either 3Com products or other workstations acting as servers.

The 3+Path product, bundled with 3+Share or available separately for $500, allows Etherseries and 3+ to coexist on one network and permits Etherseries 2.4 users to migrate to the new software, Tobes said. However, she cautioned that the software is "not a 100% upgrade path," because applications employing semaphore locking schemes will have to be rewritten. The company will continue to sell Etherseries software for Ethernet networks.

The 3+ family also features enhanced backup facilities, with users able to back up their work down to the file level.

Pacific Bell tests integrated voice/data multiplexer

SAN FRANCISCO — Pacific Bell Telephone Co. has signed up some 200 residential and small business customers to field-test a multiplexer that increases the capacity of a single copper telephone wire sevenfold.

Project Victoria, as the six-month new technology trial is called, is the realization of the product's announcement in March, when Pacific Bell applied for patents on the technology. The patents are still pending, and more are currently being filed, according to John Lucas, a Pacific Bell spokesman.

The Project Victoria technology, which was called a breakthrough when Pacific Bell first announced it, combines and compresses voice and data signals to enable a telephone line to handle two digitized voice channels. It includes one full-duplex, 9.6K bit/sec. data channel and four full-duplex, 1,200 bit/sec. data channels as well as an additional optional channel for signaling.

> ”
>
> *Project Victoria combines and compresses voice and data signals to enable a telephone line to handle two digitized voice channels.*

Pacific Bell said the equipment also accommodates fiber-optic lines and any digital or analog switch now on the market.

Key testers will be approximately 200 residents, many of them Pacific Bell employees, and a few as yet unnamed small businesses in Danville, Calif., that will have access to a menu of on-line services that will enable them to test the new capability, Project Victoria manager Jill Lander said. Multiplexers will be installed at participants' homes and at the Danville central office switch, one of Pacific Bell's newest operations centers. All will be activated in February 1986 for a six-month trial.

Though Pacific Bell is prohibited by the Federal Communications Commission from manufacturing the equipment itself, the telephone company is permitted to make the prototypes for the trial, Lucas said. No manufacturer has yet been signed to produce the product.

Supplying other equipment for Project Victoria participants' use in the trial are Apple Computer, Inc., which will loan Macintosh computers to all 200 of the test sites, and software developer Solutions, Inc. of Montpelier, Vt., which will provide its communications software called Straight Talk, published by Dow Jones & Co., according to Lander.

Maynard, Mass.-based Digital Equipment Corp. will provide a Microvax II to run an electronic community bulletin board system for Project Victoria participants to call as part of the trial.

The bulletin board system, which will also be accessible to callers who are not part of the trial, will feature the services of Chronicle Videotex, an entertainment information listing run by Chronicle Information Services, located in San Francisco, and additional information on Danville-area events.

Project Victoria participants will also be given access to an on-line data base from Dow Jones Information Services of Princeton, N.J., and MCI Mail from MCI Communications Corp. of Washington, D.C.

Pacific Gas & Electric Co. of San Francisco will conduct a small trial of its own by asking some Project Victoria participants to help track their power use, offering them breaks on electricity rates for off-peak use. The utility will offer all participants new, on-line home energy audits and customer information services, and if the programs are well received, they may be installed at kiosk terminals in the utility company's branch offices for any customer to consult, said John Caskey, Pacific Gas & Electric supervisor of load management technology.

"I think there is a large potential for [Pacific Bell and Pacific Gas & Electric] to work together in the future," Caskey said, mentioning on-line billing and energy-use monitoring.

Security Pacific National Bank, based in Los Angeles, will give participants access to its new electronic PC Banking service.

Another potential Project Victoria trial participant is the San Ramon Valley School District in California, which has talked with Pacific Bell about establishing an on-line message service for updating records, instructor memos and home lessons, Lander added.

Danville was chosen as the trial site because Pacific Bell found it had a "high proportion of people interested in electronic services" and because of the convenient proximity of a new Pacific Bell operations center, according to the company.

Though the on-line services are available by using most modem-equipped microcomputers, trial participants will use the same systems for uniformity, Lucas added.

SAS Institute Inc. Announces

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Features of the Lattice C compiler for the 370 include:

- Generation of reentrant object code. Reentrancy allows many users to share the same code. Reentrancy is not an easy feature to achieve on the 370, especially if you use non-constant external variables, but we did it.
- Optimization of the generated code. We know the 370 instruction set and the various 370 operating environments. We have over [illegible] staff years of assembler language systems expertise on our development team.
- Generated code executable in both 24-bit and 31-bit addressing modes. You can run compiled programs above the 16 megabyte line in MVS/XA.
- Generated code identical for OS and CMS operating systems. You can move modules between MVS and CMS without even recompiling.
- Complete libraries. We have implemented all the library routines described by Kernighan and Ritchie (the informal C standard), and all the library routines supported by Lattice (except operating system dependent routines), plus extensions for dealing with 370 operating environments directly. Especially significant is our byte-addressable Unix®-style I/O access method.
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From page 1

'Get tough,' DP managers urged

Conference and Business Exposition, signaled an effort to recruit major users to his cause.

Goodman's guidelines focus on product designs employing an intelligent architecture that would provide users with maximum flexibility. The guidelines included the following:

- An intelligent architecture must be used that isolates key system components to accommodate changes in operating environments and technology.
- Applications software must be flexible enough to address individual user needs.
- Applications software must be event oriented, allowing users to combine or chain processing events to reflect their business practices.
- Applications software must be a working partner in the information center, allowing for easy interface and integration with other products and inquiry tools.
- Common functions or tasks should be provided through a single, shared software module.
- Applications software must support the trend toward expansion of functionality to networked personal computers.
- Applications logic must be independent from other key components of the applications software.
- Applications code must be in a generally accepted programming language and not nonstandard or proprietary languages.
- Applications software must use standardized reporting and inquiry tools so users can retrieve information easily.
- Applications must be developed in an automated fashion to provide users with high-quality products expeditiously.

Goodman also suggested five standards that could comprise a profile of how the ideal applications software company should operate. Among those standards were the proposals that vendors limit product announcements to 90 days before commercial availability; that the product be serviced by a dedicated organization; that the vendor should supply multitiered education and support; that products be installed in a quick, clear and efficient manner; and that vendors provide support when the users need it.

Attendees reacted favorably to Goodman's speech but emphasized that what he proposed could only be used as guidelines not standards.

One systems analyst said Goodman's suggestions were like a preacher's sermon — good to use as goals but tough to carry out in the corporate world where top management makes decisions based on dollars and cents, not on whether a vendor can deliver a product as promised.

Another attendee, L. R. Handy, director of MIS for Dibrell Brothers, Inc. of Danville, Va., added that standardization could hurt the innovator. He said, "Standardization is good, but we still need that guy who will come up with a [Lotus Development Corp.] 1-2-3. Let's keep standards as guidelines. If we standardize too much, there might just be a few leaders with everybody else following."

■

In other occurrences at the DPMA conference, personal development and general management seminars grabbed as much attention as technical sessions and exhibit floor activities. The 1,100 DP managers, supervisors and directors filled conference rooms for seminars dealing with end-user programming, information centers and artificial intelligence. However, attendence at those sessions was matched by the turnouts for general management and personal improvement presentations about such topics as motivating personnel and "How to have a great day."

Attendees interviewed at the conference said they wanted that mix of topics and noted that the gathering was an association meeting more than a product and technology showcase. Several managers said their primary purpose for attending was to get information on DPMA's educational programs so they could return home to work with local high school and college authorities in DP curriculum development.

"I've talked to quite a few people in terms of what is happening with DPMA and picked up some things that I wasn't aware of. They have already mapped out what should be covered in high school and college," said Les Bough, manager of technical systems for Home Oil, Ltd. of Calgary, Alta., noting that some schools produce graduates "who can program like the devil but don't know how to get along with people." He said it can take three years for a programmer to learn how to communicate with other workers and to understand the business world.

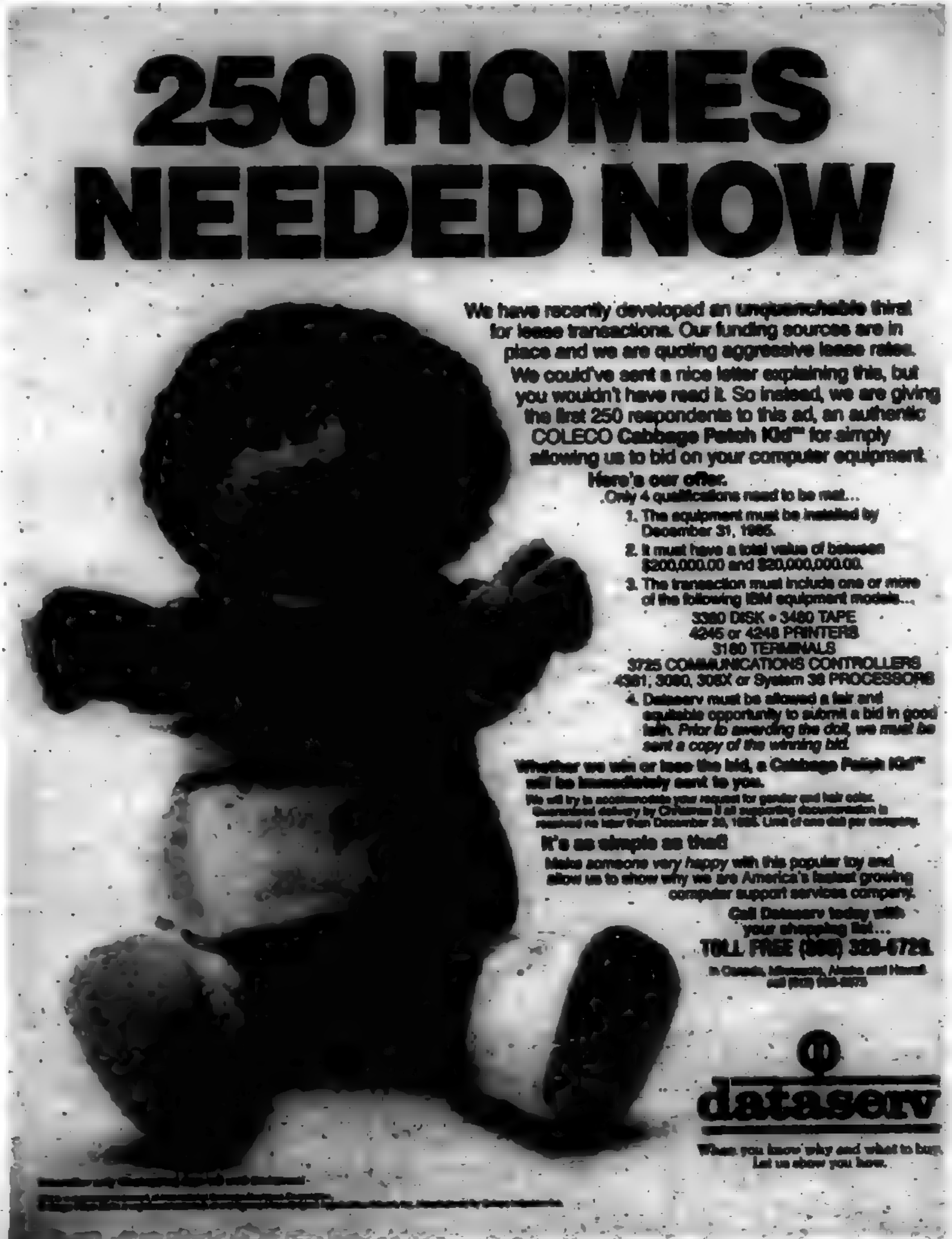
Another attendee with an interest in education, Wilfred R. Ramiall, chairman of computer sciences at Rollins College's Patrick Air Force Base in Palm Bay, Fla., said he was a nonmember attending his first DPMA conference. He noted, "I was primarily interested in getting to know the organization and in how DPMA is working to get the proper curriculum developed."

Ramiall reported that he viewed several state-of-the-art products on the show floor in which he was interested. However, he and other attendees said their primary purpose in attending was not to shop for hardware and software.

■

Vendors generally said traffic on the exhibit floor, which featured 80 exhibitors, was sporadic, suffering at least partly because of the threat of Hurricane Juan 100 miles to the east.

One exhibitor who reported a steady stream of booth visitors was Jorge Cordova, director of major account sales for CPU Corp., a Houston distributor of local-area network and microcomputer products. He said, "We were swamped on Monday from 8 a.m. on, even though the floor didn't open officially until 10. There were a lot of buyers — managers and MIS directors. I have maybe 15 leads that I think I can turn over in 90 days. I don't know why there was so much interest. Maybe it was the product itself. Local-area networks are just coming of age."



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Early Supra user claims DBMS boosts productivity

By John Gallant

MILWAUKEE — An early user of Cincom Systems, Inc.'s newly announced Supra said the data base management system's (DBMS) relational architecture and its information access and data administration tools promise to boost programmer and end-user productivity significantly.

When the Information Systems department of Northwestern Mutual Life Insurance Co. set a goal of doubling its development productivity in three years, Michael Backus, assistant director of the department, knew the group would need sophisticated data management tools. That is exactly what Backus thinks he has in the Supra relational DBMS, which was unveiled in September [CW, Sept. 23]. Northwestern Mutual, which recently migrated all of its production systems to Supra from Cincom's older, nonrelational Total DBMS, is one of the first users of Supra.

Northwestern has nearly two million customers, many of whom have a variety of policies in force. On an IBM 3081 Model G under MVS/XA, Information Systems supports 28 major insurance-related applications. According to Backus, the 28 data bases supporting those applications comprise 270 files that occupy nearly 50 IBM 3350 and 3380 disk drives. By itself, the largest of those files contains more than 4 million records and takes up three 3380 units.

After an extensive product review, Backus said, Northwestern Mutual decided more than two years ago to use Supra, which was then still under development, as the backbone of its future information systems architecture. Beginning in mid-1984, the department put Supra through an exhaustive test gauntlet. The group then redesigned the interfaces between applications and Total data bases to work with Supra. Two weeks ago, Northwestern began running its production work under Supra.

Had to go relational

"We could not achieve our productivity goal with Total. It was just costing us too much time and effort to build new systems and, more important, to maintain systems," Backus said. "We had to move to a relational architecture to insulate our applications from our data bases. That cuts down on our development and maintenance time, and it lets our end users begin to do things on their own. They can now get at information without having to go through all the programmer-type things that were once involved in accessing data."

Formerly, Backus said, when a member of his more than 170-person applications development staff wanted to increase the field size within an application or add a new data type, the data administration staff, which comprises eight people, faced an unenviable task.

"In the past, applications accessed whole records, even if they only needed data from two fields within the record," Backus said. "So if we needed to add a new data type or increase a field size, we had to redesign the physical data base and reload the whole thing with the larger sizes or added data. That became a multidivisional effort, and it was a bear of a job."

Backus said Supra's data normalization tools are helping Northwestern Mutual reorganize data bases so that applications are independent of the data they use. (Normalization, simply put, is the process of reducing data to its most basic form.) Thus, when an application is modified, the data base need not be redesigned. And, when changes in business operations prompt the restructuring of data bases, no maintenance is required for production systems.

"Supra forces you to get away from organizing your data physically," Backus said. "It forces you to look at the interrelationships among data. It makes you look at your data from a logical view. Then, Supra handles the creation of the physical data bases; it builds them using that logical view.

"We are looking at our data in a completely different way than we did in the early 1970s," he continued. "Only by doing that can we have data bases that are appropriate for an end user to access. Only then can our applications programmers change a record or field without having to worry about the data base."

The relational DBMS has taken a toll in machine resources, adding more CPU cycles to the evening processing load. But Backus said that cost is well worth the benefits.

"That price tag is worth it to save our development time on the front end and our maintenance and redesign time in the future," Backus said.

Backus said Northwestern Mutual has only begun to experiment with Spectra, the end-user information access tool within Supra. "Our main mission was to get the guts of Supra up and running," he said. "My charter for the coming year is to get these tools out to our end users. We have to wrestle with the issue of whether to allow users to go after production data or a copy of that data. And there is no question that down the road all those user queries will impact performance. We just do not know how great that impact will be right now."

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NEWS

WORLD DIGEST
CW International
News Network

PARIS — Matra Data Systems, the data processing branch of the French electronics and telecommunications group Matra, will soon bow out of the microcomputing arena, according to the company's new president, Charles Picasso. Picasso announced last Tuesday that the computing division plans to reorient all of its activities toward scientific computing, an area in which it has registered an annual growth of 20% to 30%.

MUNICH, West Germany — The growing importance of the personal computer in Europe's office automation market was reflected at the systems trade fair last week as several manufacturers, including Philips MV, Epson Corp., Victor Technologies, Inc. and Wang Laboratories, Inc. introduced new microcomputers.

Victor unveiled, for the first time anywhere, the V286, its first personal computer offering compatibility with IBM's Personal Computer AT. The V286 reportedly uses an Intel Corp. 80286 16-bit microprocessor and is being shown with 512K bytes of internal memory and a 40M-byte hard disk.

LONDON — Salaries in British data processing departments rose ahead of inflation for the 12 months ending in July, according to a recent report by a consulting firm. The average salary for a DP manager during that period was the equivalent of $26,963 (U.S.), up 9.6% from last year's figure of just over $24,562 (U.S.).

The highest paid DP managers now earn an average of $31,974 (U.S.). When adjusted for Britain's 8.8% inflation rate and company perks, total average salary for a British DP manager comes to nearly $27,846 (U.S.).

HONG KONG — Under its recently announced five-year plan, China said it intends to produce 400 million integrated circuits and 200,000 microcomputers by 1990. To meet that goal, China has begun a large-scale overhaul of its electronics industry, including the renovation of 2,000 electronics factories, according to the general manager of the China Electronics Import and Export Corp., Li Deguang.

Li, who spoke recently in a forum on penetrating the Chinese electronics market, said China hopes to import microcomputer production equipment as well as electronic test and communications equipment. The renovation of China's electronics factories, he said, should permit the country to achieve a sixfold to eightfold increase in the output of its electronics industry by the year 2000.

HONG KONG — Educational establishments, ship builders and a mining company in China have recently ordered computer-aided design systems worth more than $1.25 million (U.S.). The Chinese have also introduced a 32-bit, 24 million instructions per second AT&T Unix computer, the product of a joint development effort between China and Australian computer manufacturer Labtam International Pty. Ltd. The machine reportedly can run both Chinese and English software and will cost only 40% to 50% as much as its competitors.

MUNICH, West Germany — Siemens AG has recently announced upgrades of its PC-MX4 and PC-2000 microcomputers. The new micros are based on the National Semiconductor Corp. 32016 processor and support up to 16 users. The machines use Sinix operating software, an AT&T Unix relative, which allows them to be compatible with each other and with such older products as the PC-X and PC-MX.

TOKYO — Toshiba Corp. has agreed to develop jointly, with Visa International of San Francisco, a multifunction smart card to be unveiled in mid-1987. The card, tentatively called the "super-smart card," will also work as a magnetized automatic teller machine card and will have 64K bits of memory, Toshiba said.

The card will be about the same size as a credit card, but on its back will be a flat, nine-number keyboard. The front of the battery-powered card will look the same as a current Visa card. The card's users will have to enter their personal identification codes to complete a transaction. The card will verify the user's identity, deduct the amount of the transaction from the appropriate account and record it in memory for later accounting.

PARIS — In a move aimed at increasing network capacity and promoting the French telecommunications industry's prestige, the French Postal and Telecommunications Administration lengthened France's 23 million telephone numbers last Friday to eight digits. The action was aimed at relieving pressure on a telecommunications network that was almost saturated in some regions, the administration reported.

Although France once had one of Europe's least developed telephone systems, today it boasts one of the highest per-capita rates of telephone installations.

FRANKFURT — The market potential for information and communications technologies in West Germany still remains largely untapped, according to Gerd Wigand, general manager of ZVEI, an electronics industry trade association. Manufacturing companies expect revenue to surge by 15% in 1985 and 1986, where a 14% overall growth rate has been reported for the first half of 1985, and orders increased 32.2%.

Despite growing unemployment in other industrial sectors, communications and electronics companies reported a 5.1% increase in staff during the first half of 1985. Nevertheless, many job openings remain unfilled because of a lack of computer training facilities and qualified candidates in West Germany.

OSLO — The president of IBM Norway, Eyolf Haug, announced on Oct. 16 an IBM plan to establish a scientific research center at the University of Bergen, in western Norway. The company will invest approximately $40 million (U.S.) in the center, which will be given to the university.

An IBM 3090 and peripherals, worth more than $12.5 million (U.S.), will be donated to the center. The center's processing power reportedly will then dwarf that held by other Scandinavian universities. The center will house 10 to 15 IBM international research staff members and 30 to 40 other employees.

MELBOURNE, Australia — A $500,000 computer system has been gathering dust for nine months because of a dispute about the ergonomics of the system between its user — a Melbourne hospital — and members of the hospital's union. The dispute is costing $70,000 a month in bureau fees alone. The hospital has spent more than $20,000 on ergonomic furniture, acoustic hoods for printers and wrist pads for operators in its attempts to comply with union demands, yet the dispute is no closer to resolution.

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NEWS

Government DP centers hit hard by quake

By Ricardo Romo and Carlos Trujillo
Special to CW

MEXICO CITY (CWN) — Twenty thousand magnetic computer tapes, containing Mexican census data going back to 1960, were destroyed when back-to-back earthquakes rocked Mexico's capital city in September. The tapes contained vital information on Mexico's population, economy and housing situation.

The data processing centers of the Mexican government were among the hardest hit by the quakes, with a total of four mainframes, 17 minis and numerous disk storage libraries all destroyed.

All Sperry Corp. computers at the Mexican ministries of Commerce and Industrial Development and Planning and Budget were destroyed, a company spokesman reported.

The data center at the national bank of Mexico, Banamex, however, was one of the few largely unaffected by the disaster. Banamex attributed the survival of its DP shop to the fact that it is located in an underground, earthquake-proof and fireproof structure.

Though the quakes occurred Sept. 19 and 20, an assessment of the total destruction involved is only now being made as the last of the rubble is cleared. The damage to the city's data centers is estimated to be in the millions of dollars.

Among the hardest hit was the Mexican government's Ministry of Planning and Budget. Thirteen people died when the ministry's center for census data was leveled by the quakes. A Sperry 1100/80 mainframe, being rented by the planning agency, was also destroyed. Damages within that agency reportedly exceed a minimum of $2.5 million.

The census data center's tape library suffered the loss of magnetic tapes that held Mexico's Economic Census of 1982, its General Population and Housing Census of 1980 and population censuses for the 1970s and 1960s. It is not known whether backups of the tapes exist.

When the earthquakes struck, telephone and data transmission lines were severed. Computers responsible for managing data traffic shut down due to loss of power. For days, telex messages were the only means of communications still open.

The sudden loss of communications hit hard at Banamex, where Burroughs Corp. computers are linked with those at other banks throughout Mexico and the world. The national bank was cut off from the Society for Worldwide Interbank Financial Communications (SWIFT) network until replacement computers were brought up at Banamex headquarters. Data traffic from Banamex then traveled to other world banking centers, including banks in the U.S., via a connection between Banamex and a SWIFT network site in Madrid, the bank reported.

In the wake of the disaster, the Mexican branches of major U.S. computer vendors rushed to the assistance of their customers. IBM is said to have offered clients use of the mainframes at its Mexican center for scientific computing and to be providing consultation and damage evaluation. It has also reportedly sent to Mexico 30 tons of medical supplies, tools and power generating equipment.

Romo and Trujillo are contributors to the CW Network.

TOP OF THE NEWS

Continued from page 1

tential for another Apple Computer vs. Steve Jobs-style clash. "We agreed at once that Allen and the others should leave the company immediately," said President and CEO Paul C. Ely Jr., who came to Convergent from HP last year.

Heading out the door with Michels were cofounder and Executive Vice-President Eliot G. Wegbreit, Corporate Vice-President for Business Development Matthew Sanders III, Vice-President of American sales Robert Van Naarden and Divisional Vice-President of Engineering Richard Lowenthal.

■

"Working on the frontiers of supercomputing," is the way one Cray Research source described the projects currently being pursued by two independent research teams within the Minneapolis-based firm. One team, headed by company founder Seymour Cray, has been working on a supercomputer to succeed the Cray-2 unit, which has recently begun delivery. The second team, under the direction of Senior Vice-President Steve S. Chen, will reportedly go beyond the mandate of Cray's group to "explore brand new architectures and technologies," said Cray Chairman John A. Rollwagen.

■

Corvus Systems, Inc. increased its stake in the local-area network business with the acquisition of Applied Intelligence, Inc., a privately held Mountain View, Calif., developer of the Personal Computer Network Operating System (PC/NOS). Terms were not disclosed. San Jose, Calif.-based Corvus will use PC/NOS software in its Omninet local-area network and in future local net products.

■

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Some of the cost of the system is underwritten by manufacturers whose wares the computer stores carry and who have logged in to the schedule to broadcast product information as part of the deal. Among the companies supplying programming — and commercials — are IBM, Hewlett-Packard, AT&T Information Systems and Compaq Computer Corp.

The premier broadcast of Microage Communications Network is set to feature a live discussion titled "The Health of the Computer Industry: 1986," with a panel of analysts led by Stewart Alsop II and commentary by columnist John Dvorak.

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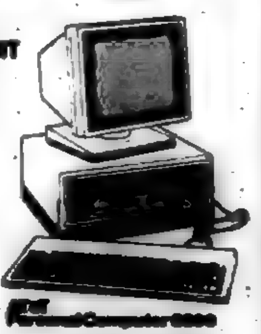

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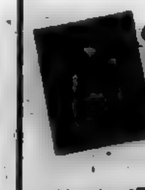

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VIEWPOINT

EDITORIAL

The stress factor

After a typical uneventful day, you leave work at 5:30 p.m., hop in the car and drive placidly home to a nice, quiet dinner with your spouse and kids, enjoy a restful evening of leisure topped off by a good night's sleep. If you do, however, you are unlike the majority of your fellow DP/MIS professionals.

For many of you, an evening like the one described above is a pipe dream. Missing from it is the factor that has become a habitual and unwelcome intruder in your life: stress. A difficult concept to quantify, stress is nonetheless a real and dangerous outgrowth of the computer age. And for DP/MIS pros, it is a concept that has hit hard.

Although it is the rare worker, blue collar or white, who feels that his job is *not* pressure filled, data processing management — like top jobs in air traffic control or surgical medicine — is generally found near the top of every list of high-stress vocations. Caught in the backlog web with user demand escalating, top management demanding bottom-line results and technology changing faster and faster, the DP/MIS worker is intimately familiar with rocks and hard places. The picture is a grim one: Starting on page 53 of this week's issue of *Computerworld*, we explore it at great length, looking at the varied causes of DP stress and methods for coping with it.

Linked to a growing list of physical and emotional problems, stress can lower productivity and increase turnover as well as lead to alcoholism, drug abuse and suicide. Stress is becoming the target of many industrial psychologists, management consultants and corporate personnel specialists who have implemented programs to confront the situation head on. Unfortunately, the solutions tend to be perfunctory at best — Band-Aids on an open wound. Much more needs to be done, especially within the data center itself.

For DP executives and middle managers, the strain is worse than ever. Many feel the squeeze from top management above and from their staff below and simply don't know where to turn. Besides heart attacks, ulcers and high blood pressure, DP burnout is a common symptom. And a one-day seminar on stress management simply will not solve the problem.

Before stress can be treated, it must be recognized as an issue. As one DP manager told CW, "Stress is not a top priority issue here."

Given that attitude, it is unlikely that top corporate management will take up the fight against stress in DP/MIS of its own volition. Therefore, DP and human resources departments must join forces to call for the institution of on-going, in-house programs to handle the problems of stress. Beyond workshops and seminars, there must be regular group and one-on-one meetings to discuss the human issues of computing, and counseling should be made available to employees who desire it.

Of course, this just adds another stressful responsibility to the DP manager's growing pile. It may, however, turn out to be the most important issue of all.

LETTERS TO THE EDITOR

Creative journalism no excuse for inexperienced 'whiz kid'

The article, "Whiz kid, 22, runs Longman Group operation" [CW, Sept. 30], proves that "creative journalism" abounds, even in data processing publications.

The article, if properly written, would have stated that if you are unwilling to pay the salary of an experienced data processing professional, you will have incompetent strategic planning, system design, vendor negotiations, work load and time line planning, delegation and other skills of professional management.

The attempt to make this situation appear positive is amazing. Even more amazing is that the company would allow its name to be so widely publicized.

Richard R. Meyer
Milwaukee

Requirements definition technique misrepresented as system design

In the In Depth article, "A Fast Way To Define System Requirements" [CW, Oct. 7], the Western Institute of Software Engineering Corp.'s technique for Requirements Definition was misrepresented as our Business System Design technique.

It is in the Requirements Definition and Analysis that the information needs, functional needs and general characteristics of a system are defined. The categories of these needs were correctly identified as external functions, outputs and inputs; internal and reference data; internal functions; and general and future requirements.

The last step, Business System Design, takes these needs and defines the physical means of satisfying these needs. In the design phase, Wisdm is similar to Joint Application Design (JAD) in that Wisdm does define screens, reports and so on but is not restricted to transaction-oriented systems.

A second point that needs clarification is the difference between Wisdm and the rest of the techniques. Wisdm begins testing, via models, in its Requirements Definition and Analysis stage. The result is a tested and verified set of logical models of the system.

Timothy A. Merriam
Bellevue, Wash.

Debate over true relational purity clouds practical DBMS applications

In E. F. Codd's article, "Is your DBMS really relational?" [CW, Oct. 14], I wonder how long this debate over relational purity will continue.

If it smells like a duck, walks like a duck and acts like a duck, what difference does it make what lurks underneath? Codd labels a vendor suggestion to revert to nonrelational capabilities to boost performance as "an apology by the vendor . . . [indicating] the vendor has not done the work necessary for achieving good performance with the relational approach." This is unwarranted and assumes that the vendor ought to adhere blindly to a standard of "relationality" that may satisfy the academic but will not benefit the customer.

The article may have at least one real benefit. Many DBMS selection committees spend countless hours debating the relational purity of competing systems without having the slightest notion of what difference it makes.

Codd's declaration of universal nonconformance now makes their task easier: because no products are truly relational, they can forget about this criterion and concentrate on whether the DBMS meets their real-world needs.

Lee Gruenfeld
Los Angeles

Big Eight accounting firms should stick to audits, not to MIS services

From reading the article about Price Waterhouse & Co. and the New Jersey Department of Motor Vehicles, "Users tie snags to Ideal, DBMS" [CW, Oct. 14], and the article about computer systems involved in bank failures, as told by Big Eight accounting firms, "Big Eight MIS services facing congressional scrutiny" [CW, Oct. 14], one thing is very clear.

Accounting firms should never be permitted to do anything besides auditing. It is clear that they are using the contacts that they make in their auditing work to help them sell services that they are absolutely unqualified to provide. Their clients buy these services in the hope of being audited less stringently. The result is disaster.

Alida Jatich
Chicago

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VIEWPOINT

WOHL STREET MINIJOURNAL

IBM net sets market dynamics

Will Token-Ring local net hit the jackpot or miss the mark?

By Amy Wohl
Special to CW

For two or three years now, seemingly forever, an ever-growing band of analysts, users and competitors has been waiting for IBM to drop its other shoe. They awaited the announcement of IBM's Token-Ring local-area network, and most of us wondered when — and sometimes, if — it would come.

In a world attuned to standards and the possibility for compatibility they seem to offer, there have been two local-area network standards for the last year or so: a secondary standard called Ethernet invented by Xerox Corp. with 100 or more players, some of them very large; and a primary standard, a blank slot filled with vague shadows and marked in large letters "reserved for IBM." The assumption was that anything IBM offered as its strategic local-area network product would be an automatic and immediate primary de facto standard.

And this perception seems confirmed. On the day after IBM's Oct. 15 local-area network announcement, a number of major vendors jumped — if anything so carefully planned can be so spontaneous — onto the IBM bandwagon, giving the IBM product the immediate authority of an industry standard.

Other local-area net vendors are sure to follow, either changing their existing products to the IBM standard, offering bridges between their environments and IBM's or offering new IBM-compatible products. This will happen fairly quickly, too, since a detailed description of what IBM was thinking about planning to do has been publicly available for more than two years.

> ***"***
>
> ***Local net companies are licking their chops, hoping that IBM has again misguessed the market.***

But the IBM announcement is much less than we had hoped for, nothing more than a very controlled environment to hook up IBM and IBM-compatible personal computers. No mention of whether or when IBM will add System/36s or other IBM products to the local-area network scheme. IBM turned away all questions on future Token-Ring local-area network connections with a polite, "We can't discuss unannounced products."

This is a peculiar omission, given the following:

- Local-area networks seem finally to have come of age. Customers are now ready to install local-area nets as a significant, strategic interconnection scheme, and they would prefer to buy from a few, large vendors with standard products — that is, products that will form broad coalitions of cooperating vendors and products around them, permitting the customer additional selections.
- Many customers prefer to buy all of their system from a single vendor. All includes everything from processors to workstations, from communications schemes to software. IBM seems to approve of, even strongly urge, this practice, but in the current state of affairs, it would be difficult to buy a whole system, installable now, from Big Blue.
- IBM is clearly a vendor of choice for many customers, and many of those customers have been waiting for an IBM local-area network solution that could include its entire system. The IBM Token-Ring announcement, as it currently reads, is not yet that solution.

But IBM customers can be patient souls, full of faith in their vendor. That's exactly what competitors fear. They are afraid now that IBM has filled the primary local-area network slot in the marketplace with an announced, partial solution, and they will be unable to sell their existing products.

During a previous time, there would have been rumbles of antitrust proceedings and murmurs of preannouncements. Note that this has not occurred. Instead, there is a rush to hop on the IBM bandwagon, to offer compatible products and to attempt to get a reasonable share of the huge market IBM is expected to establish.

You could call this the "Personal Computer Effect." Vendors with fond memories of 1982 and 1983 hope to make their fortunes by establishing beachheads in markets assured of health and stability by IBM's role as a standard setter. In an orderly market, there is plenty of room for the niche players.

We call it the "Imprimatur Effect." IBM places its stamp of approval on a hitherto risky market, tells the players what its preliminary position will be and gives the market a takeoff point. Remember 1976 and display-based word processors? Or 1981 and personal computers for business? Note that IBM doesn't always get to be the initial primary player — that depends on the market reaction to its product.

In 1976, for instance, IBM announced the OS 6, its first dedicated, display-based word processing system. Other vendors were already selling display technology, but the predominant technology was still nondisplay based. IBM established the market, which immediately and explosively took off, but it failed to have an adequate product of its own until its announcement of the very successful Displaywriter product in mid-1980.

Contrast this with the Personal Computer market in 1981. IBM's stamp of approval not only established the business micro market, it became the primary player with the hottest product.

So where does the IBM local-area network fit into the scheme of things?

The users are anxious to get started now. IBM may have underestimated the urgency of that need — or they may simply be unprepared to exploit it. The outcome is difficult to estimate. If IBM announces big chunks of the rest of the local-area net announcement soon, that could be good enough to give it the lion's share of this market.

If it takes much longer or if the next pieces are perceived as unexciting and partial, IBM could be looking at 1976 all over again. The customers may just think that giving birth to a mouse — or even two or three mice, one at a time — just wasn't worth that elephant-size waiting period.

In that case, you will want to look for the next Wang Laboratories because it was IBM's failure to bring a display-based word processor to the marketplace on a timely basis that gave Wang its marketing window and created a $2 billion company. Local-area net companies are licking their chops this week, hoping that IBM has again misguessed the market — and that their opportunity lies in a giant company's inability to apply quick corrections.

On the other hand, IBM may know its customers and the market all too well. If customers are now ready only to plan for local nets installing cable, controllers and small systems, while thinking about and planning for larger ones later . . . well then, IBM has done exactly the right thing. It has given its customers what they need. It has established an orderly market where other players will need to follow its rules and will be at the mercy of its design changes and marketing plans. And it has an excellent chance to achieve the kind of market share big companies like.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

READER'S PLATFORM

Information, revolution and social justice

By Thomas W. Madron
Special to CW

Problems of social justice occurred in the American Revolution, the French Revolution and to even a greater extent in the Russian Revolution. The industrial revolution spawned generations of urban poor. So too, social justice is a potential problem in the information revolution. There is, unfortunately, little sense of the problem of justice among DP professionals.

Most of us who deal with computing, whether micros, minis or mainframes, are so caught up in the excitement of the technology and in the pressures of the job that we fail to think about the social impact of what we do or develop.

In the U.S., at least, short-term inequalities are likely to arise from the movement away from an industrial economy to an information economy. This means that as old occupations are eliminated, segments of the population will be unable to move automatically from industrial work to information-based work.

Not everyone will be able to be retrained. Moreover, the developing information society may not be capable of absorbing a large supply of new workers as fast as they are being turned out. Retraining, therefore, is only a partial answer.

An instructive example of change in the workplace is the decline in membership of the typographers union. That is taking place because printing with hot lead is giving way to composition with computers and offset printing. This phenomenon is identical to what happened to scribes following Gutenberg's discovery of printing from movable type in the 15th century.

Inexpensive printing techniques put an entire profession out of business within a generation. Computers are doing the same thing to typographers today. These are direct examples of old information technologies giving way to new ones.

The information revolution that is developing may also worsen inequalities that have been characterized by certain societies, such as the separation of the rich and the poor. Where that separation is also associated with racial or ethnic differences, further injustices may arise.

For computer-based knowledge to become an extension of a human mind, that mind must at least have access to the technology. The poor will not immediately have such access, placing them at a further disadvantage.

The attention that professional organizations pay to these issues is one way to measure the information industry's concern for such inequalities. If we look at the programs of such organizations as the Data Processing Management Association, the Association of Computing Machinery or the Society for Information Management, we find a complete lack of concern. We also find a very uneven distribution of microcomputers in elementary and secondary schools and a lack of significant training for teachers.

What should make the last few years of the 20th century different from those of Great Britain or the U.S. in the industrial revolution is that we now understand the consequences of major social changes.

Knowing that we can observe and measure injustices, future generations will judge us on our willingness to bring about a revolution of justice. In the 1980s, it is not at all clear that the commitment to social justice exists as public policy.

Madron is manager of computer services at North Texas State University in Denton, Texas.

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SMALL TALK
Eric Bender
CW Senior Editor

Riding through the next wave

In end-user computing, "a new wave of technology is about to crash around our heads," information systems expert Michael Hammer warned late last month at the annual Hammer Forum in Boston. Faced with "the exhaustion of traditional metaphors and ideas," MIS staff must find new ways to ride the wave, Hammer maintained.

As desktop systems boasting multimillion instructions per second (MIPS) processors and multimegabyte internal memories approach, "What will we do with them?" Hammer asked. "You don't need a 5-MIPS machine to run [Lotus Development Corp.'s] 1-2-3," he said.

Hammer, president of Hammer & Co. in Cambridge, Mass., acknowledged that large corporations — "the dominant force today in personal computers" — have successfully absorbed hundreds of thousands of microcomputers during the past few years.

"Five years ago, everybody was in the state of original sin and ignorance," he commented. "There was no such thing as 'users' — they were all 'victims.'

"You don't have to acculturate people any more," he said. "A lot of the issues we've been struggling with for five years are over."

However, companies generally have concentrated on word processing and spreadsheets and should not overestimate their progress, Hammer emphasized. "Calling these systems personal computers is about as useful as calling a toaster an energy converter," he said. "What we ought to call these machines, to date, is spreadsheet machines.

"Some of those machines have been

Continued on page 27

Micro-CPU links vital

Lotus' Kapor stresses need for tighter integration

By Clinton Wilder

BOSTON — Tighter integration of microcomputer applications with mainframe data is a key element in future end-user computing, Lotus Development Corp. Chairman Mitchell Kapor told a group of MIS managers at the Hammer Forum late last month.

The continued popularity of programs such as Lotus' 1-2-3 will depend on how easily its users can interface with information on the corporate mainframe, Kapor said. "It will become possible to effectively incorporate real corporate data into the spreadsheet," he said.

Echoing a theme sounded by many industry principals and analysts in recent months, Kapor said that the future of business micros is directly tied to how well and how fast vendors can supply true multiuser, network and micro-to-mainframe solutions.

"Sharing real data on [micros] through a technological intermediary — that's what will win," he predicted. "No one wants to do anything on a terminal anymore. And the distinctions between micros, minis and mainframes will become more blurred. What will differentiate systems is not the processor [driving the computer] but the tasks that it is asked to perform."

Kapor said that Lotus will aggressively continue its development work in the micro-to-mainframe arena, as exemplified by its current strategic partnership with Cullinet Software, Inc. "We're taking a more active role in that intermediary step," he said. "We're working with other vendors [besides Cullinet] as well. We're not going into the mainframe software business, but file servers and network servers are very plausible candidates for our participation, either in-house or through partnerships."

Fielding several audience questions on site licensing, Kapor said that Lotus has taken steps toward more liberal pricing policies, such as volume discounts and site upgrades for large customers. But he reaffirmed his belief that unlimited site licens-

Continued on page 27

> *'Sharing real data on [micros] through a technological intermediary — that's what will win.'*
>
> — Mitchell Kapor
> Lotus Development Corp.

Tandy laptop features drive

Tandy Corp. has unveiled the Model 600, a $1,599 laptop based on a CMOS version of the Intel Corp. 8088 chip. The system features a 360K-byte 3½-in. floppy disk drive, an internal 300 bit/sec. modem and a built-in clock. The flip-up LCD display shows 80 char. by 16 lines. Memory is 32K bytes, expandable to 224K bytes for $399.95.

Microsoft Corp. Works software, stored in read-only memory, gives file management, data base, word processing, spreadsheet, calendar and telecommunications capabilities. The life of the built-in nicad battery is about 11 hours.

INSIDE

Information center managers warn of unrealistic user expectations/22

CXI introduces gateway connections for micro-to-mainframe access through local-area networks/26

NEW THIS WEEK

- Tandy introduces a portable disk drive for laptops
- Software Link enhances Lanlink
- Phoenix Computer Products bundles utilities

For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"In five years, some smart MBA is going to come along and say, 'Maybe we can put all of these applications on one big system.' "

— Mort Rosenthal of Corporate Software, quoting one personal computer coordinator

Sytek offers file/print server for IBM net

Designed for networks with 20 to 30 users

By Eric Bender

MOUNTAIN VIEW, Calif. — Sytek, Inc. has broadened its 6000 family of IBM PC Network-compatible products with the introduction of a high-end dedicated file/print server.

The new Model 6610 server "is designed for larger networks with 20 to 30 users or for data-intensive applications such as [computer-aided design or computer-aided engineering]," product manager Duane Bowman said. The number of users is limited primarily by disk storage, with users typically requiring 3M to 5M bytes, according to Bowman.

Currently, on most PC Networks, an IBM Personal Computer AT acts as network server, but its performance as a workstation degrades noticeably, Bowman said. "The more server functions the AT takes on, the worse the situation gets."

The new Sytek server, which carries a starting price of slightly more than $10,000, is scheduled for January delivery.

Based on an Intel Corp. 80186 running at 8 MHz, the server provides 75M bytes (unformatted) of disk storage. Average access time is 28 msec, compared with the AT's 45 msec, Bowman said. The server supports multiple printers.

An optional 60M-byte streaming tape drive handles backup and restore functions for each micro on the network. These functions can be accessed through very simple commands, Bowman said.

Other utilities support remote diagnostics, with the ability to run and modify diagnostic procedures from any micro on the net.

The Model 6610 supports IBM's PC-DOS 3.1 and Network Program and implements the IBM Netbios interface. With a new interface being developed by Sytek, the server will work on the IBM Token-Ring network when that becomes available.

The 6000 family also includes the 6050 Network Translator, introduced in July, which permits a micro network to expand up to 1,000 nodes over an area of up to three miles.

Future products will include gateway options, Bowman said. Additionally, he noted, asynchronous dial-in and dial-out functions are not currently supported on the PC Network.

Text aid bows for IBM micro

By Charles Babcock

NEW YORK — The Battelle Software Product Center of Columbus, Ohio, has put its Basis text retrieval system on a compact optical disk that can be used with an IBM Personal Computer.

Battelle is offering Microbasis in a form that includes large-capacity, read-only storage as a way to make large archival data bases easily transportable on nonsensitive media. Since a laser reading device does not touch the disk, dust and fingerprints will not harm the stored information, according to Michael McDonald, manager of the Basis Products Office in Columbus.

Continued on page 26

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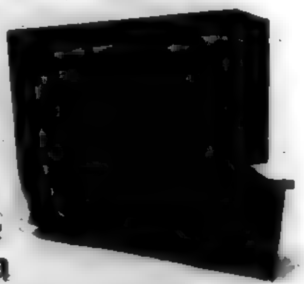

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Users key to info center

Managers cite aims, ills on road to success

By Charles Babcock

NEW YORK — If you want to encounter the problems of training end users all at once, try instructing a group of medical doctors, advised Carmine Guiga, director of the information center at the Memorial Sloan-Kettering Cancer Center in New York.

"They have no time, little patience and big egos, but they like to fiddle with computers," Guiga told 200 listeners at a session titled "Information Center Strategies for Success" during the Info '85 conference in New York last month.

Guiga and others at the session cited many pitfalls that need to be skirted while focusing on the overall goal of increasing end-user self-sufficiency. There was agreement on the pitfalls but differences on how best to achieve that goal.

Shaku Atre, a Rye, N.Y., consultant on information centers, said, for example, that information center staffs should not get involved in developing applications.

But Jarunee Denniston, manager of a 3-year-old information center at Riggs National Bank in Washington, D.C., said that her staff successfully had developed applications for end users.

Guiga supervises four staff consultants in an information center at the cancer research center. The center caters to the doctors, scientists, middle managers, administrators and secretaries who are employed by the center.

Sloan-Kettering has 300 IBM Personal Computers in use connected to a host mainframe running IBM's Professional Office System. The information center is implementing Focus

Continued on page 27

AST memory board to come with Quarterdeck Desqview

By Peggy Watt

SANTA MONICA, Calif. — Quarterdeck Office Systems Co. and AST Research, Inc. of Monterey, Calif., have announced that Quarterdeck's multitasking operating environment Desqview will be included with every purchase of an AST Rampage memory expansion board.

Desqview takes advantage of Rampage's expanded memory capabilities, enabling more computer systems to integrate programs under Desqview, said Therese Myers, Quarterdeck president.

To run applications in more than several of Desqview's nine windows would otherwise require significant disk swapping or a hard disk drive, she said.

The Rampage board, announced in June, will include a coupon for Desqview in first shipments, which began last month.

The price is $495, and the board carries a two-year warranty. The systems run on IBM Personal Computers and compatibles, including the Personal Computer AT.

Younger sibling of Desq

Desqview is the younger sibling of Desq, a window management program developed by Quarterdeck last year before the appearance of such similar products as IBM's Topview, Microsoft Corp.'s Windows or Digital Research, Inc.'s Graphics Environment Manager.

However, Desq still got off to a slow start, blazing new integrated environment trails with like products from better known developers still on the horizon. Its price has dropped from $399 at introduction to $199 now.

Desqview, released in July, is priced at $99 and will accept all programs designed to run under Topview, with multitasking capabilities. It requires 128K bytes of random-access memory (RAM) and two floppy disk drives. Unlike the case with Desq, a hard disk is not required.

The Rampage board neatly sidesteps any need for further memory to run Desqview but offers the speed of hard disk drive access, said Tony Paradiso, AST senior product manager.

'Market just appearing'

"The market for these [expanded memory specification] products is just appearing," Paradiso said. He calls the Rampage technology a superset of the Lotus Development Corp./Intel Corp./Microsoft expanded memory specification. The board uses paged memory to boost RAM capacity to 2M bytes for faster performance.

Myers also pointed out that a Desqview user can put Lotus' 1-2-3 or Symphony to work number crunching in the background while working with other applications in different windows, but the Lotus programs will not work in the shadows under Topview.

However, the user cannot split the 1-2-3 applications among several Desqview windows and must switch between them in one window.

Quarterdeck had always planned to do a "mini-Desq" program, Myers said. The evolution was established when IBM introduced Topview, and Desqview was written to be compatible with IBM Topview program interface files and run Topview-aware programs. It also features such Helpware features as easy access to DOS commands, an autodialer and macros as well as data transfer between windows.

Purchase of the $99 Desqview alone includes a coupon for $20 off on an enhanced memory board, including AST's, Myers said.

It is not the first bundling deal for AST; the company last April began bundling Sidekick, from Borland International of Scotts Valley, Calif., with its AST Six-Pak Plus.

Digital Research also recently announced it would modify its Concurrent PC-DOS to take advantage of AST's Rampage board extended memory capabilities.

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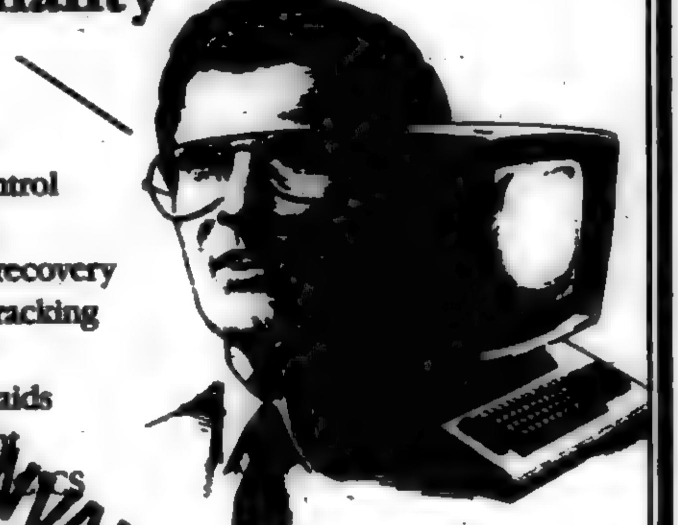

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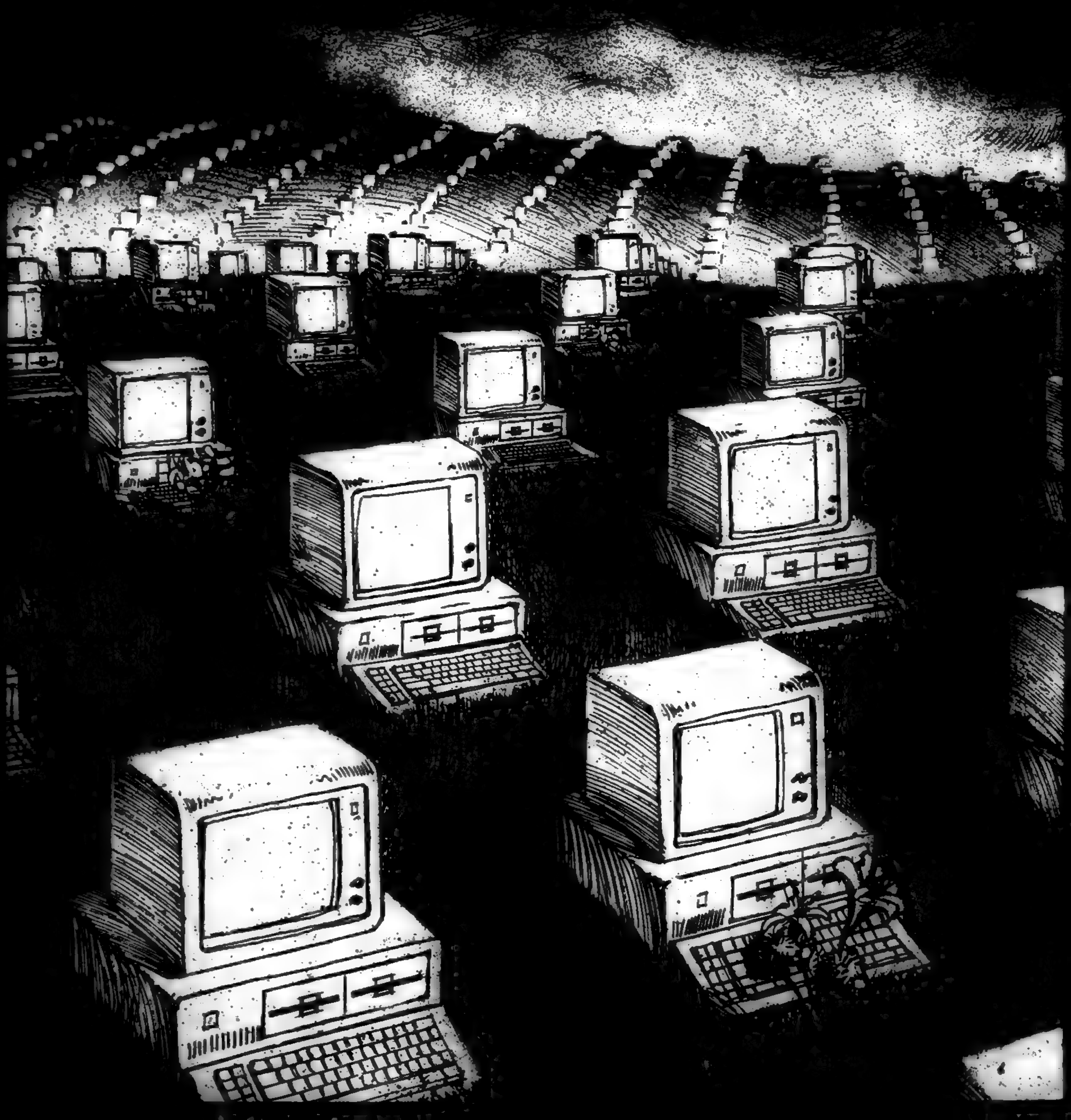

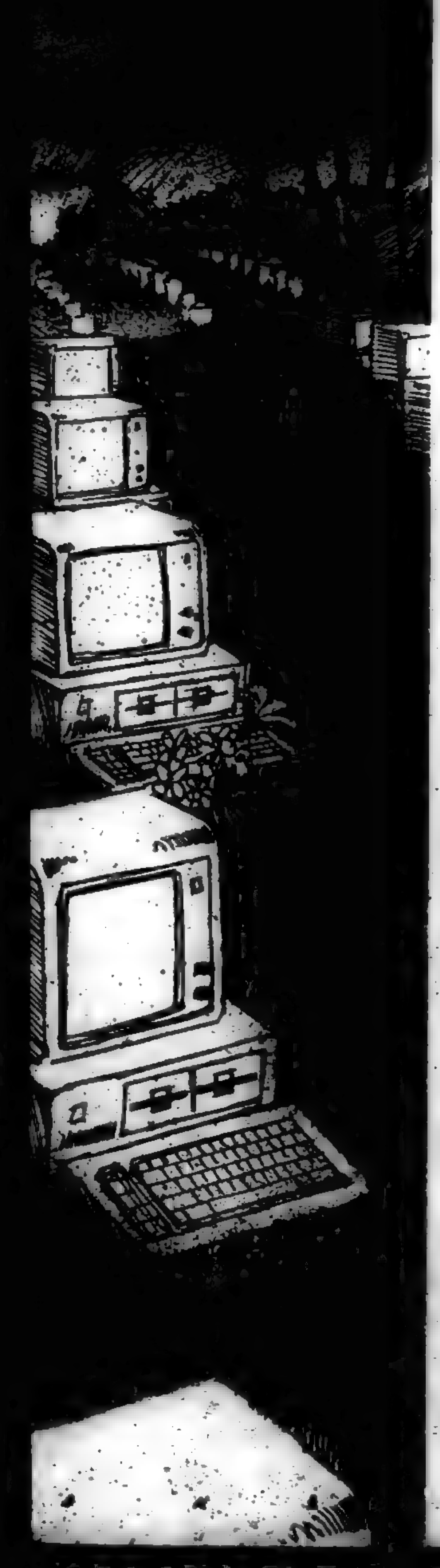

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From page 19

Text retrieval system out for IBM micro

Battelle is targeting publishers as an initial market for the device. Publishers would be able to send out large text data bases, 200,000 pages per disk, along with the Microbasis retrieval software on one 4.7-in. disk. Bookstore managers would need a laser disk reading system and an IBM Personal Computer or compatible to retrieve information, McDonald said.

Encyclopedia publishers, insurance companies and other users of large information data bases that change infrequently may be spurred to use the parent Basis software through the availability of Microbasis, officials said.

Microbasis is one of the few storage systems employing the rainbow-hued optical medium in conjunction with a microcomputer. There are few commercial uses of optical storage systems so far, McDonald conceded.

The retrieval software features a query language that provides instructions for directing the data management system. Records may be searched with a variety of key words, more than one key word or a combination of key words and numbers, McDonald said. In addition, documents may be retrieved by searching for key phrases or a word prefix or suffix.

The software includes reporting capabilities to enable users to present data in a variety of standard and custom formats.

In addition to running on the IBM Personal Computer and Microsoft Corp. MS-DOS compatibles, Microbasis can run under AT&T Unix-based systems and Digital Equipment Corp.'s Microvax under VMS. No price was announced for Microbasis, since the disks will be sold in conjunction with large data bases also placed on them.

Publishers whose distribution systems come to rely on the Microbasis disks may be spurred to buy the Basis software so that they can build the data bases themselves for dubbing on the disks, officials said. It sells for $15,200 to $38,000, depending on the size of the system, McDonald said.

Another recently introduced optical disk package running on a micro provides 3G bytes of character storage or 50G bytes of image data through a data compression system.

Advanced Graphic Applications, Inc. of New York, in a joint effort with the Cooper Union Research Foundation, developed a write once, read many times optical disk system for an IBM Personal Computer.

Priced at $31,000, the microcomputer-controlled storage and retrieval system, the Discus 1000, has the capacity to store two million pages of data, 50,000 scanned images up to 8½ by 11 in. each or 30,000 hours of speech recording, said Stanley Marder, executive vice-president of Advanced Graphic Applications.

Without the compression facility, Discus 1000 costs $21,500, he said.

The system is designed for users with a need for tamper-proof storage, such as insurance companies, legal offices or hospital X-ray sites, Marder said. The system uses a 12-in. optical disk in an Alcatel Thomson Gigadisc player. Alcatel Thomson is a French company with East Coast headquarters in Blackstone, Mass.

CXI gives IBM gateway links

CXI, Inc. of Palo Alto, Calif., has unwrapped micro-to-mainframe local-area network gateway connections.

CXI's 3270 Pcox/Gateway family has add-on boards and gateway software that resides in an IBM or compatible personal computer on a local-area network.

The systems serve as a gateway for that net to provide session service to computers on an IBM PC Network or compatible net.

The workstation software provides users with a choice of IBM 3278 and 3279 terminal emulation, 3278 and 3279 terminal emulation with 3287 printer support and IBM 3270 Personal Computer emulation.

Any of the 3270-PC host sessions can be configured as an IBM 3287 host-addressable printer.

The family includes the Pcox/Gateway Coax connection. This product includes Pcox/Gateway WS workstation software and user documentation for five IBM Personal Computers.

The $2,995 package will be available in January. Additional workstation software can be purchased at $275 per package.

The Pcox/Gateway-16 remote connection, available in January for $2,595, is said to provide local-area network workstations with remote access to up to 16 concurrent host sessions. It emulates a remote Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) or IBM Binary Synchronous Communications (BSC) 3274 cluster controller and links via synchronous modem to an IBM 3705, 3725 or equivalent controller.

The product includes the Pcox/Gateway WS software and user documentation for eight Personal Computers.

The Pcox/Gateway-64, available in February for $4,595, provides up to 64 concurrent host sessions.

This connection links via synchronous modem to an IBM 3705, 3725 or equivalent communications controller.

It emulates a remote SNA/SDLC or BSC 3274 cluster controller. Sixteen Pcox/Gateway WS workstation software packages and documentation are included.

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From page 22

Managers cite pitfalls to info center success

from Information Builders, Inc. and has a report writer, query language and a data base management package available to end users, he said.

"We are shooting to have 8,000 IBM [Personal Computers] on-line eventually," he said, but both he and later speakers said that too rapid expansion of information centers could prove their undoing.

"Use the striptease approach," Denniston advised. "Give [users] a little bit at a time so they can come back for more."

Guiga put it a different way. "Many centers offer good products and good training, but there's no follow-up. That's when the frustration sets in." He remarked that he has seen information centers fail — despite good managers — because they could not satisfy the expectations they had created for their end users.

Both Guiga and Denniston said that information center staff members can teach end users as fast as they want to learn, but that the staff should be wary of leading the users in deeper than they want to go.

Guiga cited the following examples of things an information center should not expect to do: eliminate the applications backlog; assemble a staff of frustrated MIS programmers who want to show end users how difficult it is to do what they request (the "it-serves-them-right" crew); or reduce customer service, since training coworkers to use computers will increase the demand for service.

An information center should not expect a staff consultant to serve more than 40 active users. Each user will tend to demand 45 minutes a week of the staff member's time, which will account for 30 hours, Atre said.

Guiga warned against assembling a staff that "speaks in four-letter words, such as VSAM and ISAM." End users will not be able to understand them, he emphasized.

Atre also said an information center should limit the applications software it makes available to users so that the center can be certain to support what it does offer.

Denniston and Guiga agreed that information center staffs need to gain expertise in networking to link personal computers to other personal computers and to mainframes. With networking facilities, it is much easier to satisfy end-user expectations of being able to get and share data.

From page 19

Kapor stresses need for tighter integration

ing contracts for micro software are not practical.

"The analogy I use is the pricing of coffee," Kapor said. "It doesn't make sense to buy coffee by the bean, which would be per-copy pricing for software, but a per-host policy would be selling all the coffee you want at a set price, which doesn't allow the vendor to earn a fair profit. I suspect both these extremes will regress toward the mean — coffee by the pound, which, in fact, is how coffee is sold."

The most exciting developments in micro software may come outside the office, he suggested.

"I have thought about an idea I call 'mom's information service,' " he said. "I think vendors will look at [personal computers] outside the corporation and consider the information needs of people in everyday life."

Asked if Lotus had another revolutionary product like 1-2-3 up its sleeve, Kapor said, "Lotus would be ill advised to assume another one like that."

From page 19

Riding through the next wave

out there for two years, and people are starting to get bored," he said. "Now the mating cry of the end-user is, 'What have you done for me lately?' "He added jokingly that "whoever taught end users to read did us a real disservice.

"You thought it was tough buying those 5,000 [personal computers]," he remarked. "What's it going to be like to replace them?"

Claiming that no one has a clear view of what is ahead, Hammer listed, tongue in cheek, the signs of an oncoming revolution.

Class-conscious end users

His list included palace intrigues among vendors; rising expectations and class consciousness among end users; a complacent bourgeoisie of computer dealers; an arrogant and effete aristocracy (the technocrats "who say, 'let them eat Macintoshes' "); intellectual ferment; a floundering economy; and meaningless reforms.

The revolution, Hammer went on, may take one of three Marxist forms.

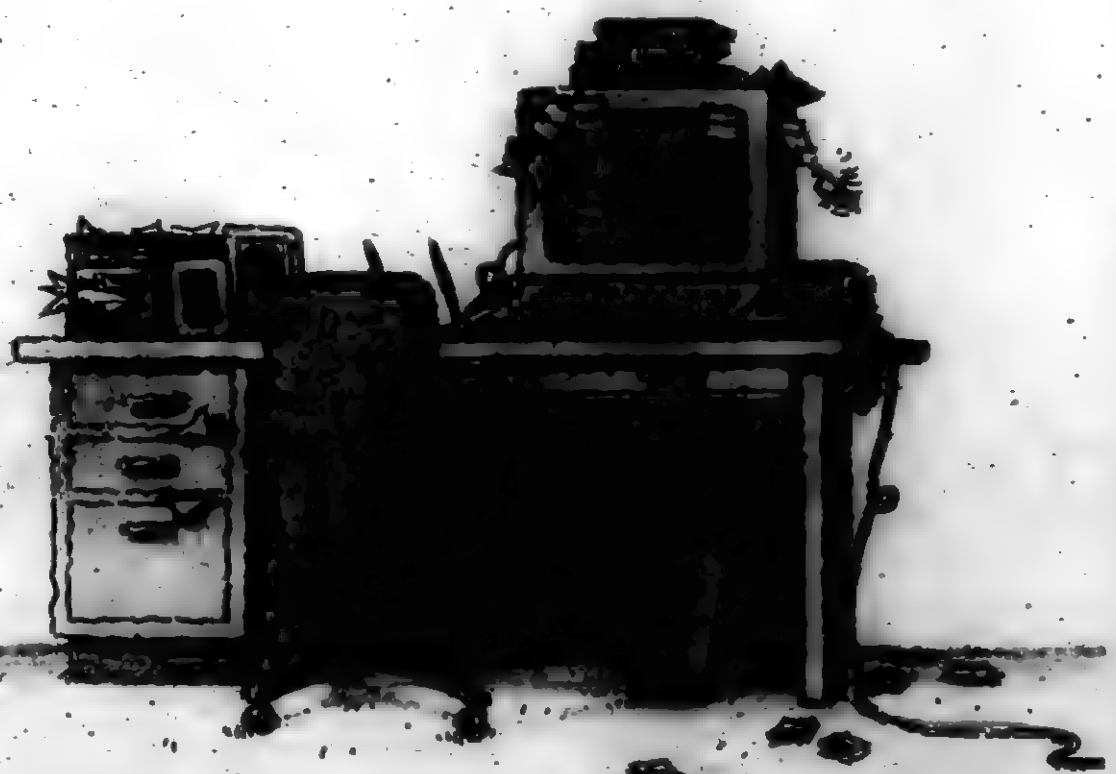
The Trotskyite model would be a permanent worldwide revolution, with personal computers becoming a standard appliance like a telephone, while a Stalinist approach would be a localized revolution, emphasizing development for existing power users.

A Maoist view would treat the personal computer simply as a small mainframe ("let's take the personal out of personal computer and talk about CCs — cheap computers").

Hammer's final view was an apocalyptic scenario in which everyone who needs a personal computer already has one.

"This is a bit of a chilling thought, but we need to include it for the sake of intellectual honesty," he remarked.

And which view will triumph? "The answer that we can be sure of is that we don't know," Hammer concluded.



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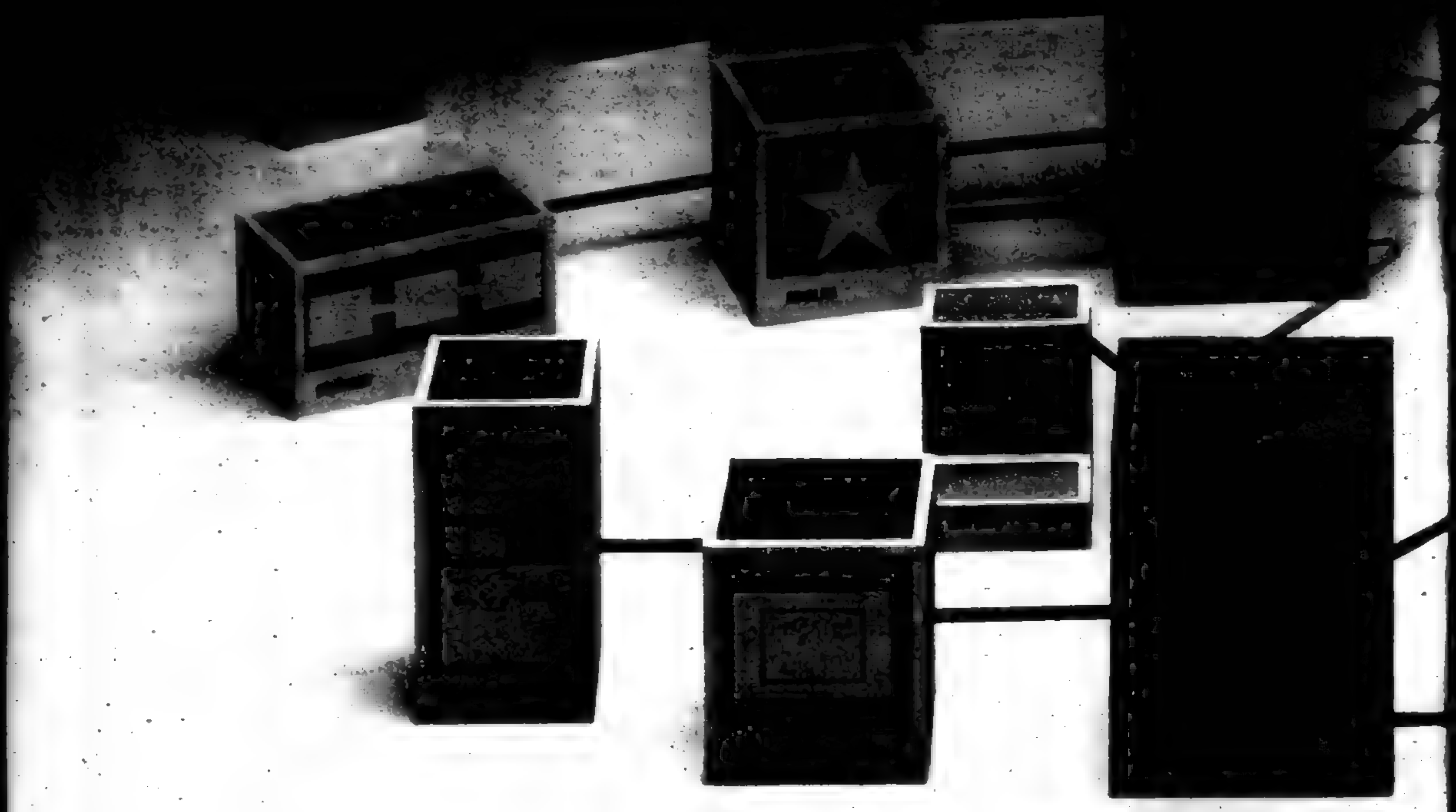

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SOFTALK
John Gallant
CW Senior Editor

Vendors ask: Make or buy?

Make vs. buy.

At a time when the make vs. buy debate has quieted somewhat in the user community, it is heating up, ironically, in the community of software vendors.

For years, essentially since IBM was forced to unbundle sales of hardware and software, independent vendors have been urging users to buy, not build, their software. Those vendors have been very successful in convincing users that buying packaged software is an acceptable, if not preferable, alternative to the increasingly costly task of developing custom systems. Witness the success that applications, data base management systems and systems software vendors have enjoyed in recent years.

But now those same vendors, most notably the largest software companies, are wrestling with a similar issue. Should they invest the time and money involved in bringing a software product to market? Or should they simply seek out a smaller vendor with, at least one hopes, a quality product or two and buy out the company?

Of late, a growing number of major software vendors have opted to go with the latter strategy.

Some notable examples: Martin Marietta Data Systems acquired Oxford Software Corp. and Mathematica Products Group, Inc. in the last two years. Computer Associates International, Inc. has acquired Sorcim Corp.; Johnson Systems, Inc.; Capex Corp.; Value Software, Inc.; Stuart P. Orr Associates, Inc.; and Information Unlimited Software since 1982. Uccel Corp. last month acquired Software Corporation of

Continued on page 32

Ada language on the move

Designer: Language's maintainability key feature

The message that Dr. Jean D. Ichbiah brings to DP managers is this: Ada has just now emerged as a viable and competitive language for applications development.

INTERVIEW

Ichbiah: a principle designer of Ada

Ichbiah, one of the principal designers of the Ada language, led the team of software experts that won the competition in 1979 to develop a new standard language for the U.S. Department of Defense.

In 1980, Ichbiah founded Alsys, S.A. in France to develop Ada software products. The firm now has two subsidiaries, Alsys, Inc. in Waltham, Mass. and Alsys Ltd. in the UK.

During a recent visit to Washington, D.C., Ichbiah spoke with *Computerworld* correspondent Mitch Betts about the future of Ada.

Is the Ada marketplace growing as quickly as you had first anticipated?

Yes, though the perspective of other people may be different because they overlooked the difficulty of [developing] compilers. But we at the heart of the Ada development process knew how long it would take to develop a solid technology. We were expecting it to take off right about now.

Ada compilers are quite elaborate programs. They do a lot to simplify the work of users. There are now more than 20 compilers on the market, some of them very good. For a computer language, compilers really are a starting point. People are now in a situation where they can deliver serious applications in Ada.

[Compare] the history of PL/I, which was defined in 1964.

The first compiler didn't appear until 1968, but, unfortunately, that compiler was not very good. It took until 1971, 1972 before you had a good PL/I compiler. By that time people had lost patience.

Continued on page 34

SOFTSCOPE

News from the industry front

AI — a better idea. **Ford Motor Co.** recently acquired an ownership interest in two of the leading artificial intelligence products companies — Los Angeles-based **Inference Corp.** and **Carnegie Group, Inc.** of Pittsburgh.

From Inference, which sells the Automated Reasoning Tool expert systems development environment, Ford will recieve knowledge engineering support for the building of expert sys-

Continued on page 34

Nixdorf expert system shell out

By James A. Martin

WALTHAM, Mass. — Nixdorf Computer Co. has announced an expert system shell for the MProlog language that runs on the IBM VM/CMS and Digital Equipment Corp. VAX/VMS operating systems.

The expert system shell, Twaice, was developed by Nixdorf through a joint venture with Logicware, Inc. of Wellesley, Mass. Twaice is said to offer a general mechanism for reasoning and documentation and a specific knowledge base incorporating the desired expert knowledge and data. Both are said to be totally interactive, functioning in the same shell, and require 4M bytes of main memory each.

Continued on page 34

INSIDE

Cincom Systems announces a conversion aid that lets users transport HP Image-based applications to Cincom's Ultra relational DBMS/32

NEW THIS WEEK

- Application Development Systems releases a full-screen version of Xpediter
- Goal Systems enhances its Explore/VM
- For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"In the next five years, we will probably see a large computer or aerospace company acquire a [major] software vendor. That strategic fit will change the scope and competitive nature of the industry."

— Brian Mefert
Robertson, Colman & Stephens

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Cincom conversion aid out for Ultra, Image DBMS

Cincom Systems, Inc. of Cincinnati has announced a conversion aid that allows users to transport applications written for Hewlett-Packard Co.'s Image data base management system to Cincom's Ultra relational DBMS on Digital Equipment Corp. VAX processors.

A spokeswoman said Cincom's Image conversion utility allows users to migrate their Image applications portfolio to VAX hardware. The Image conversion utility lets users maintain only one set of source code and enables them to use the performance of the Ultra relational DBMS on the VAX.

The utility is said to intercept automatically Image DBMS calls and translate them into Ultra calls, eliminating the task of redesigning I/Os, navigating file structures and maintaining two sets of source code.

Screen conversions are not handled by the utility, which converts Ultra status and error messages into Image return codes and messages, according to the vendor. Thus users can continue applications maintenance with Image terminology.

The utility is priced at $4,000 per copy.

From page 31

Vendors ask: Make or buy?

America, the ninth software firm it has acquired in little more than two years. Other examples abound.

For users, the issues behind the make vs. buy decisions are straightforward. Custom software usually — although it is certainly not guaranteed — meets user needs more closely than a packaged system and can provide unique and often vital functions that a more generic package does not. But a custom system generally takes a long time to develop and can be, overall, more expensive than a loosely fitting, but immediately available, packaged product.

What's behind the make vs. buy decision for vendors? "There are a lot of little companies that have been able to develop one or two good products. But they do not have the resources to expand beyond that, or they do not have the sales force to adequately market their products," said Brian Mutert, software analyst with Robertson, Colman & Stephens in San Francisco.

"Companies like Uccel and [Computer Associates International] gobble up these high-quality regional vendors to widen their customer base and to acquire more products with which to leverage their existing sales forces," Mutert continued. "In many cases, they can acquire some very key people in the process. There is also the issue of timeliness in entering a market with a product. Instead of developing something over three or four years, you buy an existing product and have an immediate presence in the market."

In addition, major software companies are often hamstrung by the width and success of their own product lines. The vendor's key development personnel begin to spend more and more of their time maintaining and enhancing existing products, rather than developing new systems.

IBM and applications mart

Perhaps the most important software vendor facing the make vs. buy decision is IBM. For years, analysts have been predicting that IBM will become a force in the applications market — a market it has, for the most part, conceded to the independents — by picking up an existing applications vendor. The impact of the industrywide slowdown has probably made more than a few such vendors willing to entertain the notion of being acquired. And that factor will no doubt lead to an increase in such acquisition activity in the coming months.

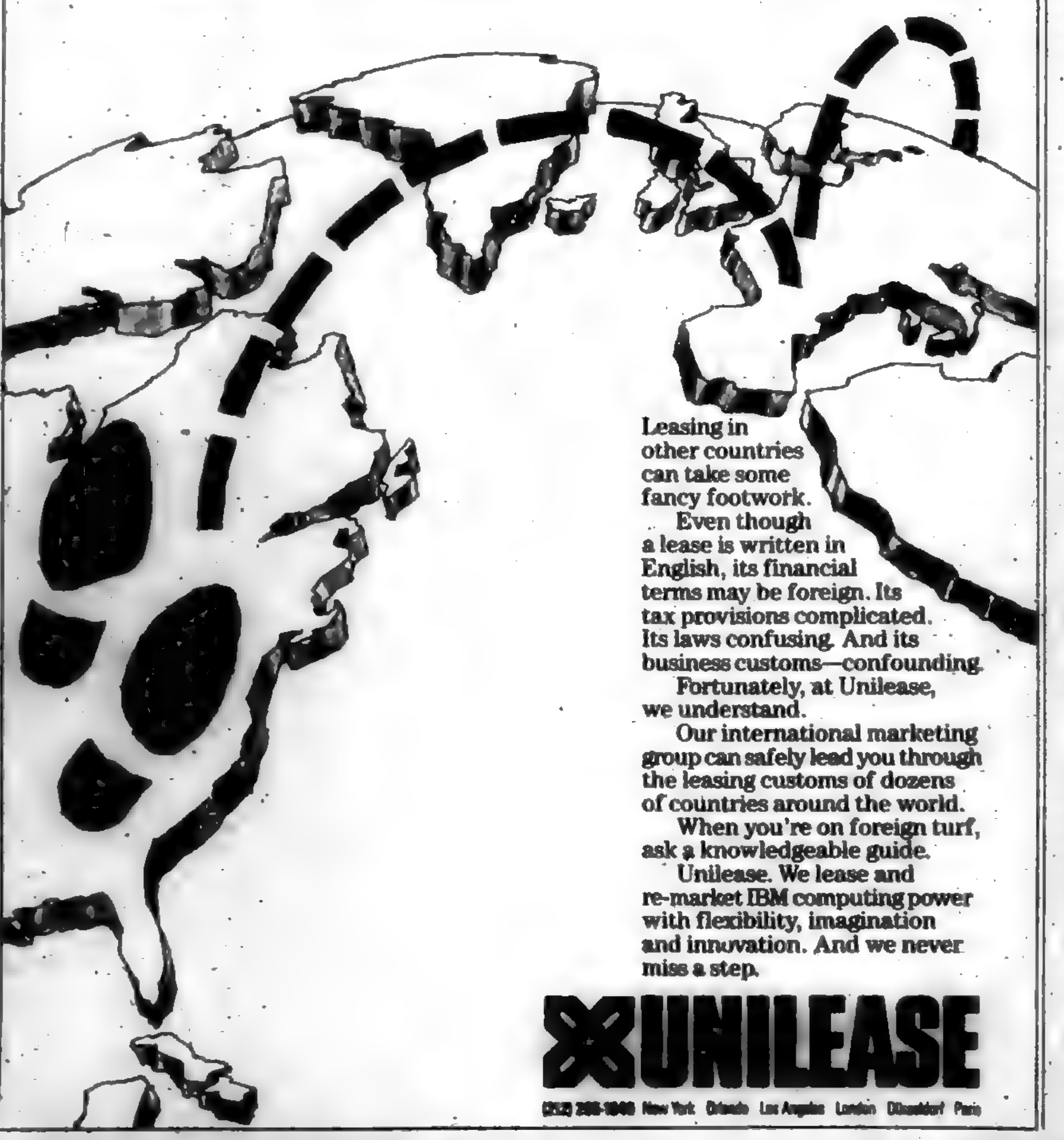
While the acquisition strategies of the software vendors may outwardly appear to be nothing more than the usual corporate machinations, they may have a dramatic impact on users. Perhaps the most challenging task facing a vendor that has acquired another software company is integrating the acquired party's package (or packages) into the vendor's own line of software. There's a great deal more involved in that process than simply redesigning screens and menus and rewriting documentation.

When a vendor chooses to develop a product, that product is designed from Day 1 to work with the vendor's other offerings. It may be more difficult, some would argue, to reshape an existing, disparate product to fit into an otherwise integrated line than it is to develop a new one from scratch.

Thus, users have to look carefully when considering the purchase of a newly acquired product — even if they are satisfied with the vendor's other offerings. Is the package truly integrated into the vendor's existing line, or has it simply been cosmetically altered to appear integrated? Did the vendor really reach down to the source code level and make the changes required to ensure true integration? Did the changes the vendor made impact the functionality or quality of that package?

At a time when users seem to have gotten a handle on their own make vs. buy dilemmas they are faced with a new problem. How do you deal with the vendor who has decided to buy rather than make?

We can help you take a giant step.



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From page 31

Ada language on the move

Your firm and others are developing Ada compilers for microcomputers such as the IBM Personal Computer AT. Why is that?

We are following the example of firms like [Microsoft Corp.] rather than traditional service-oriented firms. If you look at the software industry, where it's most vivid is in micro products. That is where you have the big numbers in terms of computer workstations, and therefore, if you want to succeed you have to be there.

Now that we have secured that, we also are developing [compilers] for mainframes, such as the IBM 370 architecture. They will be ready in the middle of next year.

Now that compilers are available, are there other obstacles to Ada development? For example, are there enough trained Ada programmers?

Our experience is that training programmers is not complex. So we don't see that as a barrier. Now that the compilers are there, it really depends on the Ada [vendors] to get it moving. They have to convince DP managers of the benefits, in terms of long-term maintainability, of their products.

When you talk to these managers, what's your best selling point for Ada?

It's maintainability, by far. Two years ago, much to our dismay, a survey of software firms indicated that they had not heard of Ada and that they planned to write their applications in C. Two years later, [a follow-up survey showed] the attitudes had changed radically. For one thing, they had heard of Ada. And, having used C, they were disappointed by it. C didn't induce programmers to [write] very regular code; they wound up with tricky code that is not very easy to maintain. The survey found a much more favorable attitude toward Ada because of the added maintainability it offered.

Are C and AT&T Unix the chief competitors for Ada?

Unix is not a competitor; it's an ally. C was seen as a competitor two years ago, in the absence of anything else. C was very much propelled by Unix. But more and more, Ada itself will be propelled by Unix. The availability of a number of good Ada implementations under Unix is likely to propel [the language] in the same way.

With the added qualities of Ada — maintainability and [modularity] — I predict Ada will be using Unix to make its way.

The masterpiece of the long-range DOD strategy on Ada has been the validation [requirement]. Forcing all compilers to go through a very stringent validation process is really the best guarantee for users that their programs will be portable. Everybody who has been using C has suffered from the difficulties inherent in its different implementations. That's not going to happen to Ada because of the very stringent validation requirements.

What is the most typical objection to Ada?

The reluctance to [abandon] a big investment in Cobol code. We have just reached the point where we confront companies with big investments in Cobol or C. The person who has a small program — for example, 20,000 lines — and is happy with assembler language, C or Cobol, would be difficult to convince. And why should we? The people who have very large problems, and who know they cannot continue to use the solutions of the past, are easier targets for us.

We intend to price [our Ada workstation compilers] very aggressively, close to the price of a standard Cobol compiler. We want to make these high-quality compilers affordable so that we can encourage DP managers and applications programmers to use Ada for small, experimental projects.

What is the significance of the recent decisions by the National Aeronautics and Space Administration and the Federal Aviation Administration to use Ada?

They are very significant. [Those agencies] are seeking to improve reliability, long-term viability and portability. They have the usual problems of large programs that have to be used for more than 20 years and which have to be reliable. This is a sign that, whereas Ada was put into orbit by DOD, it is starting to fly by itself, which is a sign of maturity.

How does the U.S. response to Ada compare with the European response?

The one difference I see is that when we do Ada seminars in France, we see in our attendance a higher proportion of DP managers . . . than we see in this country. In this country, we see more representatives from [computer-aided design and manufacturing], scientific and defense industries.

Has Ada become a personal crusade for you?

A very good test of the success of Ada will be when the day comes that people do not know who designed it; they've forgotten my name. The measure of the success of Fortran is that only the specialists know about [Fortran developer] John Backus. I see that day coming soon. I see more and more books about Ada that don't mention my name, and I see this as a very good sign that the language is progressing. I'm not disappointed; my objective is to see Ada succeed.

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From page 31

Softscopes: News from the industry front

tems based on the environment. The $14 million corporate agreement, which gives Ford a 10% minority equity ownership position in Inference and a seat on the company's board of directors, also involves a transfer of Inference's AI and expert systems technology to Ford.

Ford's two contracts — totaling $14 million — with Carnegie Group will provide the Dearborn, Mich.-based automaker with AI expertise and knowledge-based software and a 10% equity in the company. Ford said the technology transfer will initially focus on the development of expert diagnostic systems for Ford's major divisions.

Ford will have immediate use of all Carnegie Group commercially available development environments, including Knowledge Craft and Language Craft. Ford joins Digital Equipment Corp., the French Generale de Service Informatique, Boeing Co. and Texas Instruments, Inc. as investors in Carnegie Group.

■

From the original. **Language Technology, Inc.**'s Recoder Cobol restructuring software for improving Cobol programs is now available through a three-year site licensing agreement. Previously, the service was available only to clients who brought their programs into the firm's Salem, Mass., headquarters for restructuring at a cost ranging from 20 to 50 cents per line of code. The license costs $150,000 for unlimited code restructuring. Recode Gobol, now in Version 4, runs in IBM VM and MVS environments.

Eric Bush, chairman and chief technical officer of Language Technology, said the license option is being offered for both marketing and technical reasons. "It's more convenient. Customers prefer to restructure on their own premises and at their leisure," he said. The licensing approach is beneficial to users with millions of lines of code to be restructured, he added.

■

Leading the leaders. Boston-based **Keane, Inc.** introduced a management education program — dubbed Project Manager Development Program (PMDP) — aimed at helping clients train project managers for large-scale applications development tasks.

PMDP was designed to instill in prospective project managers the "behavioral competencies" needed to manage complex DP projects. The service was positively received by its first client, the Customer Record Information Systems Division of Illinois Bell.

Using a "competency framework," PMDP reportedly helps clients select, hire and assign managers to projects that require their individual skills.

■

From page 31

Nixdorf unveils expert system

Twaice was described as a skeleton system that can be fleshed out with whatever knowledge base is selected, a spokesman said. It is said to be an evolution of Nixdorf's Faultfinder, Repplan and Conad expert systems.

Twaice was designed to "bridge the technology gap between MIS and AI," the spokesman said, allowing MIS users to access easily expert information using the MProlog language.

Twaice features

Features of Twaice include a taxonomy model for the knowledge base and the ability for interactive acquisition of taxonomic structures.

Also featured are a rule compiler for added speed at runtime and for taxonomic checks at compile time and explanation capabilities.

General lease for the expert system shell is $70,000, with availability in January.

COMMUNICATIONS

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Daniel Minoli

Managing the No. 2 resource

FIRST IN A THREE-PART SERIES

Next to having an intelligently designed network that uses the best possible technology, the second most important factor to ensure reliable and cost-effective communications is having the right people.

How can the communications manager or communications director obtain the best talent and retain such talent? What criteria should be applied to judge a potential candidate or an in-place work force?

Some factors that experience has shown to work well are described here and will be followed up in two subsequent columns.

In the case of an in-place work force, the listed criteria should be applied not on an individual basis but rather on a basis that identifies desirable skill development goals that then become part of yearly departmental objectives, along with standard hardware and software projects.

Technology is moving at a furious rate. The half-life of all technical data communications information is currently estimated at five years. There is a constant need to read trade literature, vendor brochures, conference proceedings and the like. The ideal candidate should indicate that he reads on a regular basis. Test that crucial habit by

Continued on page 36

Minoli is a member of the Bell Communications Research (Bellcore) network architecture planning group. Opinions in this column are strictly the author's and do not represent the view of Bellcore.

Pacific Telesis unit offers net management service

By John Dix

WALNUT CREEK, Calif. — Users with small to mid-size networks who are left cold by the idea of staffing up and installing equipment for network management may be interested in a new service from Pactel Spectrum Services.

Spectrum Services is a nonregulated business of the Pacific Telesis Group, the holding company formed by the AT&T divestiture that consists of Pacific Bell and Nevada Bell and nine other nonregulated businesses.

Formed in March, the company is marketing a net management service targeted at users with private networks consisting of six to 20 lines. From one of Spectrum Services' 14 planned Network Response Centers, the company can provide remote net monitoring and diagnostics, initiate and oversee network restoration and manage information about a customer's network, including details about vendor contracts and network configuration. Today, Spectrum has two centers, one in Irvine, Calif., and the other in Walnut Creek.

These centers monitor a customer's network by working in conjunction with a remote test computer installed at the host facility in each user's network. The test computer oversees the health of the network by interrogating loop-back test devices Spectrum Services installs at each of the user's network nodes. For the sake of security, customers can deny Spectrum remote access to the test computer until a problem arises.

The service accommodates all types of modems — they do not have to be diagnostic modems — and communications facilities, including two-wire dial-up and four-wire leased lines, multidrop lines, AT&T's Dataphone Digital Service, International Record Carriers and bypass facilities such as Digital Termination Services and small

Continued on page 37

IBM network compatibles out

By John Dix

Hoping to hitch their wagons to IBM, Ungermann-Bass, Inc. and Proteon, Inc. have announced local networks that are reputedly compatible with the mainframe maker's recently introduced Token-Ring network.

Ungermann-Bass is rounding out its Net/One product line with Net/One Token Ring, the first network offered by the company that does not use an Ethernet-type access method.

The Santa Clara, Calif.-based company has been working on token passing — the access method used by IBM — for two years, a spokeswoman said. Fruits of this development effort are reflected in products from both Ungermann-Bass and Industrial Networking, Inc., a company jointly owned by Ungermann-Bass (60%) and General Electric Co. (40%). Industrial Networking markets networks compatible with General Motors Corp.'s Manufacturing Automation Protocol.

Like the IBM network, the IEEE 802.5-compatible Net/One Token Ring is a 4M-bit/sec. baseband network that runs on the IBM Cabling System, including versions with either shielded or nonshielded twisted-pair wire. The Ungermann-Bass network supports the same number of devices as the IBM net: 260 when shielded twisted pair is used and 72 with nonshielded wire.

To create larger networks, Ungermann-Bass will provide bridges between ring segments, claiming it will offer the first bridge that supports the IEEE 802.5 specification.

While IBM's Token-Ring will initially support only Personal Computers, Ungermann-Bass reported it will provide a number of interface options, including a network interface unit for devices based on

Continued on page 36

INSIDE

A California Bank has reduced network downtime from two to three days to hours using a new net management service from Pactel Spectrum Services/37

NEW THIS WEEK

- TAB Products introduces three new modems
- Chipcom announces a family of broadband communications products
- For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"I don't think we have anybody who understands [all of Systems Network Architecture]; I don't think we need to. As long as the pieces work together."

— Edward Sussenguth
IBM Fellow and
former chief
architect of SNA

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS

From page 35

Managing the No. 2 resource

asking a few questions about recent developments that have made the major press publications.

Encourage the staff to subscribe to magazines and to share them. Set up a small practical library. Provide a few company-paid subscriptions.

Many trade magazines are free to qualified individuals. It is not unreasonable, however, to expect an employee to pay for one subcription out of his own pocket.

Above all, the manager should set the example. If the manager has moved away from the raw technology, then he should read resource management, financial-related or quality control publications.

It is not clear how a manager who is mostly in a decision-making area can continue to remain optimally valuable to his firm if he divorces himself from the technology that he is supposed to evaluate, recommend or maintain.

Coping with change

A few generations ago, one could get away with one-time training. Today, it is imperative that the individual's knowledge base be constantly replenished. Even when a certain technology branch may be relatively stable (for example, Cobol programming), the company's needs change, such as its expectations, strategies, products, profitability and even advertising campaigns.

The work force must be able to change with the firm's climate. Hence, the best candidate is not the one who knows A, B and C but the one who can quickly learn A, B and C. For example, it may not be important if the individual knows RS-449 but rather to consider how many modem interfaces he has successfully mastered in the past six months.

Sometimes communications managers seek an individual who has in-depth knowledge of many disparate areas. Such an individual may be hard to find, and a substantial monetary premium may be required. It may be better to find two individuals at a lower cost, each with a major and a minor field that complement each other.

Finally, when in need of a special candidate, don't just look at the people searching for a job. They represent only 15% of the total possible employee population. In fact, the best candidates may very well be those happy individuals who are already satisfied where they are. Many of these people can be contacted through colleagues, vendors, universities and conference speakers.

From page 35

IBM network compatibles debut

the Intel Corp. Multibus backplane.

A network starter system will include a Multibus interface, two- and eight-port net interface units, IBM Personal Computer interface units, Distributed Wiring Concentrators and a Ring-to-Ring Bridge.

With appropriate software, the Token Ring Intro/Net will cost $47,750, a speculative price as the company has not yet chosen the number of interface units to be included in that figure. The net will be made available in January to coincide with IBM's stated shipment schedule.

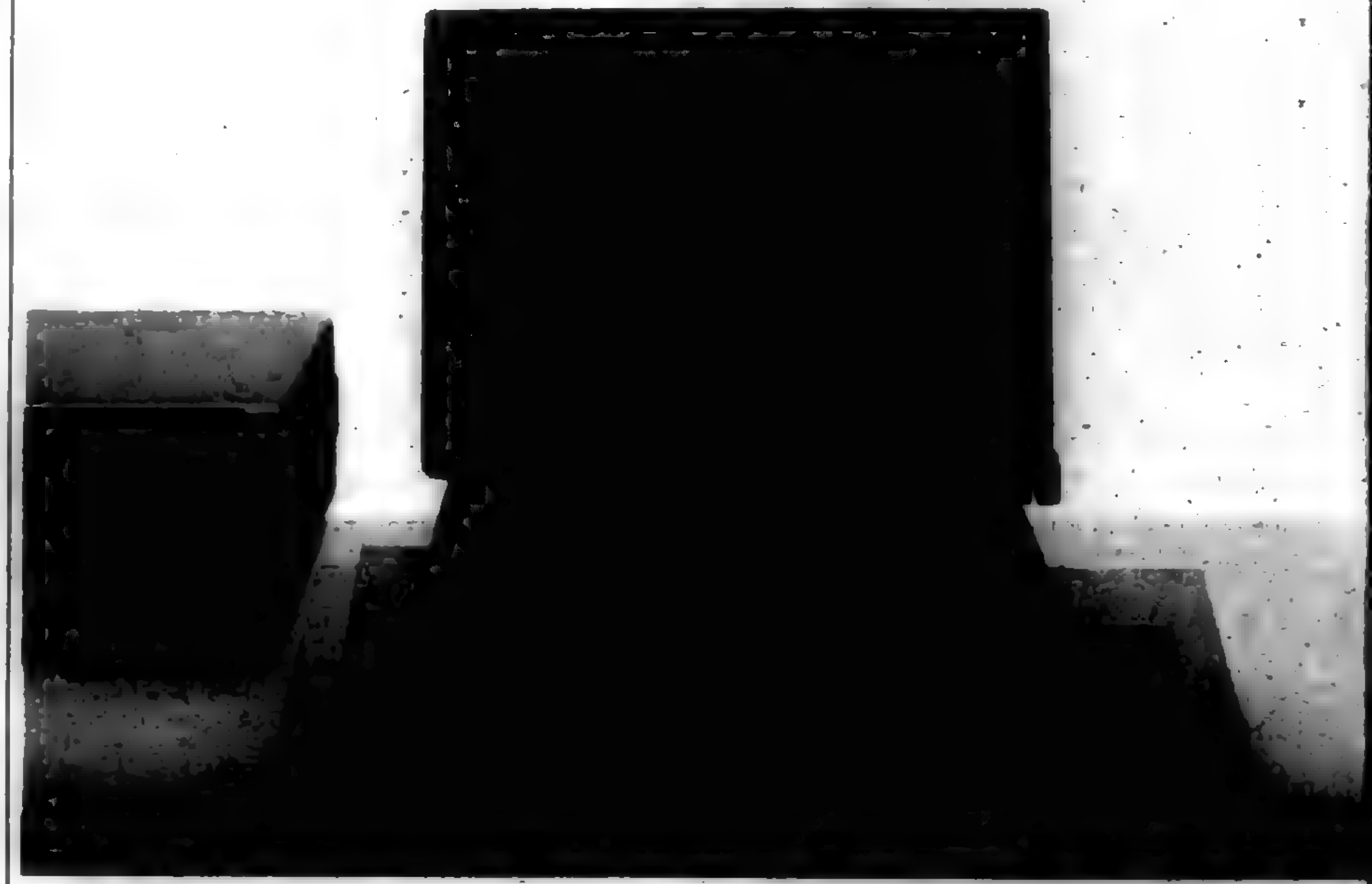
Proteon of Natick, Mass., was one step ahead of Ungermann-Bass in its quest to release an IBM-compatible network, because it already used the token-passing access scheme in two of its other net products.

The IEEE 802.5-compatible Pronet-4 is the lower speed brother of Proteon's Pronet-10 and Pronet-80, nets that operate at 10M and 80M bit/sec, respectively. Proteon will offer Pronet-4 host interfaces for processors based on Digital Equipment Corp.'s Unibus and Qbus, Motorola, Inc.'s VME-bus and Intel's Multibus. It will also provide an interface unit for IBM Personal Computers and compatibles.

The company said it would provide gateway products that would enable a Pronet-4 to be connected to higher speed Pronet products as well as to other network standards such as the IEEE 802.4 token-passing bus.

Proteon is scheduling the introduction of its Pronet-4 to coincide with IBM's first-quarter 1986 shipment date. A company spokesman estimated that Pronet-4 would cost between $1,900 and $2,500 per host node, including software.

Where graphics



It isn't that today's executives lack information. Far from it.

Fact is, they are deluged with information.

The problem, of course, is getting through it all. To get at those relevant facts executives need.

Fortunately, there is a solution. The Smart Desk equipped with an IBM graphics workstation.

This kind of Smart Desk lets the user look at easily understandable pictures—such as graphs, charts and diagrams—instead of thousands of words. As a result, executives spend less time making their way through data and more time making decisions.

What's more, with a Smart Desk with graphics capabilities the time executives save isn't only their own. For they can easily translate the information they need to share into charts, graphs and the like.

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There's an IBM graphics workstation ready to make almost any desk a Smart Desk. The IBM 3270 Personal Computer AT/G, for example, lets the user interact with the host computer or work in the stand-alone mode. With

The Smart Desk from IBM

From page 36

Pacific Telesis unit offers service

dish antenna satellite service. Speeds can range up to the 1.54M bit/sec. T1 rate.

When contracted, Spectrum Services takes a full inventory of the customer's network, including the names, serial numbers and manufacturers of all network devices; maps out the network topology; and gathers information about vendor contact names, maintenance contracts, circuit characteristics and protocols.

This data is entered into a relational data base management system maintained on a Digital Equipment Corp. VAX 8600 at one of the company's regional Network Response Centers.

Once the inventory is completed, Spectrum installs loop-back devices throughout the customer's network and a central test computer. Both pieces of hardware, which Spectrum owns, are manufactured by Datacomm Management Sciences, Inc. of East Norwalk, Conn.

In practice, the customer's test computer monitors the network by interacting with the remote loop-back devices. When preestablished thresholds are exceeded or a device fails, the test computer automatically dials Spectrum's remote Network Response Center. The VAX 8600 down-line loads diagnostic routines particular to the user's network.

Data gathered in this process is fed back to the VAX where operators diagnose and pinpoint the problem, typically within 15 minutes. Spectrum personnel call in the maintenance forces of the appropriate vendors and monitor the restoral procedure, keeping track of the elapsed time since the problem was reported.

Communication between remote loop-back devices and the customer's test computer requires use of the data channel, unlike most diagnostic modems, which use a side frequency band that does not interfere with data transmissions.

Because of this, the test computer has to take the circuit down when a problem occurs. According to company President Douglas W. Fagg, this interference is minimal.

The service for a two-host network with five or six lines serving approximately 170 sites would cost roughly $5,000 to $6,000 per month, Fagg said.

■

Service saves bank time

The use of Pactel Spectrum Services has cut the time of network problem detection and correction at Mechanics Bank in Richmond, Calif., from two or three days down to hours, according to Tony Chavez, vice-president of data processing.

Mechanics Bank is one of two beta test sites for Spectrum's network management service targeted at small to medium-size network users.

Chavez said he is very satisfied with Spectrum Services. The use of this firm's service has ended arguments between the bank's circuit providers and its vendors of data communications equipment, finger pointing that often required days to sort out.

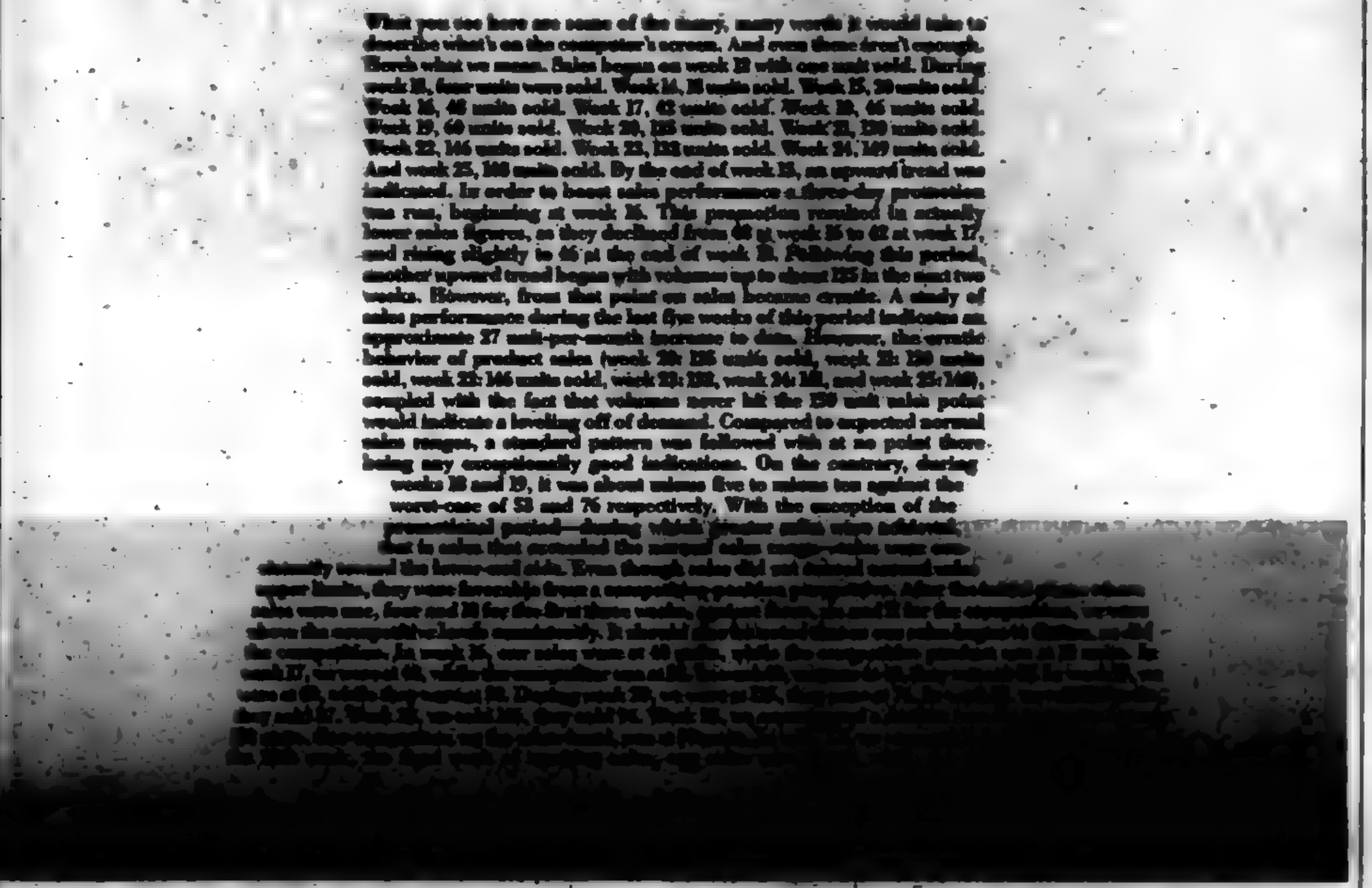
The bank has eight leased, multidrop circuits, each serving a specific application. One line serves the bank's automatic teller machines, hopping from branch to branch. Four circuits are used to support teller terminals, and three additional links support administrative terminals. In all, roughly 180 devices are supported.

Since Spectrum Services took over the bank's net management, the longest it has taken to fix a failure is six hours, Chavez said. The fastest network restoral was achieved in only two hours.

Chavez said the bank considered assuming the responsibility of net management itself but thought Spectrum Services would do a better job for the same amount of money. In-house management would have required the bank to hire a data communications expert and buy test equipment, whereas Spectrum Services already owned more comprehensive analysis tools than the bank could have afforded to buy.

An added benefit of the service, Chavez said, is the record-keeping capability. Over time, the bank will be able to weed out continually weak net links and fix them and pinpoint underused equipment.

speak faster than words.



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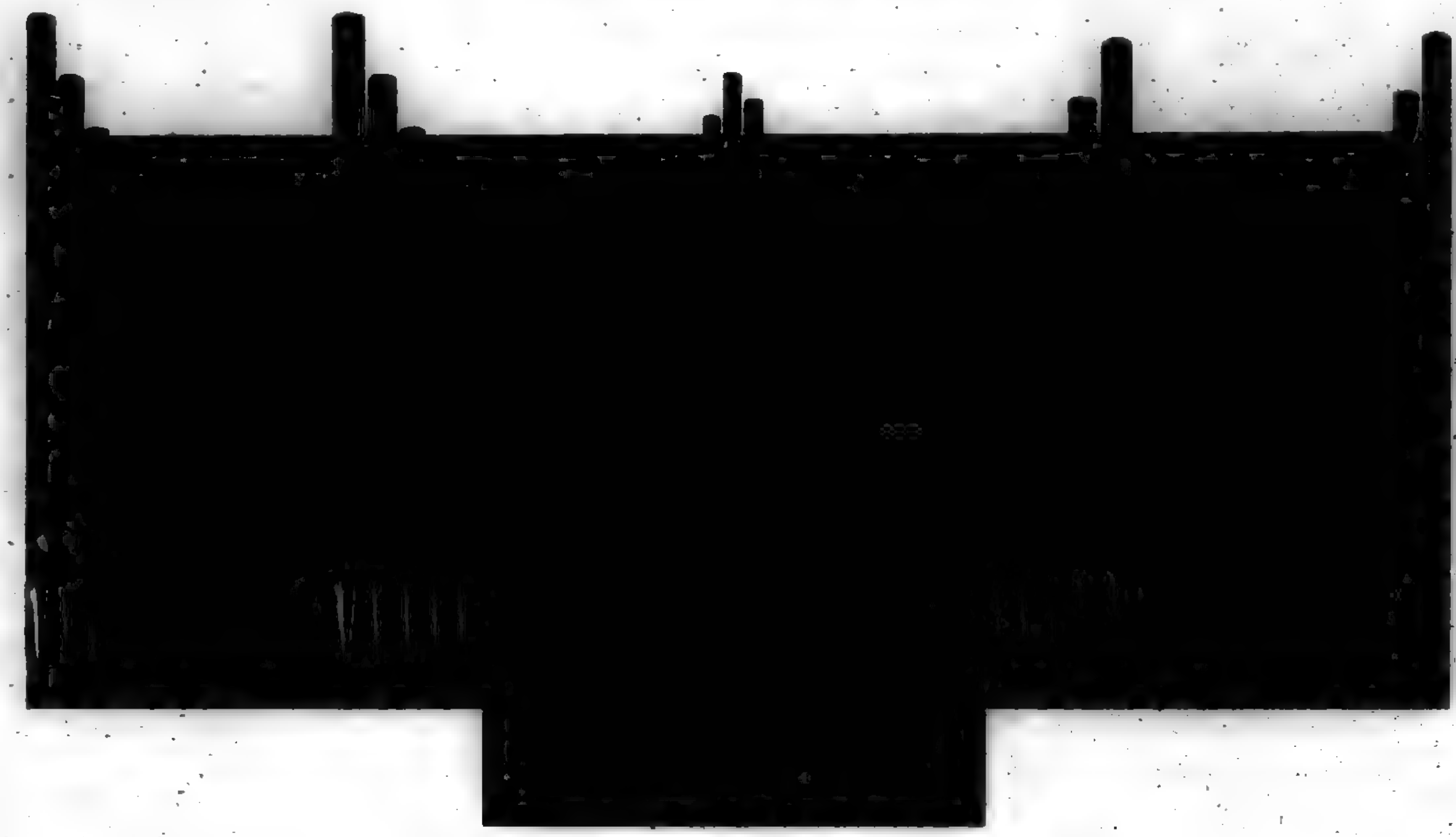

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HARD TALK
Donna Raimondi
CW Senior Writer

Knee-deep in hyperbole

I have spent the last couple of weeks trying to track down parallel minicomputers, the wunderkind that everybody is buzzing about. Well, it's mostly buzz.

Outside of a few university research centers and maybe one or two vendors, parallel processing is not commercially available. That fact, however, does not deter public relations flacks from claiming that their multiprocessor is a parallel processor.

The same is true of reduced instruction set computer (RISC) technology. True RISC embodies a set of principles that includes a very small instruction set — say 31 instructions — and a number of other specific attributes. In the morass of literature that the marketing hypsters heap upon us here at *Computerworld*, one would think that nine out of 10 new machines were RISC machines. Nothing could be further from the truth. The two companies — Pyramid Technology Corp. and Ridge Computers, Inc. — that come even a wee bit close to RISC have approximately 100 instructions in their instruction sets.

Software companies by the dozens claim to be enlightening the data processing world with artificial intelligence or expert system products, when in fact so few real ones exist that AI is essentially a product of the future.

Ditto fourth-generation languages and the phrases "IBM-compatible" and "user friendly." In extolling the virtues of its memory expansion boards, Orchid Technology Co. claims they "breathe new life into the personal computer."

Continued on page 44

Putting Cray-2 to net use

Unix-based supercomputer works as network node

By James Connolly

Supercomputers are no longer just back-end processors sitting helplessly without a supermini or mainframe preprocessor. Instead, as early users of the Cray Research, Inc. Cray-2 are proving, the high-powered systems can be used as nodes on local-area and wide-area networks working alongside microcomputers, superminis and other supercomputers.

The Cray-2 can perform 250 million continuous calculations per second.

Unlike its predecessors in Cray's product line, the Cray-2 uses AT&T Unix, so early installations at the National Aeronautics and Space Administration's Ames Research Center at Moffett Field, Calif., and at the University of Minnesota Supercomputer Institute in Minneapolis have placed Cray-2s on Ethernet, Network System Corp.'s Hyperchannel and the U.S. Defense Department's Advanced Research Projects Agency Network (ARPANET).

The goals at Ames and at the University of Minnesota are to establish supercomputer centers that can serve local users as well as users in the public and private sector tied in through national networks.

Managers at both facilities, where the systems have been undergoing diagnostics

Continued on page 40

Vector Automation units bow

Cadmax-100 series workstations expand offerings

By Donna Raimondi

A new series of workstations has joined Vector Automation, Inc.'s Cadmax family of computer-aided design and manufacturing systems.

Vector Automation of Baltimore said the Cadmax-100 series includes an entry-level Cadmax-110, the intermediate Cadmax-120 and the full-function Cadmax-130 model.

The series replaces the Cadmax-IIB and Cadmax-M systems.

All three workstations include Vector's proprietary software for design and drafting. Each configuration is field upgradable to the next level, and all may be intermixed within Cadmax's local-area network, according to the vendor. Each workstation features a 21-in., 4,096- by 4,096-pixel display.

The entry-level system includes a single processor with 1M byte of main memory, a 31M-byte fixed disk and a 2.5M-byte floppy disk. It costs $27,500.

The $37,900 dual-processor intermediate system includes a host processor and a terminal processor, each with 1M byte of memory, a 31M-byte fixed disk and a 2.5M-byte floppy disk.

The top-of-the-line model costs $46,800 and includes a dual-host processor and a terminal processor. Included with each is 1M byte of memory, a 62M-byte fixed disk, a 14.5M-byte tape cartridge and Cadmax's Bill of Materials software package, the vendor said.

INSIDE

Workstations based on IBM's Personal Computer AT and DEC's Microvax II superminis debut from GE's Calma division/40

NEW THIS WEEK

- DEC introduces its Packaged Automation System family of MicroPDP-11s
- Motorola unveils two supermicros
- Xerox announces a CAD system
- For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"I compare myself to sheriffs in the Old West who protected the women and children for very little money. I am the sheriff of the Wang world."

— Hank Berkley
publisher of
Wang-independent
'VS News'

Culler Scientific Systems unwraps Culler 7 family

Units span supermini, supercomputer gap

By Donna Raimondi

SANTA BARBARA, Calif. — Culler Scientific Systems Corp. has unwrapped a family of six systems that is said to span the gap between superminicomputers and supercomputers.

The Culler 7 family ranges from a $250,000 low-end server for Sun Microsystems, Inc. networked workstations to a four-processor, $990,000 supercomputer. It is geared to scientific and engineering environments, particularly for modeling and simulation tasks.

The four high-end systems handle both scalar and vector tasks, a spokesman said. Million instructions per second (MIPS) and million floating-point operations per second (MFLOPS) ratings range from 7 MIPS, 2 MFLOPS for the entry-level machine to 36 MIPS, 16 MFLOPS for the top of the line.

Early products funded by government

Culler was founded 16 years ago by Glen Culler, who is said to be the father of array processing, according to a company spokesman. The company's early products — signal processing, speech processing and simulation engines — were funded largely by government agencies. A total of $16.3 million in funding for the Culler 7 line has been provided primarily by Adler & Co. and the F. Eberstadt & Co. investment firms in the past two years.

The Culler 7 architecture is said to capitalize on parallelism found in repetitive codes such as vectors and DO loops, the company said. The system employs a number of parallel computational resources that allow execution of several complete instructions within a machine clock cycle. Mathematical functions have been built into the hardware and firmware.

The company's CSD operating system is a version of University of California at Berkeley Unix 4.2 that has been enhanced, according to a spokesman.

System components

Components of the systems include a user processor, which is a 64-bit computational processor; a kernel processor dedicated to the operating system; a memory subsystem composed of kernel memory, global data memory, program memory and array memory; and two high-speed 64-bit system buses (a staging bus and a data bus) to connect all user processors and data memory.

Also included is an I/O storage subsystem, one disk and one tape, attached via a multibus. A system can have one to eight drives, and each drive has a 430M-byte capacity with an average access time of 18 msec. The tape is a dual-density 1,600/6.2K bit/in. streaming drive.

An Ethernet local-area network connection is standard on each model, and the system supports the Department of Defense's TCP/IP as well as its Advanced Research Projects Agency Network, File Transfer Protocol and Telnet. Two compilers — Fortran 77 and C — are available.

Between the low-end Model W and the high-end Model 40 are the $297,000 Model 5; the $397,000 Model 10 that includes a vectorizing compiler; the $575,000 dual-processor Model 20 and the triple-processor Model 30 that costs $855,000.

GE subsidiary rolls out design units for manufacturers

General Electric Co.'s Calma Co. subsidiary has introduced two design workstations based on IBM and Digital Equipment Corp. microcomputers and focused on the automotive, aerospace, electromechanical and general manufacturing markets.

The systems are intended to be production-worthy computer-aided design and manufacturing and computer-aided engineering (CAE) workstations that take advantage of hardware trends allowing for lower cost and higher performance, according to officials of the Milpitas, Calif.-based Calma.

Calma's Draftstation was designed as a low-cost two-dimensional drafting workstation. Based on the IBM Personal Computer AT, it is targeted to new users who need 2-D capability and to Calma's existing customer base for use as a complementary system with three-dimensional systems.

The Draftstation runs IBM PC-DOS 3.1 and can be operated on a stand-alone basis or in a local-area network. It consists of an IBM Personal Computer AT with 512K bytes of memory, a math coprocessor, a 20M-byte hard disk drive, a floppy disk drive, a 32-bit graphics processor capable of simultaneously displaying 16 colors, five expansion slots, a 19-in. monitor featuring 1,024- by 1,024-pixel resolution, an IBM-compatible keyboard and a tablet with stylus. The software was developed by GE. The Draftstation costs $27,450.

Calma also introduced a CAD/CAM/CAE system using a DEC Microvax II supermicro. The system, intended for use in mechanical, architectural, engineering and construction businesses, runs Calma's Design, Drafting and Manufacturing (DDM) and Dimension III architecture, engineering and construction software and Dynamics Research Corp. I-Deas 3-D mechanical engineering and design package.

The Microvax II system is an extension of Calma's DEC-based product line, which includes VAX-11/785-based systems. The product was designed to operate in an office environment as a network node for distributed CAD/CAM/CAE operations. It also operates as an entry-level, stand-alone system.

The Microvax II-based system supports up to three of Calma's GPS100 graphics stations, a product announced with the Microvax-based product. A standard configuration includes a Microvax II with 5M bytes of main memory, three of DEC's 71M-byte RD53 hard disk drives, a DEC TK50 95M-byte cartridge tape drive, an interface to DEC's Decnet and Ethernet, a DEC MicroVMS 4.1 license, a GPS100 station, a system console and a DDM software license. It costs $150,000 and will be available in the U.S. in November and in Europe and Asia during the first quarter of 1986.

From page 39

Users put Cray-2 to network use

before going into production, reported that installations went smoothly last month.

At Ames, a four-processor Cray-2 with a memory capacity of 2G bytes was installed and will be a building block for NASA's Numerical Aerodynamic Simulation (NAS) project, which was planned as a national facility for computationally intensive research in areas such as aerothermodynamics, computational chemistry and atmospheric modeling.

NAS projects office manager Ron Bailey reported that the Cray-2 will be integrated with Amdahl Corp. 5840 mainframes, Digital Equipment Corp. VAX-11/780 superminis and Silicon Graphics, Inc. workstations on a national NASA network. Bailey said preliminary work such as installing Fortran code, system software and networking software is continuing and that the configuration, including remote links, should be completed by next summer.

Cray-2 set for development use

In Minneapolis, Supercomputer Institute Director Peter Patton said a uniprocessor Cray-2 is scheduled to be ready for full use as a development machine in early November. That machine, which had been used earlier as a development machine at the U.S. Department of Energy's Lawrence Livermore Laboratories in Livermore, Calif., until that laboratory received its permanent four-processor Cray-2, will be joined in December by a four-processor Cray-2 now being built by Cray as a production machine for the Supercomputer Institute.

In each case, the Cray-2s are being installed in temporary quarters while NASA and the university build new supercomputer center buildings.

For NASA, the new NAS project means "starting at ground zero," according to Bailey. The NAS Cray-2 is not replacing another supercomputer and has no existing configuration into which it fits. Like the university, NASA will partially finance the supercomputer project through usage fees paid by government agencies, private companies such as aircraft manufacturers and university researchers throughout the U.S.

For NASA, those fees would be for the use of the existing NASA Program Support Network, on which the

Continued on page 44

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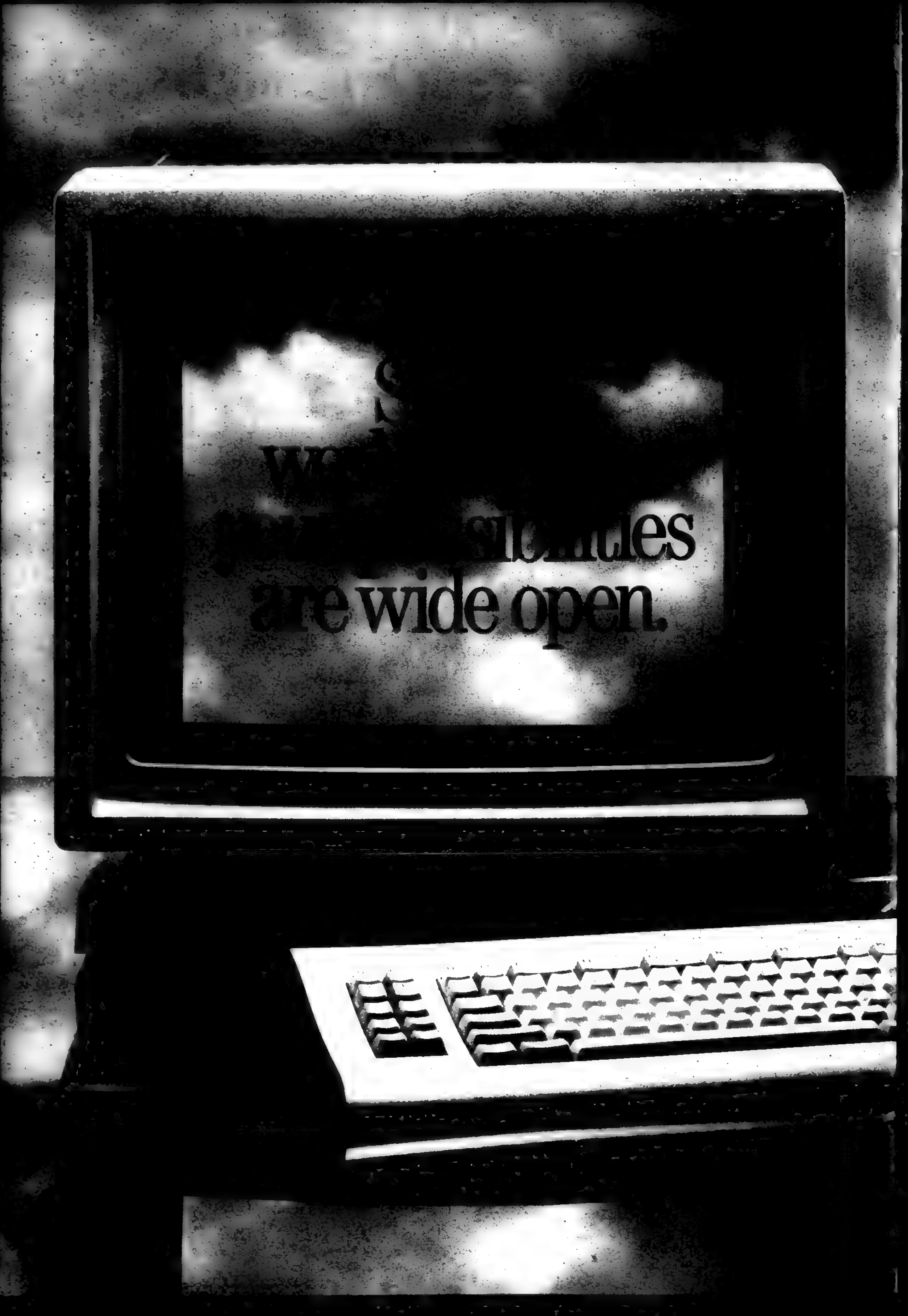
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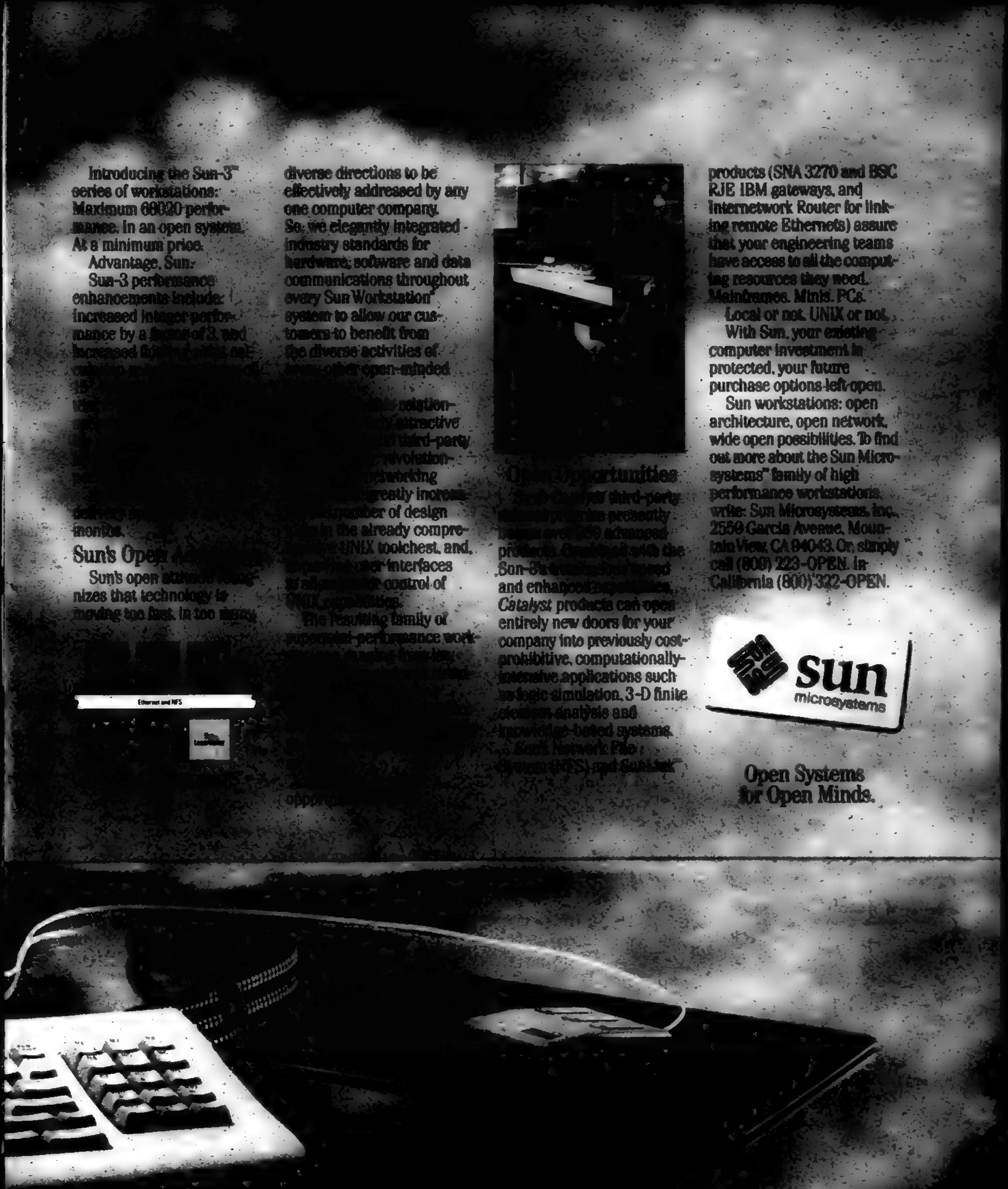

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From page 40

Users put Cray-2 to network use

Ames supercomputer will be one resource. In addition to the NAS project, NASA has several other supercomputers at Ames, which will be linked to the Cray-2 through gateways.

Bailey said the inclusion of Unix in the Cray-2 will best allow NASA to take advantage of the system.

"We set out our objective early on; we want to have a common user interface. We didn't want to have users jumping from one operating system to another, and we didn't want to get locked into one vendor," he said.

Access through ARPANET, Ethernet

Users on the NASA and Minnesota supercomputers will access the systems through ARPANET and Ethernet and using the Department of Defense TCP/IP.

While much of the massive quantities of data will be input through 9.6K bit/sec. communications lines or carried on ½-in. tape, the users will be able to run their applications by addressing the supercomputer as if it were any other device on the network.

Patton said, "The Cray-2 [represents] quite a different philosophy in computing in that it doesn't require a front end like the old supercomputers did because the Unix is fully interactive. So now the question arises of how much interactivity you want to support on a machine this large and this fast.

"So what we plan to do is to front end not in the environment sense like you would with an [IBM] 3084 or a [Control Data Corp.] Cyber 845, but in a communications multiplexing sense, where you have an array of VAX-11/750s with each VAX handling 16 to 32 users. The VAXs will handle the multiplexing and accounting and all of that kind of work, but they won't do job setups and file transfers. Those will all be done on the Cray," he said.

Patton said the 2G-byte (256-million-word) memory capacity on the Cray-2 due in December is so much more than that of the earlier Cray-1 that it eliminates the need for a front-end machine that "constantly worries about managing the memory banks."

"We've challenged our users to think of problems that can use the 256 million words on the Cray-2, and so far nobody has thought of anything that can use more than 40 million words of memory," Patton added.

Fluorocarbon cooling system

Patton and Bailey said the Cray-2's innovative fluorocarbon cooling system presented no problem during installation.

However, Patton did warn that opening the Cray-2 cabinet for even the few minutes required to replace a module causes a gallon of the volatile coolant to evaporate, at a cost of $400 per gallon.

The institute is trading in a Cray-1 toward the cost of one of the Cray-2s and hopes to replace its ETA Systems, Inc. Cyber 205 with the expected next-generation ETA-10, while acquiring what is expected to be Cray's next processor, the Cray-3.

Challenge of running jobs in parallel

Patton said one challenge for the Minnesota researchers is to run jobs in parallel while presenting a single image to the user. He said he knows of only two universities — the University of Minnesota and the University of Illinois — working on that problem with four-processor Cray X-MPs or Cray-2s. He said Minnesota is the only early Cray-2 buyer interested in using Unix in parallel processing.

But Patton said of the institute's long-term plans, "Our goal is to establish computational science as a third branch of discovery alongside theoretical science and experimental science. We see this Cray-2 and the other supercomputers as offering the possibility of what John von Neumann foresaw as a mathematical laboratory in which we can frame experiments and test hypotheses.

"We are pushing into what we call computational science and computational engineering. It's possible now to do engineering design of systems on a scale where we have never done it before, to emulate several parts of some complex system at the same time."

From page 39

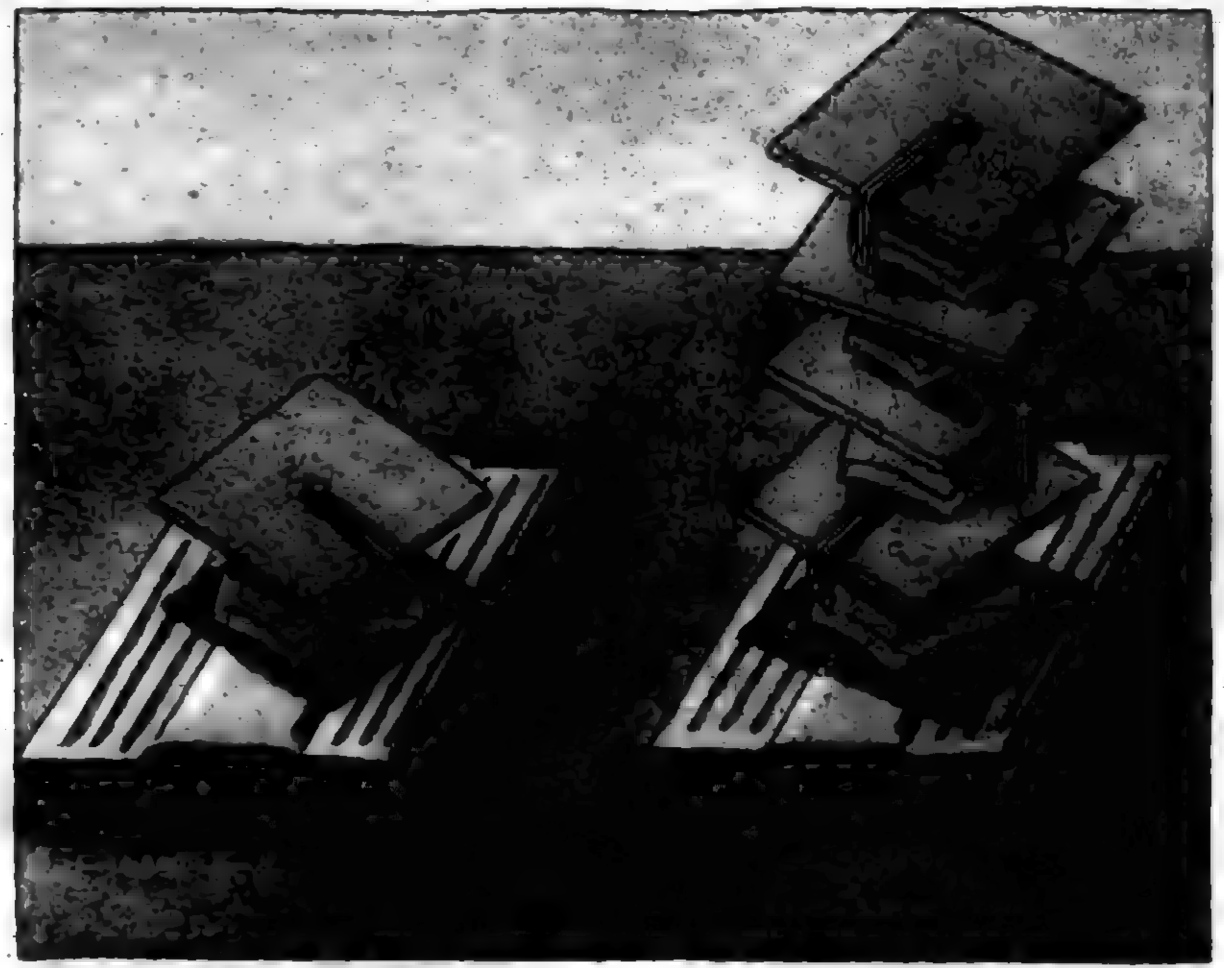
Knee deep in hyperbole

Four out of five vendors claim that, for "the first time ever," a product that has several dozen peers is about to "revolutionize the marketplace."

The marketing hype almost obscures the fact that some of these products are good, some even excellent. It is difficult to separate fact from the public relations people's own special brand of fantasy, even within a company.

"Usually, when two technical people get together, like when I get together with one of my colleagues . . . then the [term] 'parallel computer' is ambiguous, because it has so many meanings that we don't [think of it] as having any semantic value," said Gary Feilland, director of advanced development at Sequent Computer Systems, Inc. "But in a marketing sense, people kind of make . . . a big deal about parallel or not parallel," he added.

From a user point of view, the terminology can be very misleading. A busy MIS manager who is trying to keep abreast of new technologies or the state of the art in a particular technology had better have a sturdy shovel to help him sort out what is real from what is, well, let's call it hyperbole.



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Financial service firm banks on DBMS to manage net

Supports data traffic among remote users

NEW YORK — Citibank NA is using relational data base management software to manage its private packet-switched telecommunications network, a system that supports data traffic between Citibank operations on six continents and provides customers and employees with access to bank services from remote terminals.

The DBMS had to meet several objectives, according to Walter Grifel, a Citibank vice-president. Among those requirements, he said, were the ability to determine how much traffic was on the network and where it was going, the ability to provide a breakdown of costs and usage in a way that meets Citibank's accounting needs and the ability to provide network managers with on-line access to the data base.

Citibank chose Logica Database Products, Inc.'s relational data base system, Rapport. It runs on a Prime Computer, Inc. 550 minicomputer at the bank network control center in New Jersey.

Grifel said that Rapport is used with on-line network usage data to analyze network utilization, the percentage of errors on lines and the availability of the network. The data base, he said, also provides reports that show these figures for all network components and can generate ad hoc reports on a user-request basis using its menu-driven report generator.

[illegible]

Application: Data base management system

Business: Financial services

User: Citibank NA

A complete inventory of network components and their relationships is also maintained.

Because of the complex and matrix-like relationship of the elements of the data base, a relational system was the best choice for a DBMS, Grifel said.

"The four most important reasons [why it was chosen] for the Citibank implementation were decreased time scales for implementation, availability of application development aids, ease of use of output reports and ad hoc report generation," Grifel explained.

No other packages investigated

No other relational DBMS packages were investigated prior to the purchase of Rapport, Grifel acknowledged, because there is "not much available for Prime [minis]" in that area.

Citibank estimated that the majority of the MIS implementation work was completed in three to four months and that development of an equivalent system using traditional methods would have taken more than a year.

He said he was satisfied with the software's flexibility of design and found that Rapport required only two, rather than three, files to be established when Citibank decided to add in extra security features. Three separate files would otherwise have required three different entries to update the system.

Grifel said that the firm liked the availability of such application development aids as a fourth-generation language that "dramatically diminished time scales for implementation." Other development aids used by Citibank with the DBMS include a screens package and a report writer.

Grifel said he expected time savings in system operation as well. This is because the fourth-generation language will allow Citibank MIS staff members to extract data and write special reports for themselves rather than have a specialist write a program for them.

"Because reports were able to be generated very soon after [the] implementation of the [DBMS] began," he noted, "they could be shown to eventual users and their comments and changes taken into account from an early stage in the data base design."

Ability to query the data base

Also appreciated was Rapport's ability to query the data base in unforeseen ways, Grifel said. Citibank, he said, specifically sought the capability to compose reports on new relationships between data on the system without affecting the structure of the data base.

The system's security, another plus, can protect the data sought down to the data base element level, rather than the usual file or record level, he said.

As an example of how Citibank plans to use the system, Grifel pointed to situations where users are finding congestion on a particular route at a particular time of day. The data base system could be used to generate reports to determine the source of the traffic and suitable alternate routes.

It could also be used for modeling alternative routing patterns to determine their effects.

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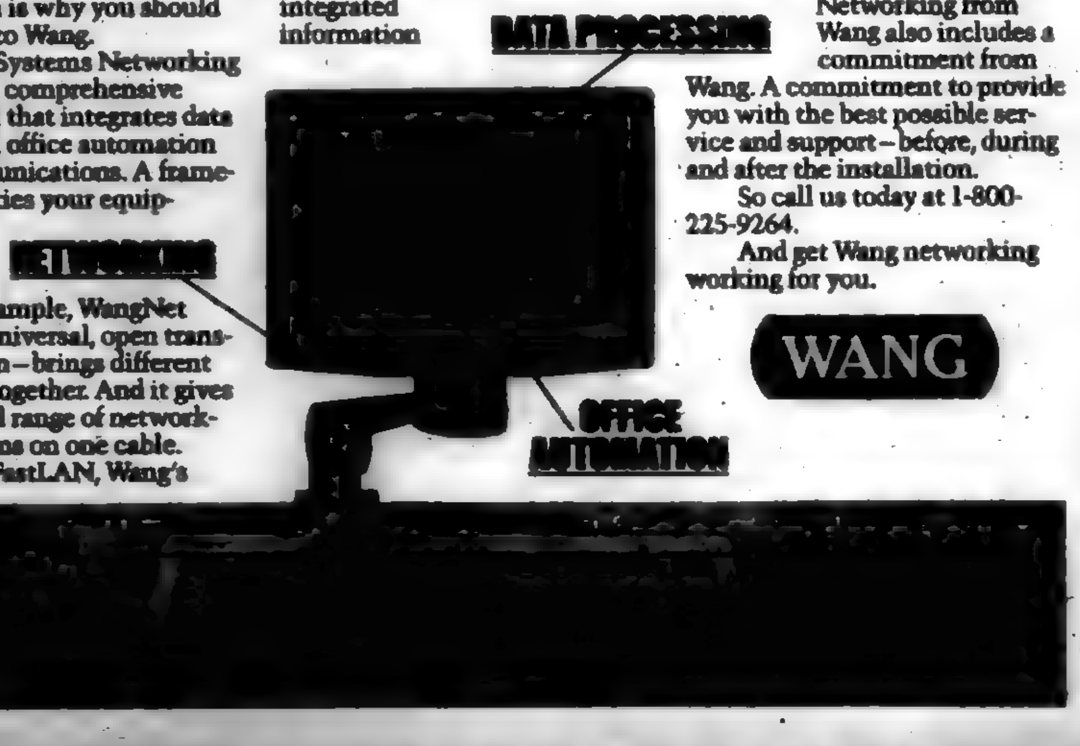

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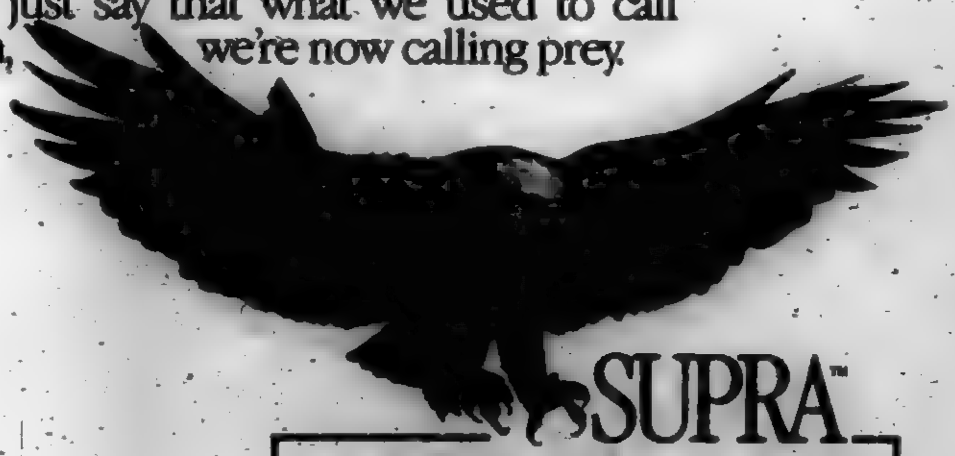

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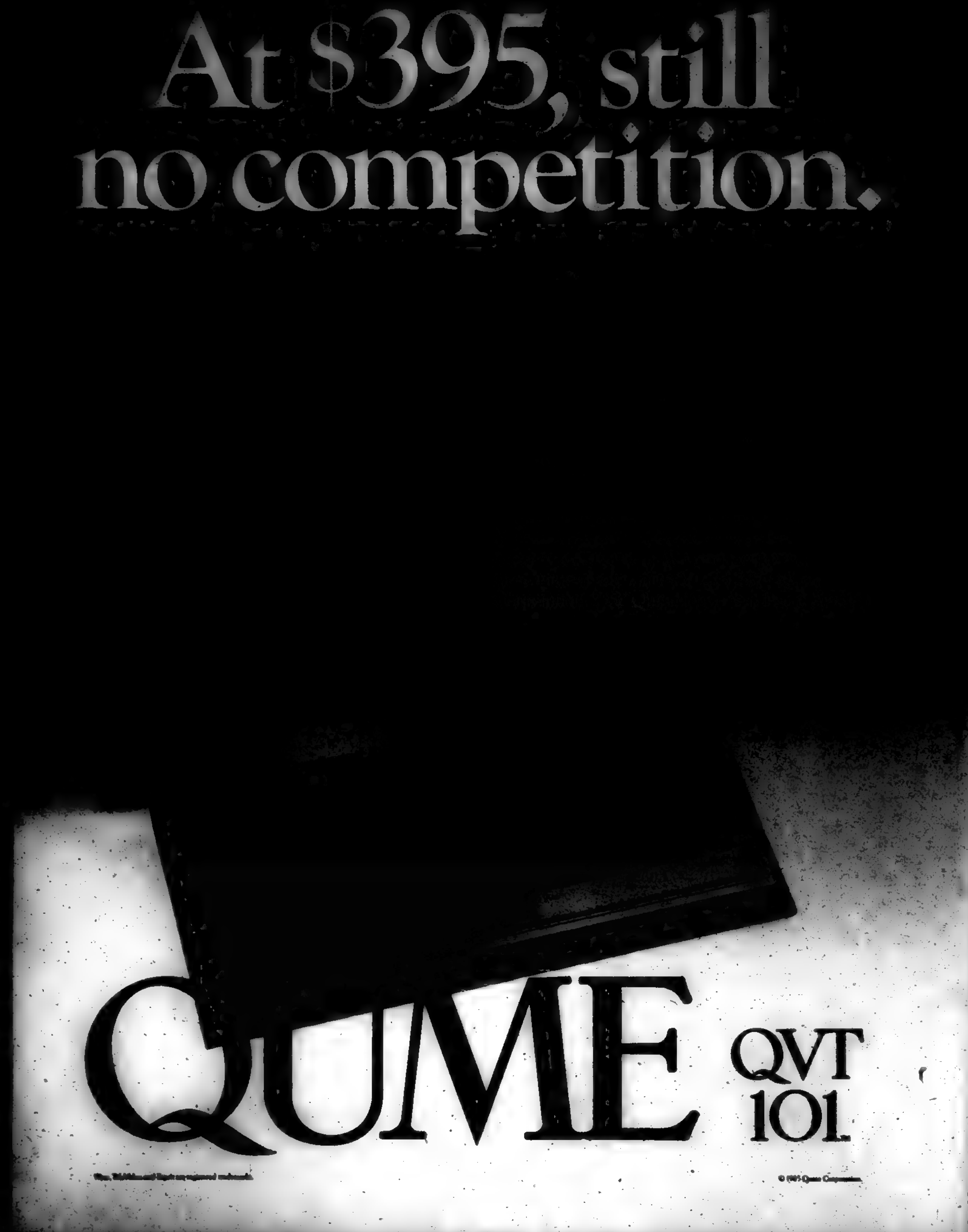

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CALENDAR

WEEK OF NOVEMBER 10

NOVEMBER 11-13, ATLANTA — **Improving Computer Based Accounts Payable Systems.** Contact: Vern Lautner, American Management Association, 135 W. 50th St., New York, N.Y. 10020.

NOVEMBER 11-13, CINCINNATI — **Mainframe Networks.** Contact: Gloria Slyfield, Federation of NCR Corp. Users Groups, Mail Station SDC-2, Dayton, Ohio 45479.

NOVEMBER 11-13, WASHINGTON, D.C. — **Conference on Software Maintenance (CSM '85).** Contact: CSM '85, c/o Institute of Electrical and Electronics Engineers, Inc. Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

NOVEMBER 11-15, SAN JOSE, CALIF. — **First International Conference on Computer Workstations.** Contact: Institute of Electrical and Electronics Engineers, Inc. Computer Society, West Coast Operations, 10662 Los Vaqueros Circle, Los Alamitos, Calif. 90720.

NOVEMBER 13-15, PHOENIX — **Long Range Information Systems Planning.** Contact: Vern Lautner, American Management Association, 135 W. 50th St., New York, N.Y. 10020.

WEEK OF NOVEMBER 17

NOVEMBER 18-19, BOSTON — **Software Tools Conference for Artificial Intelligence/Expert Systems.** Contact: Warren Briggs, Conference Chairman, Suffolk University, Boston, Mass. 02108.

NOVEMBER 18-19, SAN FRANCISCO — **Real Estate Investment Opportunities for Financial Institutions.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 18-22, ARLINGTON, VA. — **Tutorial Week Washington '85.** Contact: Martez A. Camilleri, Institute of Electrical and Electronics Engineers, Inc. Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

NOVEMBER 18-22, HOUSTON — **Structured Systems Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

NOVEMBER 18-22, SAN FRANCISCO — **Database Management Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

NOVEMBER 20, BOSTON — **T-1 Carrier Strategies.** Contact: DMW Group, Inc., Seminar Division, 2020 Hogback Road, Ann Arbor, Mich. 48104. Also being held Dec. 3 in Los Angeles.

NOVEMBER 20-21, ROSEMONT, ILL. — **Network Management/Technical Control.** Contact: Louise Myerow, Registration Manager, CW/Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

NOVEMBER 20-24, LAS VEGAS, NEV. — **Comdex/Fall '85.** Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

NOVEMBER 21-22, SAN FRANCISCO — **Import/Export Financing for the Small to Mid-Sized Bank.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 21-22, WASHINGTON, D.C. — **PC as a Programmer/Analyst Workstation.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

WEEK OF NOVEMBER 24

NOVEMBER 25-27, ATLANTA — **Strategic Analysis, Planning and Forecasting on the Personal Computer.** Contact: Vern Lautner, American Management Association, 135 W. 50th St., New York, N.Y. 10020.

NOVEMBER 29 - DECEMBER 1, PACIFIC GROVE, CALIF. — **Forth Modification Laboratory Conference.** Contact: Forth Interest Group, P.O. Box 8231, San Jose, Calif. 95155.

WEEK OF DECEMBER 1

DECEMBER 2-3, CHICAGO — **Application Prototyping: A Key to Successful Systems Development.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

DECEMBER 2-5, BURBANK, CALIF. — **IMS/ADF II Application Development.** Contact: IMS Consulting, Inc., Suite 305, 16601 Ventura Blvd., Encino, Calif. 91436.

DECEMBER 2-5, NEW ORLEANS — **Global Telecommunications Conference — Globecom '85.** Contact: Tommy Mayne, Globecom '85, Canal Place One, New Orleans, La. 70130.

DECEMBER 2-6, ATLANTA — **Structured Analysis & Design Techniques Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

DECEMBER 2-6, NEW YORK — **CICS/VS Command Level Programming Course.** Contact: Bob Warwick, Branch Manager, Computer Assistance, Inc., 130 W. 37th St., New York, N.Y. 10018.

DECEMBER 2-6, WAKEFIELD, MASS. — **Tutorials for Professional Development.** Contact: Association for Computing Machinery, Tutorials for Professional Development, P.O. Box 9209, Church St. Station, New York, N.Y. 10249.

Continued on page 52

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Calendar

DECEMBER 2-6, WASHINGTON, D.C. — **Defense Computers and Graphics.** Contact: World Computer Graphics Association, Inc., Suite 399, 2033 M St. N.W., Washington, D.C. 20036.

DECEMBER 3-4, BATON ROUGE, LA. — **Bank Director's Seminar.** Contact: Peggy Meyer, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

DECEMBER 3-5, NEW YORK — **Telemarketing/East.** Contact: Philip Carroll, Telemarketing East/West, Inc., P.O. Box 329, Arnold, Md. 21012.

DECEMBER 3-6, DALLAS — **North American Telecommunications Association (NATA) 1985 Convention & Exhibition Showcase.** Contact: NATA Convention Department, Suite 550, 2000 M St. N.W., Washington, D.C. 20036.

DECEMBER 3-6, NASHVILLE, TENN. — **ATMS, The Electronic Delivery Systems Conference.** Contact: Peggy Meyer, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

DECEMBER 4-5, PALO ALTO, CALIF. — **California Computer Show.** Contact: Norm DeNardi Enterprises, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

DECEMBER 4-5, PHOENIX — **Arizona Electronics Expo.** Contact: Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

DECEMBER 5, DALLAS — **CDLA's Regional Reception.** Contact: Dianne L. Sims, Manager of Convention Planning, Computer Dealers and Lessors Association, Inc., 1212 Potomac St. N.W., Washington, D.C. 20007.

DECEMBER 5-6, BOSTON — **Local Area Networks.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 5-6, WEST PALM BEACH, FLA. — **Data Administration: Development and Practice.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 5-6, SAN FRANCISCO — **Integrating Voice and Data in the PBX.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521. Also being held Dec. 12-13 in New York.

DECEMBER 5-6, WASHINGTON, D.C. — **Introduction to Telecommunications Systems: Technologies and Applications.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

WEEK OF DECEMBER 8

DECEMBER 8-11, CHICAGO — **1985 Fall Industrial Engineering Conference.** Contact: Stephanie Starr, Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

DECEMBER 9-10, DALLAS — **PC/MIS Managers Speak Out!** Contact: Ken Orton, Future Computing, Inc., 8111 LBJ Freeway, Dallas, Texas 75251.

DECEMBER 9-10, WEST PALM BEACH, FLA. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 9-11, SAN FRANCISCO — **Telecommunications Management.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 9-11, WASHINGTON, D.C. — **Financial Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

DECEMBER 9-13, MIAMI BEACH, FLA. — **The 2nd Conference on Artificial Intelligence Applications.** Contact: Trade Associates, Inc., Exposition Management, Suite 200, 12250 Rockville Pike, Rockville, Md. 20852.

DECEMBER 9-13, LOS ANGELES — **Telecommunications and Communications Engineering Program.** Contact: University of California at Los Angeles Extension Department of Engineering and Science, P.O. Box 24901, Los Angeles, Calif. 90024.

DECEMBER 9-13, NEW YORK — **VTAM for Practitioners.** Contact: Judith Anderson, American Data Group, Inc., 3685 Woodberry Drive, Duluth, Ga. 30136.

DECEMBER 10-12, TOKYO — **Interface in Japan.** Contact: Peter B. Young or Linda M. Yogel, The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

DECEMBER 11-13, ANAHEIM, CALIF. — **Dexpo West '85 — The Eighth National DEC-Compatible Exposition.** Contact: Carol Henderson, Expoconsul International, Inc., 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

DECEMBER 11-13, WEST PALM BEACH, FLA. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 12-13, SAN FRANCISCO — **Financial Analysis for Telecommunications Equipment Acquisition.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 12-13, DALLAS — **Troubleshooting the Data Communications Networks.** Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940. Also being held Dec. 19-20 in Boston.

WEEK OF DECEMBER 15

DECEMBER 16-18, NEW YORK — **Data Analysis & Logical Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2900 N. Loop W., Houston, Texas 77092.

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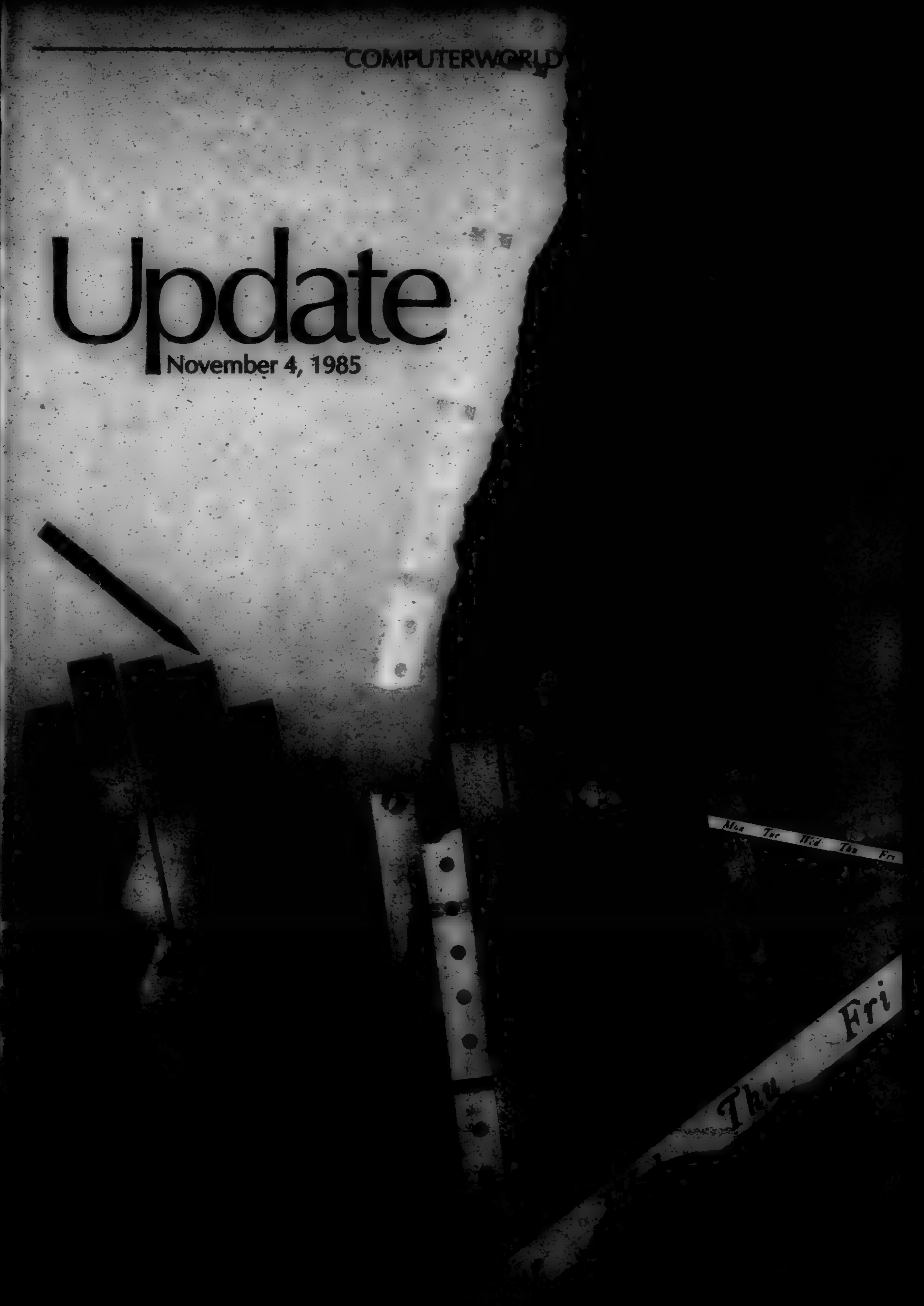
COMPUTERWORLD

Update

November 4, 1985


Mon Tue Wed Thu Fri
Thu
Fri

All stressed out and nowhere to go

By Glenn Rifkin
Update Editor

Before companies can be expected to take action to relieve the strain, they must acknowledge the problem exists in the first place. DP/MIS managers face the dual task of working through the problems of high turnover, low productivity and unhappy workers while convincing management that the problem is real and will likely get worse before it gets better.

As head of data processing for a Boulder, Colo., construction firm, Marie Christine Suarez found herself in an increasingly stressful environment. Management wanted better bottom-line results from the data center but was unwilling to invest in even the most rudimentary productivity aids for Suarez and her staff.

"Management clearly didn't appreciate what I did," Suarez recalls. "They didn't really understand the technology and DP requirements. They'd listen to my complaints just to make me happy, but there were no great changes. The bottom line to them was just to make money, and with that attitude, we were not able to keep up with the state of the art in technology."

Feeling trapped in a no-win situation, Suarez recently left the company and became an independent programmer/consultant. Though she continues to encounter stress in her new assignments — such as time constraints for programming assignments — Suarez manages that stress by taking control of her work life. "When I'm coding for a long time and feel that I'm reaching the burnout level, I just walk away from it for a while," she explains. "I'll sleep late or find something else to work on. Just being out of the work environment makes a big difference."

At the Bank of Virginia, Doug Hudgins, vice-president of systems and programming, believes his group experiences the stresses typical to other DP departments and then some. The No. 1 headache is matching user expectations to results. "The process of estimating how long a project will take is very difficult," Hudgins says. "Also, there is no real understanding outside DP of what we do, and as a result, there is not much appreciation of what we do."

As part of the banking industry, Hudgins faces even greater pressure because deregulation in the past few years has changed the business dramatically. "It's a whole new ball of wax," he says. "Banking used to be federally regulated, but now it is market driven, and new products are being developed all the time. DP has to react quickly to each new twist and turn. If the bank across the street comes up with a new product, you have to have a similar product and fast."

Craig Brod, an Oakland, Calif.-based psychotherapist and author of *Technostress: The Human Cost of the Computer Revolution* (Addison-Wesley Publishing Co., 1984) believes that the roles of MIS/DP professionals are changing drastically within the industry and that the cost of that change is increased stress on the job. According to Brod, his interest in this phenomenon was piqued when, during a therapy session, a senior systems analyst suffering marital problems due to work-related stress pointed to his wife and said, "She makes a lousy peripheral."

Stress in DP/MIS is a given. Whether one believes, as DP managers tend to, that their profession is far more stressful than others is relatively unimportant. Of growing concern to both those in the profession and those who consult to it is what is causing the great stress and pressure within the data center, and how can it be controlled or alleviated.

As information systems become more and more integral to the functioning of major corporations, top management is forced to take a look at this troubling outgrowth of the computer age. Before companies can be expected to take action to relieve the strain, they must acknowledge the problem exists in the first place. DP/MIS managers face the dual task of working through the problems of high turnover, low productivity and unhappy workers while convincing management that the problem is real and will likely get worse before it gets better.

This *Computerworld* Update examines the causes and effects of stress in DP/MIS and offers solutions from those in the field and consultants who specialize in stress management.

In addition, Update presents an exclusive *Computerworld* survey of

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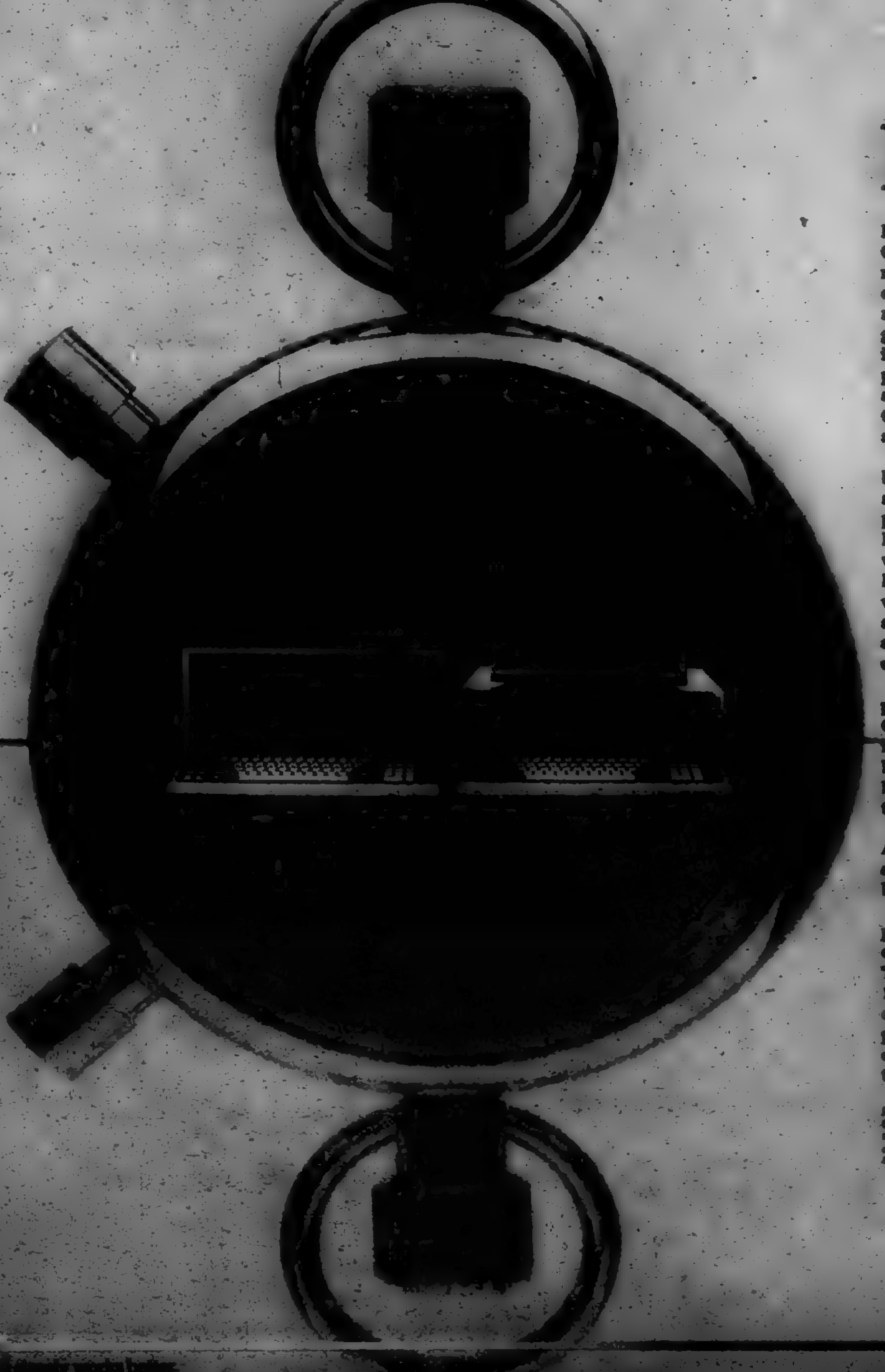

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Stress in DP/MIS: a CW survey

By James Connolly

An endless stream of demanding memos, tight budgets, three-year application backlogs and employees and systems that seem to quit together — these are the causes of DP stress identified in a *Computerworld* mail survey distributed to 1,000 management-level readers.

The respondents leave no doubt: They say their jobs are twice as stressful as those of their counterparts in other departments. Surprisingly, while many managers may complain publicly about their users, only 18.6% of those surveyed cite satisfying users or lack of user understanding as their greatest challenge. The emphasis remains on management issues such as budgets, organization and employee relations.

Among the survey's other findings are the following:

- Heavy work loads, backlogs, unrealistic demands and inadequate staff are the key causes for stress.
- There is an underlying feeling that DP/MIS managers work longer hours for no extra pay.
- The greatest challenges in DP/MIS management are traditional corporate issues such as dealing with upper management, employee motivation and staffing.
- Drug and alcohol abuse are present, but in such unremarkable degrees that they have little effect on DP/MIS management.
- Marital stress and psychological problems are more prevalent than drug and alcohol abuse but still minimally affect the manager.
- Exercise and recreation are the most common releases for stress, but there are almost as many other methods for relaxation cited as there were respondents.

DP vs. others

In the section dealing with the DP/MIS manager's peers, the questionnaire asked respondents to rate the degree of stress involved with their jobs as opposed to comparable jobs in their company and with DP/MIS jobs in general.

Nearly 60% of the respondents feel their own jobs are either "extremely stressful" or "highly stressful." A rating of "extremely stressful" comes from 16.3% of the respondents and a "highly stressful" rating from 40.4%.

Whether DP/MIS managers, who balance the interests of so many corporate masters while staying on the leading edge of technology, endure more stress than other managers is a question that remains unanswered.

But the feelings are clear: DP managers believe they are under much more stress than their management counterparts, whether in accounting, personnel or production, and more stress than other DP/MIS workers.

Only two of 11 factors listed in the questionnaire are cited by half of the respondents as "contributing greatly" to DP/MIS management stress. Those are "heavy work load" and "dealing with unrealistic demands." Backlogs are cited as contributing at least somewhat in 75.4% of the responses, keeping up with technology in 68.5% and "number of staff members" in 67.3%.

Some of the factors cited as causes of DP stress are general management concerns, as the survey shows. More than 50% of the respondents say staff turnover and size of DP staff are problems of the same concern or of less concern to DP/MIS as they are to other departments. But that same area of the questionnaire brought into greater play problems such as keeping up with technology and backlogs.

Nearly half the DP/MIS managers asked to compare their work loads with those of other managers say that they work about the same number of hours. Almost half (49.7%) of the DP/MIS managers say they work 40-49 hours per week, with another 37.9% saying they work 50-59.

Salaries

One underlying current of dissatisfaction rises to the surface in the section of the questionnaire dealing with salary. More than a third of the respondents (34.5%) believe their salaries are lower than that of other managers. Another 43.1% of the DP/MIS managers say their salaries are about the same as those of other managers. The primary reasons cited for any negative differential are, "MIS is not considered an important job function/not profit making." Some of those who indicate that they are well paid cite their educational backgrounds, their skills and the fact that without DP/MIS, the company would grind to a halt.

In looking at the challenges involved in running a DP shop, survey respondents most often cite the problem of communicating with upper management or dealing with a lack of upper management support (29.3%). But the DP managers also show that they are being squeezed from above and below, with almost as many (29%) citing challenges such as motivating personnel, hiring and training.

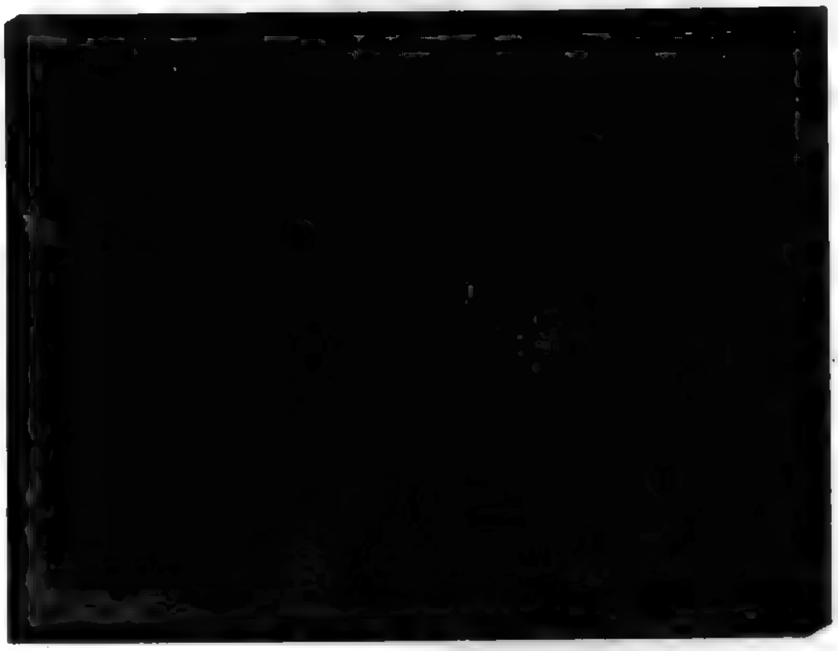
In the more than 100 cases where the DP managers cite problems that hinder their operations — whether their own or staff problems — marital stress and divorce are mentioned more than half of the time, followed by psychological problems, alcohol abuse and drug abuse.

Where there is stress, the DP/MIS managers offer a wide variety of solutions to alleviate it. More than half say they exercise, participate in sports or other activities. Also commonly mentioned are "organizing work load" and "family/friends."

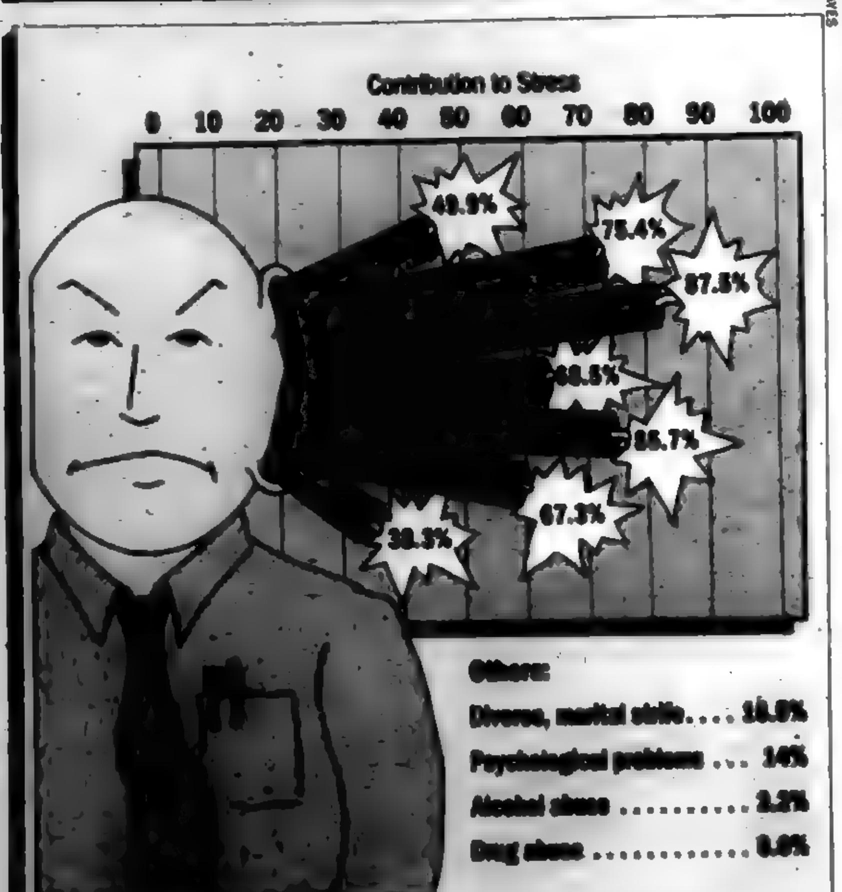
The respondents combat stress in various ways, such as reading, writing, travel, leaving work at the office, hobbies, religion and sleep. Some of the more noteworthy releases are "hack," "smoke a lot of cigarettes" and "yell." ■

Connolly is Senior Editor, Systems, for Computerworld.

BREAKDOWN OF DP/MIS MANAGERS' JOB STRESS RATINGS



FACTORS CONTRIBUTING TO STRESS IN THE DP/MIS MANAGER'S JOB*



*Figures represent percentage of DP/MIS managers who say each factor contributes at least somewhat to stress on the job.

CW Chart

MITCHELL J. HAYES

Profile of respondents

The "*Computerworld* DP Stress Survey" was conducted in September 1985. CW mailed questionnaires to a random sampling of 1,000 of its management-level readers and received 316 responses.

Of the respondents, 63.5% listed their titles as director, manager or supervisor of DP/MIS; 19% as systems manager or systems analyst; and 9.7% as director or manager of operations, planning or administrative services.

The managers had been with their firms for more than 10 years in 68.5% of the replies. ■

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Update

WHEN DO I GET INTO THE NETWORK?!
HEY THE NEW SHIPMENT OF ATS ARE HERE!
MY MUX! MY MUX! WHERE'S MY MUX!?
I JUST LOST EVERYTHING! GONE! ALL
GONE! KA-POOEY! HEY! WHEN'S MY

Continued from page 54

data processing professionals (see story page 56) focusing on stress and its causes.

The cause

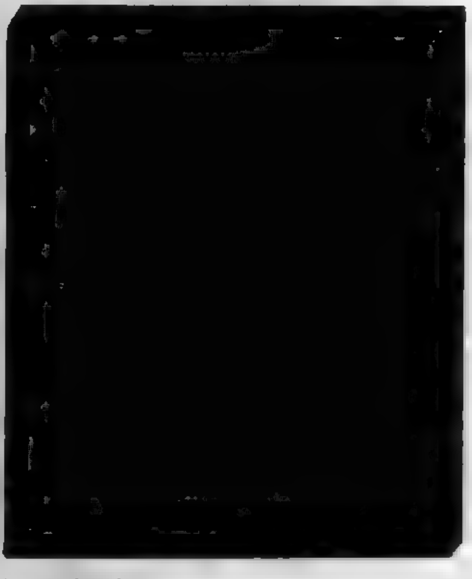
Longtime DP and MIS professionals tend to agree that occupational pressure historically has been high. And if it was bad in the past, it is now worse.

The reasons for increased stress in the computer-related professions are many. And for every general, industry-wide issue, there are likely to be as many specific, individual problems to match.

According to Michael Giannantonio, project manager in information systems for TRW, Inc. in Cleveland, the list of stress-causing problems is long and recognizable to virtually anyone in DP/MIS. Among the causes are the following:

- Tight deadlines.
- Trying to work within budget constraints.
- Finding and matching the right person to the right task.
- Sorting through company politics to find needed approvals and backing.
- Feeding the proper information to the right people.
- Knowing what the company's goals are and what the DP/MIS role should be in relation to those.
- Nonperformance of staff.
- Backlog.
- Unreasonable demands.
- Maintaining and upgrading the system.
- Keeping up with rapidly changing technology.

TOP 15 CONCERNS FOR DP/MIS PROFESSIONALS*



Clearly, any man vs. machine atmosphere is a potential hotbed for stress. As Pamela McGhee, president of McGhee Enterprises, a New York-based consulting firm, points out, DP is a constant, grueling test against the computer.

"Every project was due yesterday, and there is the endless struggle to get the system up, maintain it and handle activity on demand," McGhee says. "The atmosphere is often 'hurry up and wait.' Something is not important until it is hot, and then you have to go fast."

Ironically, though DP professionals believe they are in a high-stress environment, they seem to be unaware of the gravity of that stress. Gary Slaughter, a Tampa, Fla.-based consultant specializing in managing and motivating DP professionals, conducted a survey asking more than 1,000 DP workers to list the 15 most serious problems they contend with. Stress finished 13th (see chart this page).

Stress, however, can be an ambiguous term. Virtually every problem listed on Slaughter's survey results in stress of one sort or another. Rather than including stress as simply another problem, the survey may well have concluded that stress is the end product of all other issues on the list.

"I've found that DP pros bring on 95% of their own problems," Slaughter says. "DPers tend to characterize their environment as one of intense highs and extreme lows. They are eager to please, are high achievers and have big egos, and this causes problems in a lack of ability to control their own destinies. They overburden themselves and are unable to say 'No.' "

According to Brod, as MIS makes the transition from being an auxiliary-type function to an intrinsic part of the business, the pressure skyrockets. The days of the bearded, jean-clad techie manning an isolated service unit have changed. "I view this as a rise of a new 'cognitariat,' " Brod says. "People's brains, through information systems, are being tied directly to production, and that is an entirely new change for MIS. That has caused stress levels to climb."

Rapid changes are not easy for anyone to deal with, and DP is no exception. This new attitude of business toward information systems brings with it changes in how DP/MIS manages its function. "I'm observing that DP professionals are under greater pressure than ever in terms of bottom-line issues," says Madeline Weiss, a Washington, D.C.-based management consultant. "They are being asked to show how they are saving the company money, and this causes a lot of stress."

Adds John O'Connell, manager of the corporate data center at Montgomery Ward Co. in Chicago, "We have all the classic DP problems, and now there is much more emphasis to be productive and help make the company more competitive. That creates stress."

This need to be more competitive creates problems for DP people who are not generally considered interpersonally competitive, according to Harry Levinson, a clinical professor of psychiatry at Harvard Medical School in Cambridge, Mass., and president of Levinson Institute, a consulting firm in Belmont, Mass.

The use of computers has become more of a marketing than technical issue, Levinson asserts, and that shift has been difficult for people not used to an aggressive environment.

"The name of the game now is the bottom line," Levinson declares. "For DPers, there is a need to shift into a marketing orientation, and that means a great deal of stress. It lowers the self-image of people who always thought that their work should speak for itself."

Though CW survey results indicate otherwise, the spread of end-user computing is tagged by some as another leading cause of stress. According to Arthur W. Gutenberg, professor of management at the University of Southern California in Los Angeles, when central mainframes were the only source of computing in a business, DP held total control and "dictated everything." The proliferation of microcomputers "changed all the rules of the game."

Once they taste the fruits of computer power, users' appetites grow insatiable. Access to the mainframe data becomes a priority, and suddenly the controlled and secured data center begins to look more like a shopping center.

"Electronic data processing has to play an entirely new role," Gutenberg says. "And it is often not equipped to do that. The DP manager was given one set of rules when he was hired. In fact, he was hired for being good at [handling those rules]. But now he has to become a consultant. We're limited to the amount of change to which we can adapt, and when you are told that the rules are changing, it creates a lot of stress."

And if DP/MIS didn't have enough headaches handling the universal stress endemic to their new environments, it also must cope with the molehills and mountains specific to each company.

At Dataproducts Corp. in Woodland Hills, Calif., for example, Bill Strowbridge, vice-president of management information resources, was just finishing a complete redesign and reduction of his organization when business volume fell for the computer printer manufacturer. "We had to cut back drastically and got caught in a double dip," Strowbridge says. "It was very stressful for my people." Stress levels soared as employees felt themselves in a holding pattern and constantly feared layoff.

The stress was not confined to the staff either. Strowbridge himself felt the weight of the crisis more than anyone. "Layoffs are painful, and it really hurts to have to lay off people you brought in," he says.

The symptoms

> *Pressure on the computer worker can be enormous. When large companies computerize, slipups can be disastrous: the smallest error can disrupt a delivery schedule or misplace millions of dollars.*
>
> *Jack is a senior programmer for a large bank. When a new system goes on-line, he spends his nights in a motel near the bank so that if problems develop, he is nearby to fix them. Every night for weeks afterwards, even when he sleeps undisturbed, he dreams that he's received the dreaded phone call — "It blew up!" — and must jump out of bed to get the system running again before the entire staff comes in to use it.*
>
> — Craig Brod
> *Technostress: The Human Cost of the Computer Revolution*

Aside from an occasional sleepless night, some DP/MIS professionals, like workers in any field, respond favorably to certain levels of stress. Stress can be a motivation and challenge that helps alleviate boredom and complacency in a job. For the person with the innate personality and nature to handle it, pressure is welcome and often needed.

The line between positive and negative stress, however, is so fine that a person often crosses it unaware of the change. Soon enough, the signs manifest themselves. Research shows that too much stress can lead to physical problems in the form of high blood pressure, coronary artery disease, ulcers and other maladies.

Psychological problems, often more subtle, are an even more significant response to stress. According to Levinson, up to 80% of all the physical problems that a general practitioner sees are psychological in origin.

In her tenure in data processing, McGhee has seen such stress-related symptoms as hair-trigger tempers, decreased efficiency, job-hopping, burnout, increased absenteeism and a deterioration of personal relationships.

High rates of turnover are often attributed to the stress levels of DP although other factors have been noted as well, including high demand and low supply of talented personnel. Those who do leave a job because of stress are likely to move to

Continued on page 64

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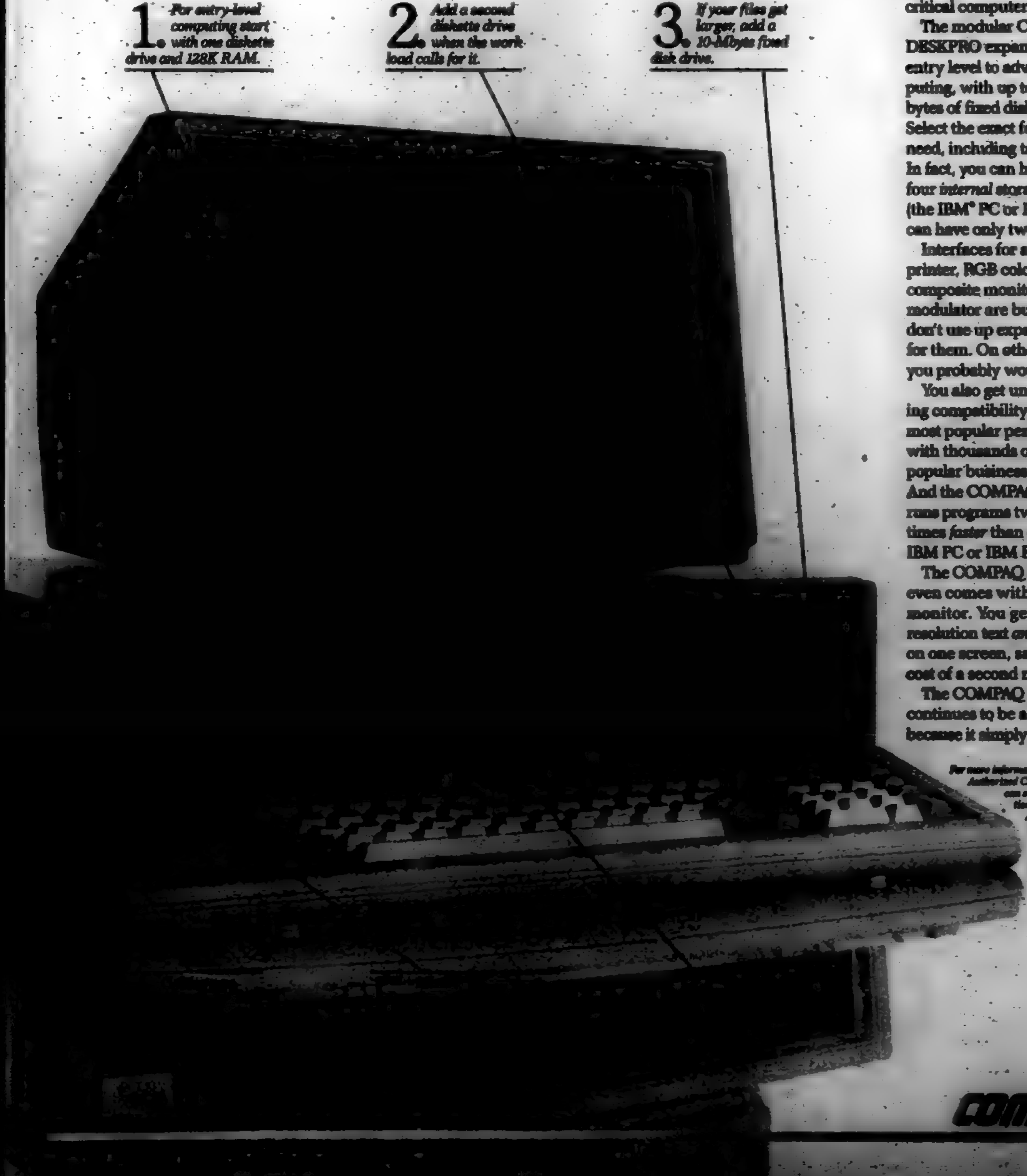
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Update

Stress in the computer age: An interview with Harley Shaiken

Professor Harley Shaiken of MIT's Sloan School of Management specializes in the field of labor and automation. He is a widely recognized authority on the effects that computerization and automation have had in the workplace. His work focuses on the interaction between management and labor over the issue of automation in a variety of work environments.

Shaiken, who authored the recently published Work Transformed: Automation and Labor in the Computer Age *(Holt, Rinehart, Winston), spoke to* Computerworld *Update Editor Glenn Rifkin about the effects of stress on today's DP work force.*

How much a factor is stress among white-collar workers today?
Stress is becoming unusually important in the white-collar workplace. As a matter of fact, it is becoming the equivalent of what silicosis was to coal miners decades ago. It is becoming a characteristic disease of work in the computer age.

Is stress greater for the DP/MIS professional, or does each white-collar position have its own equal set of stresses?
It depends on the specifics of the workplace certainly. As an overall, generic view of the problem, those [people that hold] jobs that tend to be routine or that can be electronically monitored are often those that exhibit the greatest stress after computerization. Those people who get to exercise creativity and control over their workplace exhibit fewer symptoms of stress.

Have you seen examples in which creativity was part of the job but the person did not have enough control to exercise that creativity?
That is one of the central examples of where stress is generated. When you have a job that requires a certain level of creativity, but the structure of the job and the way technology is introduced makes it difficult to exercise control over that creativity, there is great stress.

Stress is really a function of increased control over people in the workplace. It is the flip side of reduced autonomy.

Is this aimed at a certain level of worker, the mid-level manager, the top manager?
Absolutely. At the very top, senior positions, either in design engineering, in data processing or in the office, often these senior positions are enhanced by computerization.

But for mid-level managers on down, there are new constraints imposed on how the job takes place. Because very often mid-level managers exercise a great deal of authority based on their access to information and on knowledge about what is taking place in the work environment. Many computerized systems seek to bypass that and give top managers access to that data. Under those circumstances, the middle managers may remain but with their authority greatly reduced. It's in those kinds of situations that we see stress.

What about the issue of data processing itself being so vital to the organization that the pressure on it to produce a bottom-line asset has increased more than ever?
Yes, I have seen that very often. In a sense it is paradoxical because it is a result of the success of data processing and computerization in terms of rationalizing other functions. That is, in earlier years data processing was so new that the focus was not on what was happening among DP people. The focus was on how effective their output was. Now that that output has been demonstrably effective in productivity terms, there is new attention focused on the DP process itself. That is the paradox.

When you have a job that requires a certain level of creativity, but . . . the way technology is introduced makes it difficult to exercise control over that creativity, there is great stress.

Did this catch DP people unprepared?
Yes, for many DP people it's a new experience. Many people have grown up in the industry with a certain feeling of autonomy and control over their work lives. And all of a sudden we see that being directly confronted by an emphasis on control over the entire operation, not by the individual involved but by constraints that are established to essentially have greater managerial control over the function.

What are your suggestions for ways that people should or could better handle these stressful changes?
It's a mistake to put the adjustment problem on the shoulders of the individual. The central questions that have to be asked are organizational ones. They are independent of the technology.

Those questions are, What is the role of the individual worker or manager going to be in how new systems are implemented and used? Does the human being have a central role in which the technology, in this case computerization, is a very effective tool to carry out certain functions, or is the computerization itself central?

Do you see corporations making any changes in the data processing area to deal with the issues of stress, or are they lagging behind in recognizing it as a major issue?
There is a distinct lag in recognizing it as a major issue. To the extent that it's thought about at all, it's after the fact. It is very seldom a consideration as to how a system is designed and implemented. It's not formally raised as a central concern at the beginning. At times if there is really a very serious problem, it may be addressed but often rather late and in a limited way.

I believe things are going to get worse, not better, if this is let simply to sort itself out because of what we talked about earlier.

If anything, we are going to see a much greater emphasis on productivity, increases on rationalization and on the use of computerization that results in elevated stress.

What will data processing professionals do in response? Will they unionize to fight back or is that too radical?
That is certainly one possibility, though there are few concrete signs of that happening today.

Many people in data processing are used to a certain level of independence and control over their working lives. To the extent that is increasingly infringed upon, collective action or unionization is certainly one scenario that could very well affect the industry.

What are others?
There could be a great deal of individual discontent that manifests itself in higher turnover and lower productivity. It could be a combination of the two. It could be unionization and individual resistance.

DP is already an area that is known for high turnover. This is not something new. The question is, is it high turnover because these people know they are valuable now and jump from one job to another or is it because stress plays such a factor?
They are not exclusive. Both could happen. Someone could feel that he is more valuable than the way he is being treated, and, in addition, there is a lot of stress on the job. So he leaves.

It's not that data processing people are unused to or adverse to stress as a function of creativity. That's not the issue here. It's stress as a function of control.

Should companies seek outside help or clean up their own houses?
Certainly a combination of both is appropriate. But a combination of both in some cases may not be enough.

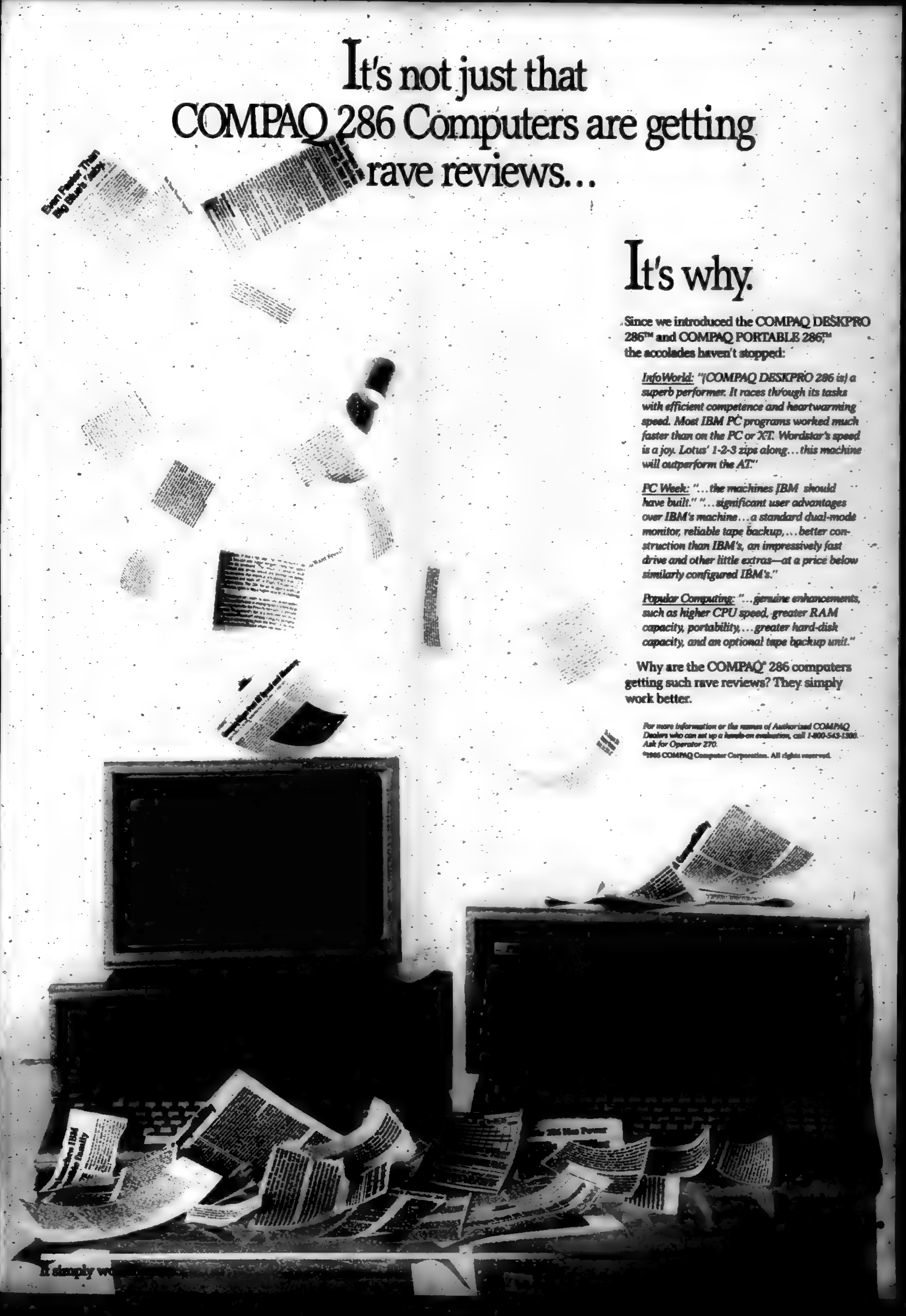
It's easy to ignore the issue of stress in a very competitive and technologically very rapidly changing situation. All the pressures are to focus on other issues.

Increasingly, another issue is the bottom line. To the extent that companies often, by competitive necessity, focus only on the bottom line, stress may be discussed but not in a way that is particularly integral to the design and organization of work.

The real question becomes, "How do you include the feelings of the data processors themselves in this process of designing new systems?" To the extent that that is not done, we are going to face a lot of very bad situations.

Have you seen examples of bad situations already?
Yes, absolutely. As we see more erosion of the quality of life on the job for many people, we are going to see employees in data processing exploring alternatives.

There is nothing inherent about data processing that means that it will forever be nonunionized, for example. Data processors in Sweden and in other areas of the world are often in unions. We may see that as one of the changes that takes place in coming years. We may see other changes. It's hard to predict a scenario. ■



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Update

End-user demands add stress

By Donald L. Frantz
Special to CW

"It seems DP people spend their whole careers selling change, and yet they're the very ones who often oppose it from others." This remark was made by Herb Allard, director of the Data Services Division for the state of Wyoming. We were discussing the impact that the expansion of end-user computing was having on the DP profession. The ever-growing use of personal computers, minis, intelligent terminals and information centers has brought about a whole new aspect of computing both to our users and to the MIS organization.

> *The confrontations we face with change and our associated stress are functions of our own individual attitudes.*

While computer professionals have long been familiar with the high-stress aspects of their jobs — generated by changing technologies, expanding work loads and critical time schedules — a new element of change has been introduced. Directors and managers of information services are facing challenges to their professionalism, their methods, their work loads and their budgets. And these challenges carry with them a very real source of pressure and stress.

Users are saying that they can do for themselves what the information services group used to do, but faster, cheaper and in a more responsive manner. They throw down the gauntlet and dare the computer professional to accept the challenge.

The purpose of this article is not to address the merits of these challenges or what our responses should be to the technical issues. Instead I want to take a hard look at the stress being generated by these events and see if we can understand better what really is happening there. With a clearer understanding, we should be better able to consider solutions that will allow us to handle that stress more effectively for the benefit of the individual manager, the information services group and the end users.

Fundamentally, the stress we see generated is the product of change. The change is directed now at the computer professional rather than at the end user. To handle this change we need to understand the change process and the various impacts we are likely to experience.

A simplified model of the change process suggests that we look at three major areas of impact: psychological, social and behavioral. These areas are all affected by the basic conflict between the organization's need to change to maintain economic vitality and our personal needs for maintaining a sense of security and preserving our self-esteem.

Noted management author Peter Drucker says, "Change is not only an intellectual process but a psychological one as well." Any change may alter the way in which we relate to and feel about what we are doing. The psychological impact of change focuses initially on our belief systems. Until now we have basically believed that we were fairly indispensable to our organization. Our technical skills and knowledge were unmatched. We alone were able to answer the technical questions and offer the solutions that the rest of the people in the organization so desperately needed (even if they did not recognize it).

But with the tremendous technical advances and the shift in general education to include computer literacy (starting in the first grade), we have suddenly found that our special expertise is not needed in the same way it was in the past. Our users have found user-friendly systems that allow them to find their own solutions to their problems, and they do not have to speak in hexadecimal to do it. And so we are faced with a very real threat to our self-image. The natural response is that of triggering our defense mechanisms. This automatically generates the stress of the "fight or flight" reaction.

This psychological defense reaction raises some very important questions that MIS management and the organization's top management need to resolve.

■ How is MIS supposed to sup-

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Frantz is president of Management Consulting Services in Franktown, Colo. He has designed and presented a series of workshops on communication skills and human resource development in the computer field.

Support reduces MIS strain

By Madeline Weiss
Special to CW

A survey I conducted among 241 management information systems managers revealed that work stress is widespread and detrimentally affects health and job satisfaction. Social support, whether from inside or outside the organization, is reducing symptoms of strain and improving job satisfaction among some MIS managers under stress. But that support is typically lower than that found among other groups of managers.

Stress is now known to be a major contributor to heart disease, gastrointestinal malfunctions, cancer, severe nervous conditions and neuroses. Job stress also has been linked to job dissatisfaction, job-related tension and anxiety and reduced productivity and effectiveness.

> *The MIS environment is replete with situations that can cause stress.*

The managers in the survey represent a range of positions from vice-president or director to project manager. The mean age is 42.5 years, and 83% are male. The education level is high (56% have master's degrees and 7% doctorates). Both corporate and nonprofit organizations of varying sizes are represented.

What are the symptoms?

Among the most prevalent symptoms of stress experienced by MIS managers are feeling restless and unable to concentrate; becoming less communicative and more irritable and excessively tired; feeling tense, uptight, fidgety; eating too much; misdirecting anger; and, suprisingly, experiencing increased interest in sex.

While the increased interest in sex may not cause much concern, the other reported strains do. Studies link job dissatisfaction with heart disease, chronic illness, disability and death.

Clearly, there is cause for concern for the health prognosis of MIS managers. From an organizational perspective, these symptoms surely must affect the job performance of managers.

What causes job stress?

The MIS environment is replete with situations that can cause stress, such as work overload, role ambiguity, role conflict, responsibility for people, lack of participation in decision making, lack of feedback, keeping up with rapid technological change, being in an innovative role, career development and organizational structure and climate.

As a member of a service organization, the MIS manager must respond to frequently conflicting demands from other departments, many of which are seen as higher in the organizational hierarchy, even when the MIS function is headed by a top-level manager.

MIS managers complain of being excluded from high-level policy decision making, yet they must lead the efforts to create the changes decided upon in these policy making meetings. Users intent upon doing their own computing on the now ubiquitous microcomputer is viewed by many MIS managers as a further attempt to undermine what little power they have.

The role of social support

The finding that increased social support can alleviate the detrimental health consequences of these stresses is encouraging for many reasons. First, we may not be able to reduce directly many sources of stress because they result from the nature of the MIS manager's job — for instance, being in an innovative job and dealing with rapid technological changes. Also, some organizational norms cannot be changed easily.

Second, even if some of the sources of stress can be reduced, it may not be effective to do so. The MIS manager is an agent of change in an organization that exists in and responds to a complex and uncertain environment. The MIS manager can often bring about change more effectively in a more flexible and ambiguous role. So role conflict and ambiguity, which may be experienced as stressful, may help the MIS manager.

But social support can be increased without adversely affecting these other elements of the job. A difficulty in helping MIS manag-

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Weiss is president of Weiss Associates, Inc., a consulting firm in Bethesda, Md., which specializes in management and organization development for MIS departments.

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*Source: Newton-Evans Research Co. 1985 survey.

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another data center in a different company; they are unlikely to leave the profession, Weiss says. Often they find the same stressful environment in the new job.

In more extreme instances, drug abuse and alcoholism show up in the data center [CW, Oct. 7]. "It is extreme, but I see it a lot," Brod says. "People get into high-stress states, and they want to relax. They assume the only way to do that is to shut themselves off and drink alcohol or smoke dope — especially some of the younger members of the team. What they find out, though, is that alcohol is really a depressant, and there is no relaxation in the true sense from alcohol."

There are no indications that drug or alcohol abuse is more of a problem in DP/MIS than in other occupations. But experts believe that if the stressors remain untreated, problems will dramatically increase. According to Slaughter, many DP professionals work in a state of free-floating anxiety that causes frustration, paranoia and a fiesty, uncooperative attitude.

"If you take a look at the average DP executive, you'll see a male, age 45-48, with 10 years at the company and 20 years in DP. And he's burned-out," Slaughter says. "He feels that he is the most hated and estranged person in the company, being squeezed from all sides."

The solution

"Managers in general cannot avoid stress," says Larry M. Singer, a project leader at Ross Laboratories in Columbus, Ohio, and author of *The Data Processing Manager's Survival Manual* (John Wiley & Sons, Inc., 1982). "The job of managing DP projects and activities is almost guaranteed to provoke stress.

"What separates those who get heart attacks at 40 from the survivors is often their degree of realism. The heart attack or burnout victims try to ignore stress. They suffer from the sleepless nights but try to ignore the causes. Or they change jobs, but the stress follows them."

According to Singer, "the survivors" understand that stress is a natural part of DP management. They don't hide from it. They analyze the problem as they would attack any complex management situation. They ask themselves whether their stress typically comes from inside. Is it related to specific projects, activities or people? Finally, is it controllable? If not, are they letting stress take over their management styles or even their home lives?

It is the rare and enlightened data center that holds regular workshops on stress for its employees.

"The survivors learn to manage stress rather than let stress manage them," Singer says.

"Managing stress" can be and often is an empty phrase. Before an organization can seek to manage this amorphous concept, it must recognize that stress exists and is a serious threat. That step alone may be the largest obstacle in modern business to treating stress.

Though many Fortune 500 companies offer workshops in stress management for employees through personnel departments, these one- or two-day seminars are often like putting Band-Aids on an open wound. "It can't be a one-shot deal," Weiss insists. "It takes constant reinforcement."

In addition, stress in DP/MIS often comes with unique characteristics that may not be handled by general workshops. It is the rare and enlightened data center that holds regular workshops on stress for its employees. More typical is the major airline, with 1,800 DP employees, that offers no special workshops or programs on stress for those workers. The DP personnel representative, when questioned, responded that she had not seen or heard of any particular problems with stress in the DP department.

DP executives who acknowledge that stress is an important issue conclude they must initiate programs to handle the problem themselves. Corporations struggling to find a competitive business edge are willing to commit resources to more hardware and software but often ignore the "peopleware."

Thus, DP/MIS managers, themselves under intense pressure, must shoulder the burden of stress among their employees. McGhee insists that poor management is the leading culprit in the spreading of stress. "Stress is not a top priority in DP," she says. "Many DP managers don't realize how much a factor it is.

"Better planning by management could help avoid the hot spots that cause so much trouble," McGhee continues. Certain "soft" spots are usually well known by those running the system, and the lack of contingency planning leads to more chaos when failure hits.

Management training

Poor management training for DP managers is also at fault, McGhee insists. Most DP managers are talented technical people who are promoted without the skills necessary to take on their new assignments. "A good project manager may not be a good people manager," she says. "Solid management training is needed." In fact, McGhee advocates bringing professional managers into the DP arena rather than simply promoting good technical people. The line people should be given a dual-career track in which they can maintain technical positions with promotions and pay increases without stepping into the managerial ring.

Even good managers, however, are not enough. Often stuck between a rock and a hard place, the DP manager needs better companywide support in handling the avalanche of requests that pour into the department. At Dataproducts, Strowbridge instituted an innovative method for easing the pressure on DP/MIS while getting better response and therefore happier users.

"Stress is created because the DPer either doesn't understand or cannot meet the requirements of the user," Strowbridge says. With a new structure of management, those problems are alleviated. At Dataproducts, each division set up its own information systems steering committee, made up of users, which reviews each request and then decides which request should be funded and when it is needed. The divisional steering committees must decide whether the request is contributing to the business goals of the company and what priority each one takes. Any request greater than $50,000 must go before a corporate steering committee.

"Now when you explain the approval process to someone whose project is not getting priority, it is no longer a DP decision but a management decision," Strowbridge says. "DP is simply responding to the needs of the business."

With the burden of being the heavy now lifted, DP becomes a service organization and part of the business rather than "judge and jury, which introduces conflict and stress," Strowbridge says. The new system deflects pressure from DP "and allows guys like me to have longer careers," he laughs.

Under this system, Strowbridge finds that his staff feels more confident about what its mandate is and how to perform. Its ability to meet deadlines rose dramatically. "We've developed a bunch of Green Berets," he claims.

For some, the preference is for more, rather than less, autonomy. Montgomery Ward's O'Connell believes that DP must control its destiny. "With that control, it is easier to respond to unreasonable demands," O'Connell says. "Otherwise you are just in react mode all the time. If the data center is under control, it limits stress."

At the Bank of New England, data services instituted an innovative career development program so that young programmers can get a taste of what they are getting into before making a long-term commitment.

"We send them to career assessment workshops, and they role-play the stressful situations they are likely to encounter in their jobs," explains Danielle Barr, vice-president of productivity services. "At that point, they can ask themselves if they want to deal with end users or just do technical consulting."

SIGNS OF STRESS*

STRESS SIGN CATEGORIES	RECOGNIZABLE SIGNS
Internal Body Processes	✓ Breathing is often rapid. ✓ Body temperature drops while heart rate increases. ✓ Frequent feelings of nervousness or tiredness. ✓ Energy level is often visibly higher or lower than usual.
Muscle Tension	✓ Tightening of the body's musculature. ✓ Signs of pain or irritation in the neck, jaw and lower back. ✓ General physical pains in the outer body regions. ✓ Headaches.
Emotional Reaction	✓ Tone of voice reflects feelings of stress. ✓ Emotional reactions are expressed through facial expressions. ✓ Common emotions frequently associated with stress are fear, anger and sadness. ✓ Positive emotions, such as joy, may also indicate physiological stress.
Behavior Patterns	✓ Changes in behavior patterns are indicators of stress (for example, changes in sleeping and eating patterns). ✓ Common behavior cues are rapid or unusually slow body movements. ✓ Nonverbal gestures of hands and face may also reveal stress.
Thought Patterns	✓ Excessive thought to the point of distraction from the present. ✓ Circular thought patterns, especially blaming self or others for problems. ✓ Limited thought patterns, excluding everything in life but one problem or situation.

* This list of signs is meant to provide guidelines and should be considered in the context of the situation as well in light of other signs. No one sign is a good stress indicator.

Source: National Employee Services and Recreation Association

Others, such as Hudgins of the Bank of Virginia and TRW's Giannantonio, agree that prospective employees should be informed in the hiring process of what they are going to face. "We have an elaborate screening process for the people we hire, so they know what they are walking into," Giannantonio says. "We screen for people who can communicate and who can tolerate the stress."

In addition, TRW fosters a policy of open communication. "We sit down and talk to people right away if there's a problem," he says. "We get the issues on the table. The delegation here is good, and we give as much responsibility as possible. It's bad to have responsibility but no authority."

Communication between the data center and the rest of the company is also vital. O'Connell points out that his organization stepped up interorganizational communication. "If everyone knows where the organization is going, it helps put things in perspective and dilutes the stress."

Hudgins has worked hard at establishing procedures to make DP deadlines more realistic. The toughest part is estimating time and cost of a project, so Hudgins has set up a process that works in stages. Early on, the projections are more vague and flexible and later get more detailed. Hudgins's veteran staff is used to the working environment and finds that this focused approach works well for them. "We don't have a lot of turnover or physical ailments," he says.

For DP/MIS pros whose organizations are less enlightened, there are practical methods for handling stress until better systems alleviate some of

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the pressure. Levinson, in an article on stress in the workplace, writes, "One of the most immediately helpful ways of coping with stress is to get out from under it. . . . There are other temporary escape mechanisms like meditation, biofeedback and relaxation methods. They don't solve problems but, like aspirin, provide temporary relief. There is nothing wrong with temporary relief."

Weiss believes that DP/MIS executives are prone to Type A behavior (characteristic of aggressive, impatient, high-achiever-type people), and Type A managers will almost certainly cause stress among their staffs. Methods for modifying this behavior are available, Weiss explains, including workshops that offer better time-management techniques and such physical solutions as breathing exercises.

Exercise is also highly rated as a stress reliever according to experts. Suarez, for example, swims twice a week and goes hiking, camping and cross-country skiing regularly.

Professional help

As massive change hit DP/MIS in recent years, industrial psychologists, psychotherapists and counselors moved in to offer their services. Former DP professionals who took their experiences and turned them into full-time consulting practices have also begun to mine the untapped resources of DP.

Companies, usually through the urging of an enlightened or frustrated individual, are now bringing in outside consultants to help alleviate stress and other management/personnel problems in the data center. Though consultants feel that they are getting through more than in the past, they agree that a great deal is left to be done.

Brod has discovered that it is women more than men who are moved to action when it comes to people problems. "Women are much more sensitive to the fact that they are under stress," Brod says. "They are the people who usually raise their hands in groups. It's a male culture, and everything going on in that culture supports the traditional male posture, which is a lack of feelings and unwillingness to admit there's a problem."

Slaughter: 'DP pros bring on 95% of their own problems.'

According to Brod, it is more likely that he will treat a computer worker in his private practice rather than through the company, and it is inevitably the wife who pushes her husband to seek help.

Brod also dispels the long-held notion that DP/MIS types are loners who would rather avoid all this touchy-feely emotional exposure. As younger people from the social sciences or humanities discovered the attraction of MIS, the field has changed. "I don't buy the myth that the isolates go into MIS," Brod says.

Though one-on-one counseling is often the best remedy, most corporations go the route of professional workshops. Slaughter does extensive work with Fortune 500 companies and believes that "people problems are no easier to solve than technical problems."

In his workshops, Slaughter advises a sound, comprehensive program designed to tackle problems on a wide front. He seeks to uncover what is at the root of the problems: Are they individual or institutional barriers, and what are the obstacles standing in the way of the solution?

Slaughter offers a checklist of seven steps for handling the stressful changes that are occurring in DP/MIS.

- Recognition of the problem — gain an awareness that you are suffering.
- Forgiveness — learn to forgive yourself and go on.
- Provide choices for yourself.
- Inventory the cost of those choices — some might be so difficult to achieve that they are not worth it.
- Design and implement the process of change.
- Set up a feedback system to monitor your own progress as well as that of others.
- Establish support systems.

"I find that these ideas are often revelations to DPers who often would rather suffer than share their problems with others," Slaughter says.

Whether or not stress moves up on the DP/MIS manager's list of priorities is likely to be determined only by the negative effects it is having on productivity. If no one complains, the issues will remain buried beneath the backlog.

It seems more than likely that top management is not going to offer solutions. For every DP department asking for help, there are accounting groups, salesmen, manufacturers and office workers complaining about the same squeeze.

Is DP more stressful? "It is if we as senior managers allow it to be," Strowbridge says. "If we allow our relationships to our people to deteriorate, we have created our own stressful environment." ■

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End-user demands add stress

port expanded end-user computing?

- What will be the new scope of MIS responsibilities as end-user computing continues to grow?
- How are individuals in the MIS organization to respond to and work with end users who are independently growing with their own computing?
- How will end-user computing resources be coordinated with the entire organization's computing resources, and who will control those resources?

These questions must be answered if the psychological stress issues of a sense of security and self-esteem are to be alleviated.

These same questions also apply to the area of social impact. Social impacts are defined by those alterations that take place in the established relationships between the MIS organization and every other part of the organization as well as the shifts among relationships within the MIS organization itself. It is here that perhaps one of the largest (and for some the most difficult) attitude shifts is required.

In the past we have considered the MIS role as one of service to the organization. We sat on opposite sides of the table from our customers. Now we need to shift so that we are both on the same side of the table sharing both interests and responsibilities for meeting the overall organization's larger needs for change. While we still are a service organization, the needs are shifting in that they now include new and different kinds of services.

This calls for a great deal of flexibility on the part of MIS professionals. It is here that the third area of impact arises — behavioral changes. The actual physical shifts in the way in which we computer professionals do our job as a result of expanded end-user computing is where the stress of change is most acutely felt. Instead of initiating changes in the user's organization, we may now be called upon to advise, support and consult with them, and then leave them alone so that they can initiate their own changes. This calls for behavioral changes on our part and often generates stress.

What can MIS management do to address this problem? MIS management can most influence the manner in which the changes are implemented. The first step is objectively to seek answers to the questions listed above. This leads to establishing a framework of policy that the entire organization, MIS and users, can work within as teammates and not competitors.

The second step is to inform the MIS staff of the impacts of expanded end-user computing and overall direction for the MIS department. It is here that the issue of professional security and self-esteem must be addressed. The larger concept of an MIS-user partnership must be emphasized for the benefit of the organization as well as departments and individuals.

Third and finally, MIS management is encouraged to expand its knowledge and understanding of the change process. MIS management can then better recognize the stresses that will be taking place with this ever continuing change process and be prepared to work with individual staff members as necessary as well as the organization as a whole. ■

From page 62

Support reduces MIS strain

ers to enhance their social support and improve the quality of their interpersonal relations is that many hesitate to ask for support for fear their requests will be construed as a sign of personal weakness. This seems to be particularly true of new managers who think, "If I'm really a manager, I should be able to do it myself." In addition, the kinds of skills (empathy, consideration, sensitivity) involved in giving or receiving social support are often devalued as "soft" or "nonproductive" in most organizations.

Enhancing social support

Successful approaches for enhancing levels of social support should include strategies both to build social support into MIS organizations as well as to help individuals learn to be more supportive of each other.

One strategy for building social support into MIS organizations is to examine the power and reward structures of the organization to determine whether those structures encourage supportive behavior. If managers are evaluated and rewarded only for activity for which they are clearly personally responsible or if they are constantly placed in competition with their peers, they will have little motivation to provide support to peers. If they are evaluated and rewarded solely on the basis of the short-term productivity of their subordinates, they will have little motivation to support the long-term development of those subordinates.

Knowledge of the importance of social support and of the skills necessary to provide it should be part of the criteria for selecting and training MIS managers. This knowledge is especially necessary for first-line managers who often must deal directly with more subordinates than managers at other levels.

A further strategy is to embark upon a team development program whereby the MIS work team, including management teams, work together in goal setting and problem solving. In the process of dealing with work issues, they will enhance their working relationships and mutual support.

From an individual perspective, it appears that most MIS managers and professionals need some instruction or training to become more supportive. Workshops in which managers and professionals learn skills in giving support and increasing their interpersonal effectiveness can be very beneficial. Participants learn and practice skills such as empathetic listening, communicating effectively and becoming more sensitive to the needs of others.

The first step is increasing awareness of the importance of enhancing these skills. In one recent workshop, an MIS manager was horrified to see how menacing and unapproachable he appeared in a videotaped role play with another participant. His reaction motivated him to enhance his interpersonal skills.

For years we have known that encouraging supportive behavior and improving interpersonal relationships at work can improve both the morale and productivity of managers and professionals. We now have evidence that enhancing the quality of social support can reduce the detrimental effects of stress as well. ■

Boeing rolls out 'ultimate' network

By Terence Milholland
and George Roberts

Boeing's network standard takes GM's MAP one step further by linking MAP with IBM's SNA and Boeing's own TOP office protocol.

Boeing Network Architecture (BNA) is an overarching set of specifications for building compatible computing systems in a heterogeneous computing environment across organizational and geographic boundaries and encompassing the integration of data processing, office automation and factory automation.

This week, at the Autofact '85 exposition in Detroit, the Boeing Co. is showing off one of the results of BNA research — the Technical and Office Protocol (TOP). For the first time publicly, TOP products will be shown linked with products built to the Manufacturing Automation Protocol (MAP) standard backed by General Motors Corp. and others. At Autofact, computers designed for office DP will communicate with systems built by other vendors for factory automation. Part of the universal connectivity picture will fall into place.

BNA takes into account strategic requirements, user needs and developments in evolving national and international standards as well as technology trends. As a result, users are able to achieve "real world" implementations, and they do so with a better understanding of how these current systems will fit the fully integrated architecture planned for tomorrow.

BNA originally was developed as a means to interconnect the Boeing multivendor-based data centers throughout the U.S. With the proliferation of micro- and minicomputer-based office systems and growth in networking technology, the architecture was expanded in 1982 to integrate office and DP systems through networks. The architecture was expanded again in 1984 to integrate manufacturing environments with DP and office systems.

Boeing Computer Services Co. provides information processing and communications services to operating companies in Boeing as well as to almost 1,500 commercial customers worldwide. Because of its diverse set of clients, Boeing Computer Services manages a large number and variety of computing systems and devices — more than $600 million worth, representing equipment from more than 100 different vendors.

Interconnect strategies

In order to contain the proliferation of incompatible computing systems and to manage future computing growth, Boeing established a corporate interconnect strategy in 1979. The interconnect strategy promotes development of networked computing systems that permit information access and sharing across strategic computer systems, regardless of application, terminal type or geographic location.

BNA implementation strategies are separated along management and technology lines. Boeing's basic management strategy has been to work with equipment manufacturers, directly and indirectly, to

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George Roberts is general manager of the advanced technology applications division of Boeing Computer Services. He is also chairman of the Boeing Computer Services workplace automation council and the BNA council.

IN DEPTH/BOEING NETWORK ARCHITECTURE

achieve system compatibility. In 1981, the company was purchasing office automation products from 85 different vendors, far too many to achieve compatibility.

This number was cut to six: Digital Equipment Corp., Hewlett-Packard Co., IBM, Wang Laboratories, Inc., Xerox Corp. and AT&T Information Systems. Using executive management-level communication, Boeing asked these companies to help create a heterogeneous processing environment that could handle data exchange between dissimilar devices. This required the vendors to adopt common communications standards.

Not all of the companies immediately agreed, so Boeing temporarily stopped doing business with them. Today, vendors recognize their products must fit into Boeing's architecture. Manufacturers understand that large companies such as Boeing are no longer willing to accept standalone systems and solutions or products that are not strategic to the manufacturer's own long-term product line.

Other actions have been less direct. For instance, in 1982, Boeing joined with companies such as General Motors Corp., TRW, Inc. and Travelers Corp. to form the Network Users Association. The association's objective: to lobby both vendors and standards bodies for open architectures.

To prove that standards are workable, Boeing joined with GM and the National Bureau of Standards to cosponsor a multivendor demonstration of local-area networks implementing application-specific subsets of the Open Systems Interconnect (OSI) protocol. That initial exhibit took place at the 1984 National Computer Conference.

The problem

Just as city building codes provide standards for construction and service connections, developers of information processing and computing service environments need guidance and rules for planning, building and operating compatible information products and services.

Data, or information, is recognized as a resource that should be readily accessible and shared by all authorized users at Boeing. Networks are viewed as the pathway — not the bottleneck — to integration. To implement this vision, a companywide program was initiated to coordinate the planning and development of compatible computing systems over time. This program established an architecture base for systems builders: This architecture base is the BNA.

Boeing is a collection of autonomous companies, subsidiaries, divisions and subdivisions. Its engineering and manufacturing sites are geographically dispersed between Seattle; Wichita, Kan.; and Philadelphia. In addition, a subcontracting relationship exists between Boeing Commercial Airplane Co. in Seattle and other Boeing and non-Boeing organizations located around the world.

In 1978 and 1979, Boeing was in the midst of constructing two new commercial airplanes, the Boeing 757 and 767. To prevent the Seattle area from bearing the full brunt of an airline economic recession similar to the one that occurred between 1969 and 1970, Boeing management dispersed the manufacturing of the airplane components to company sites around the U.S. and to subcontractors in Italy and Japan.

> ”
>
> *Networks are viewed as the pathway — not the bottleneck — to integration.*

But the major airplane manufacturing support systems for the 757 and 767 were designed and developed in Seattle. These systems, such as on-line planning, wiring, computer-aided design and manufacturing, parts inventory and order location, constituted very large computer-based systems, developed along common lines and sharing common data base management systems. The investment of labor and computer equipment to build and sustain these systems could not be duplicated elsewhere in the company.

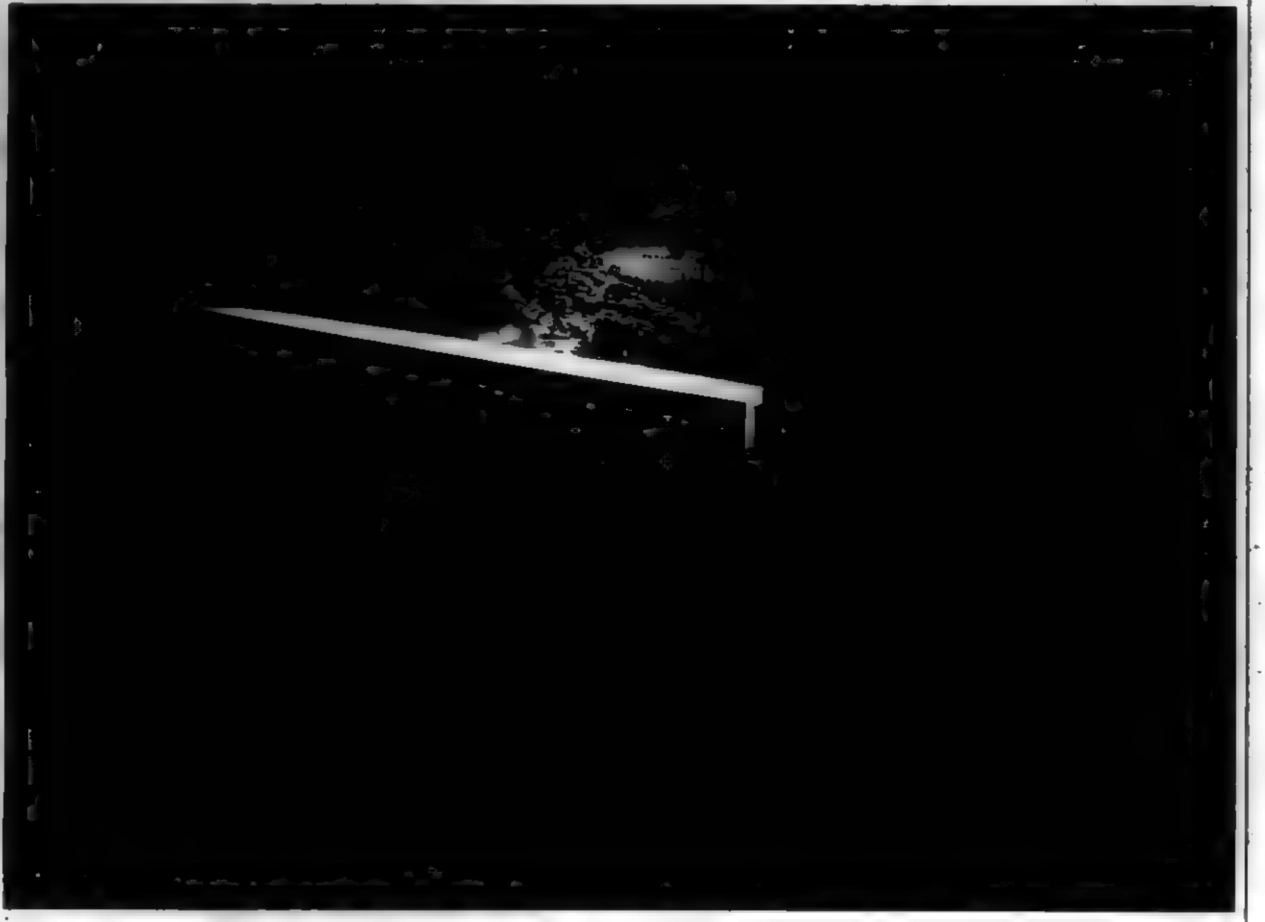
In addition, because of the sheer size of these support systems, the necessary computer processing environment was spread over multiple host mainframes. And because the manufacturing systems in the different factories were dependent on the Seattle computing systems for information, large volumes of data and transactions had to be transmitted between different hosts and different sites.

By 1979, Boeing Computer Services had installed a variety of hardware and software to support each Boeing organization's local requirements for data processing. Over 50 mainframes, almost 500 minicomputers and close to 25,000 terminals were available.

The number and variety of computing products and services were growing, but each site had an incompatible approach to networking, making remote access to the Seattle applications and data very difficult.

Boeing could provide business and scientific computer processing. But the user community wanted to be able to communicate with other mainframes and minicomputers in different data centers and have access to various special-purpose devices such as plotters and numerical control machines.

Most systems, particularly the software for networking and data-



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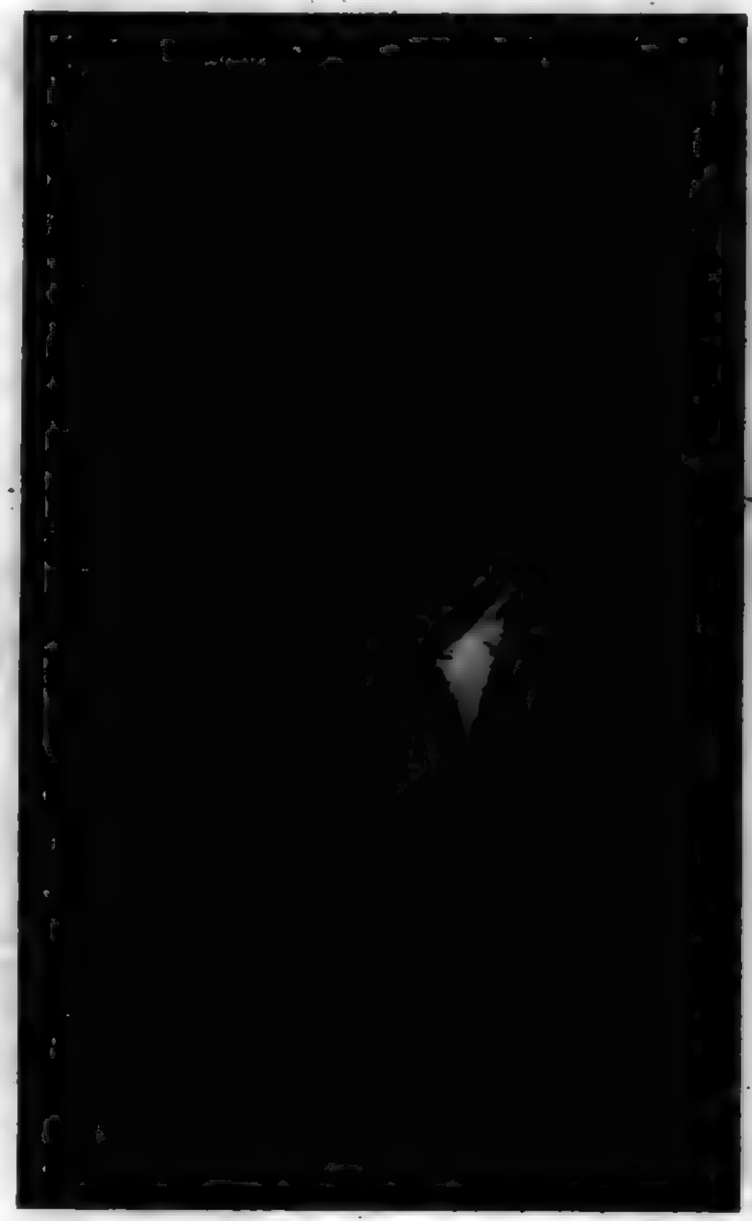
The time has come for straight talk about database management systems.

"The only reason to buy a database management system is to build better applications."



Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEO's of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

John J. Cullinane
Chairman of the Board

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The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of online and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/1, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS

Cullinet

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management, were not compatible in the same vendor environment, let alone compatible between heterogeneous computer systems.

Further, most application systems had unique characteristics so that different applications required different terminals. Many engineers used multiple terminals to access different systems.

Most large companies shared Boeing's information processing requirements in 1979:

- The need to combine multiple hosts and data centers in a consolidated network.
- The ability for applications resident on one host to access data supported by other applications in other hosts.
- The need to provide common terminal access to different applications.
- The need for complete data integrity and the ability to interface old and new technologies.

Compounding this situation was a growth in the demand for computing services from users operating an expanding and varied base of terminal types. Because of this polyglot base, a single-vendor approach was not possible.

The solution

In response to its complex technology challenge, Boeing developed BNA. BNA is a master plan for electronically integrating geographically dispersed data centers, offices and factory DP systems into an information network while controlling the proliferation of incompatible information technology.

The architecture provides a framework by which Boeing can avoid duplication of effort, devise common solutions and protect against premature system obsolescence. The information network satisfies the communications requirements of each individual computing system while creating a corporation-wide set of consolidated systems crucial to the productivity of Boeing operations.

In effect, the BNA program allows Boeing to provide the control employee access to vast and growing information resources, regardless of location.

The vision

Boeing information systems have evolved in three major stages: stand-alone systems, stand-alone systems with automated assistance and integrated systems.

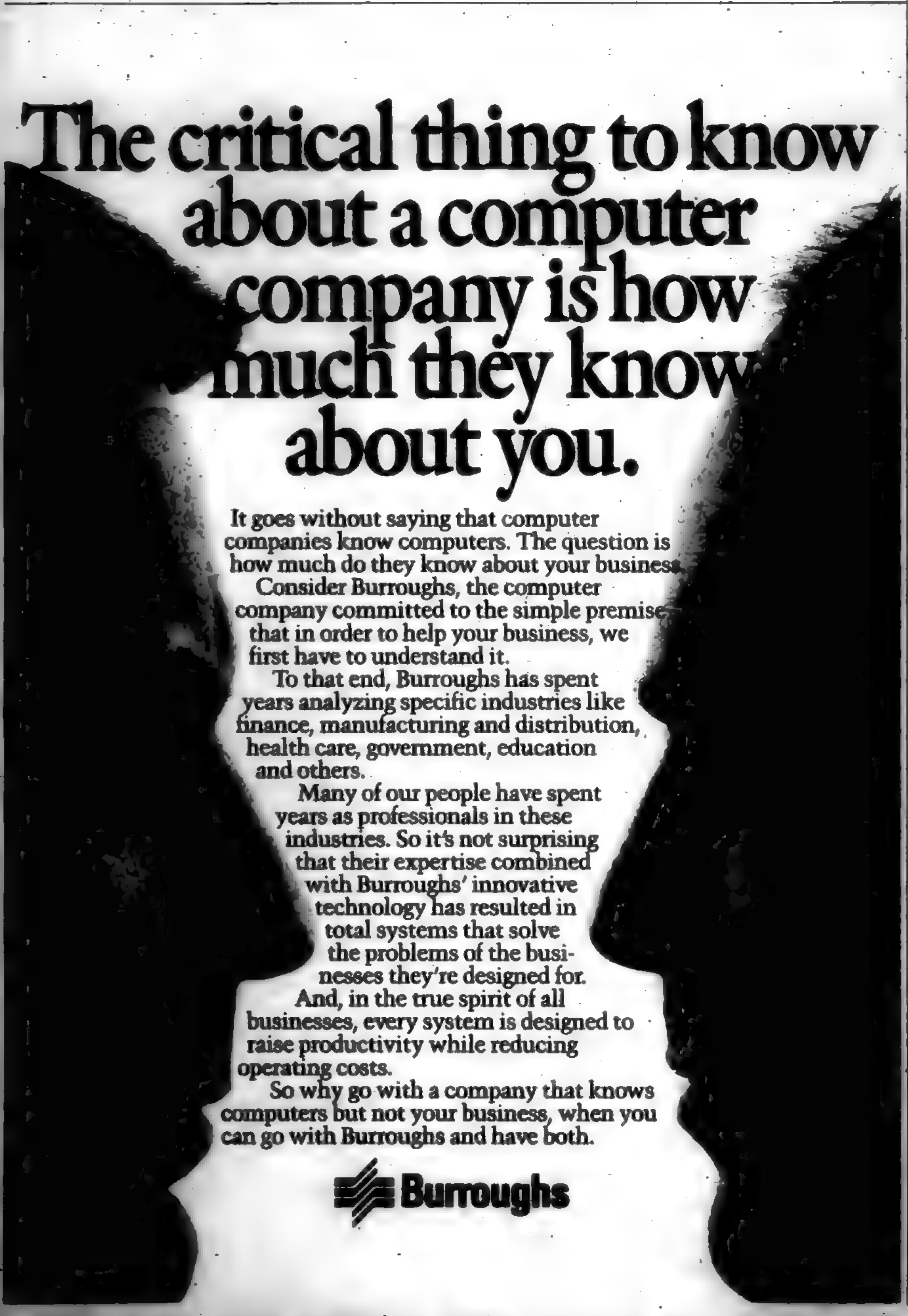
The stand-alone systems era, from 1960 to the mid-1970s, has one outstanding characteristic: labor intensiveness. Whether for office, factory or data center users, different application systems require tremendous amounts of manual processing; first, to find and extract pertinent data, often redundantly from the same sources; next, to convert data to a form for each computer system to process; and third, to pass on the results to other applications.

Data was not typically stored on-line for use by other applications and often required manual rekeying onto different computers or transportation by magnetic tape. Information took so long to produce that it was often approaching obsolescence by the time it reached the decision maker.

This situation began to change as Boeing recognized that networking was no longer the mere engineering of communications equipment for connectivity between terminal and computer. Rather, networking involves a coupling of host hardware and software with workstation hardware and software and, similarly, connection between distributed computers and central data center sites. Boeing called this new perspective "systems access."

With these new capabilities, Boeing passed into a second phase of data processing, in which some computing applications began to extract data from information retrieved from different computers. The retrieval process involved file transfers, transaction processing or a combination of both. On-line information systems proliferated and sharing of information grew, so the time necessary for data to reach decision makers shortened significantly.

But these systems remained basically independent, since expert analysts were still needed to know the location of each system's data, retrieve that data from other computers electronically and perform data reduction. While the information had greater currency, the problem of locating it remained. Most manufacturing data was available in



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electronic media — either on-line storage or tape — but could be stored anywhere in five major data centers. Worse, engineering data remained isolated within the engineering community, stored on paper or in dedicated, stand-alone computers.

The company realized that for its strategic systems to remain current, they must be interconnected electronically, not only to move data between systems but also to locate and manage it. The needed data might be resident on a large-scale storage device, on an engineer's personal computer floppy disk or in a manufacturing cell.

Boeing needed to create not only system access but also true data access — an environment where an information network for integrated systems determines where to find data, control access to it and move it in response to a user request.

This evolution in thinking spurred Boeing to establish protocols and specifications governing the implementation of applications delivery systems for interconnection, both in the data centers and in the office and the factory. This third phase in the integration of key information systems — systems that vary by operating company, function, processing environment and equipment type — is now ongoing and will continue into the 1990s.

When the process is complete, a Boeing user will be able to access information on a data base without knowing where that data base is physically located or the type of machine on which it resides. Boeing is moving toward complete device independence, allowing its users to concentrate on information, not access methods. Information flow times are being reduced and productivity increased.

This is a single-system vision, where information can be accessed or a work load distributed, regardless of geographic locations. The single-system image allows a user to employ one workstation and procedure to access required application processes and data on any general-purpose or dedicated host in the Boeing system of interconnected computers.

Baselines

Technologically, Boeing approaches the integration of vendor products through an intensive review and validation of individual architectures. The company wants its systems planners to be familiar with vendor architectures and to be able to map discrete products to them. Having this knowledge, the planners can then recommend products that are compatible with both a vendor architecture and Boeing's direction.

Boeing elected in 1979 to use IBM's Systems Network Architecture (SNA) as an intermediate baseline for integration and asked each of its major vendors to provide an SNA gateway. Boeing chose SNA because IBM is the company's largest single computer vendor. SNA is also the most completely documented, publicly available communications architecture.

However, protocols implementing the OSI model are Boeing's long-term baseline for communications integration. Basically, each vendor's architecture is used for networking that vendor's processors, and SNA or OSI gateways are used for access to other environments.

> ”
>
> ***Boeing's long-term direction is toward an international standard for information interchange and content, such as the CCITT X.400 standard.***

Boeing chose IBM's Document Interchange and Document Content Architecture (DIA and DCA) specifications as the baseline for multivendor electronic messaging, using SNA and OSI as a foundation for communications. While SNA and OSI provide the ability to access systems, DIA and DCA provide the protocols and formats to control the exchange of information. Thus, vendors must also provide DIA and DCA gateways. Again, Boeing's long-term direction is toward an international standard for information interchange and content, such as the CCITT X.400 standard.

How will it all work? DEC machines, for instance, will be interconnected using Digital Networking Architecture and access to IBM environments using DEC's gateway products. Similarly, HP will be interconnected using Distributed Systems Networking (DSN) and access to IBM using its SNA gateway.

Between environments where SNA doesn't make sense, such as between HP and DEC processors, IEEE local-area network technologies will be used. Packet-network access, utilizing X.25, can also be supported, where appropriate.

While waiting for vendors to implement international standards or SNA gateways, Boeing developed interim gateways between strategic systems. For instance, at the data center level, Boeing developed software that links IBM, Control Data Corp. and Cray Research, Inc. processing environments for batch and interactive access. To capitalize on large investments in existing text processing systems, Boeing devised a text transform that passes files between IBM, Xerox and Wang units, delivering nearly 100% fidelity for revisable-form documents.

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These system interfaces are intended as interim answers. The company does not want to create and maintain a gateway for every vendor architecture. But where appropriate, these solutions are packaged and made available as part of Boeing's commercial product line.

Specifications such as SNA and OSI provide a transportation mechanism. Information must still be located, accessed and converted to the form desired. These capabilities, termed data access, control access to data bases, whether centralized or distributed across processing environments.

Companywide efforts were initiated in 1984 for this set of enabling technologies. Boeing selected IBM's IMS and SQL products as initial directions for data access and have begun to standardize its manufacturing and engineering data elements definition.

In the long term, Boeing's direction is toward a common data model supporting distributed query and update across dissimilar data bases.

Organizing for architecture

Planning an architecture and actually building one are two different things. Even defining the concept may prove difficult. Many systems planners and technologists think of "architecture" as the product line of a particular vendor. In this context, a network architecture is simply a mainframe and communications controller running vendor-specific software.

Boeing recognizes that these views might be construed as implementations of an architecture but do not actually constitute the architecture itself. Vendor products are the tools that provided architectural services but are not the actual architecture.

Boeing defines architecture as the deliverables of a definition process (Figure 1). In this model, the deliverables of the architecture research process are a set of strategic specifications in the form of time lines, statements of direction, implementation guidelines and standards.

Architectural management

Because of the decentralized structure of Boeing Computer Services, the company created a planning group called the Architecture Management Council, which is made up of representatives from every "line" division.

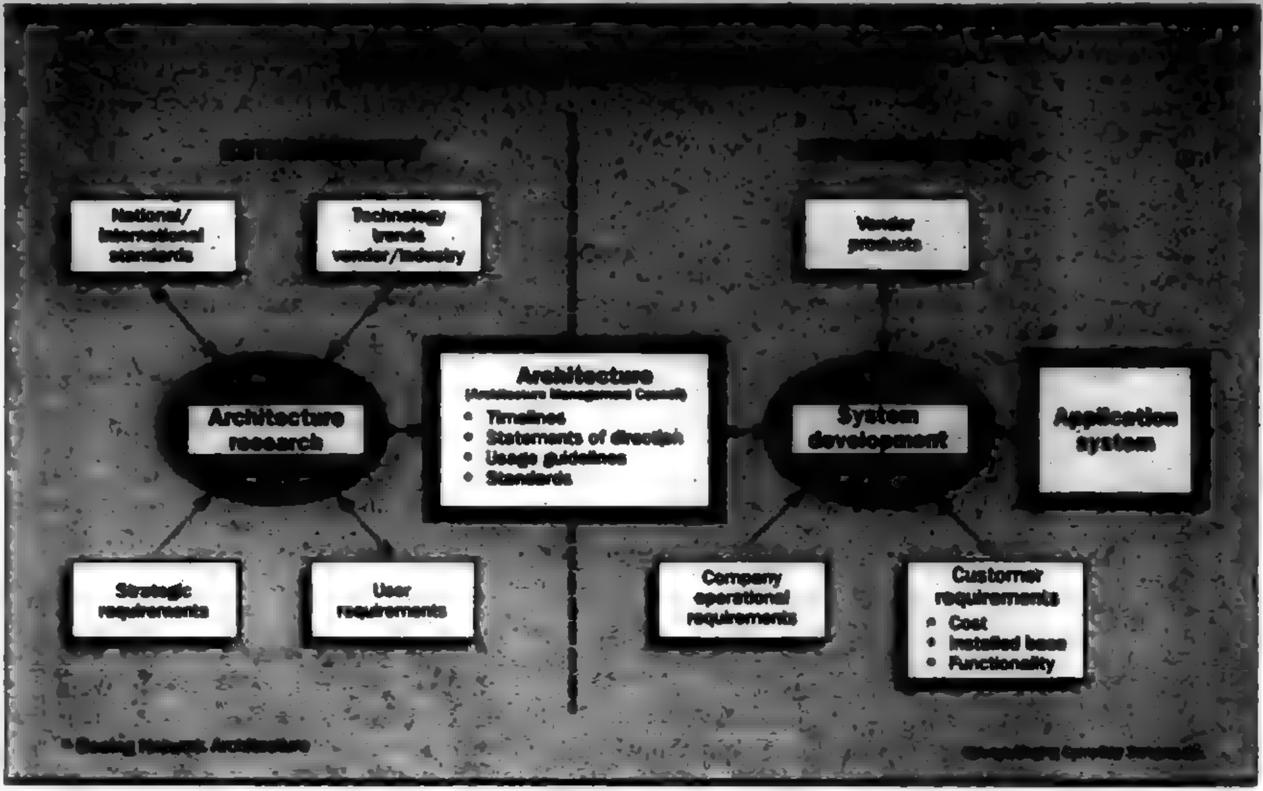

Figure 1

The council is composed of senior-level systems and technology managers who can and do make the final decisions about their information network development. This group approves BNA command media and assures its adoption throughout the various divisions.

The council charters research projects, reviews the results and agrees on the definition of the formal architecture specifications to be released in the company. In this manner, all organizations within Boeing Computer Services agree on the architecture, minimizing "not invented here" attitudes.

Initially, the group was led by an advanced technology organization, with Boeing holding no direct line of responsibility for the computing support. This organization initiated ideas, provided education on the technology, coordinated planning, documented the agreements, provided management visibility, got the right people involved and, in short, made things happen.

The Architecture Management Council defines what strategic capabilities are needed by the company over time. A subgroup of technology managers map computing technologies that will enable the different strategic capabilities. In an interactive planning process, a time line of strategic capabilities "pulling on" or being "pushed by" enabling technologies is developed.

The resulting architecture time line is a high-level master plan for systems integration. Thus, investment recommendations for research and development in those technologies and systems can be made in light of Boeing's long-term needs.

Enabling technologies now being addressed include local-area network

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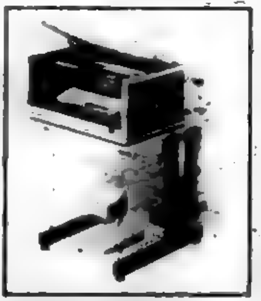

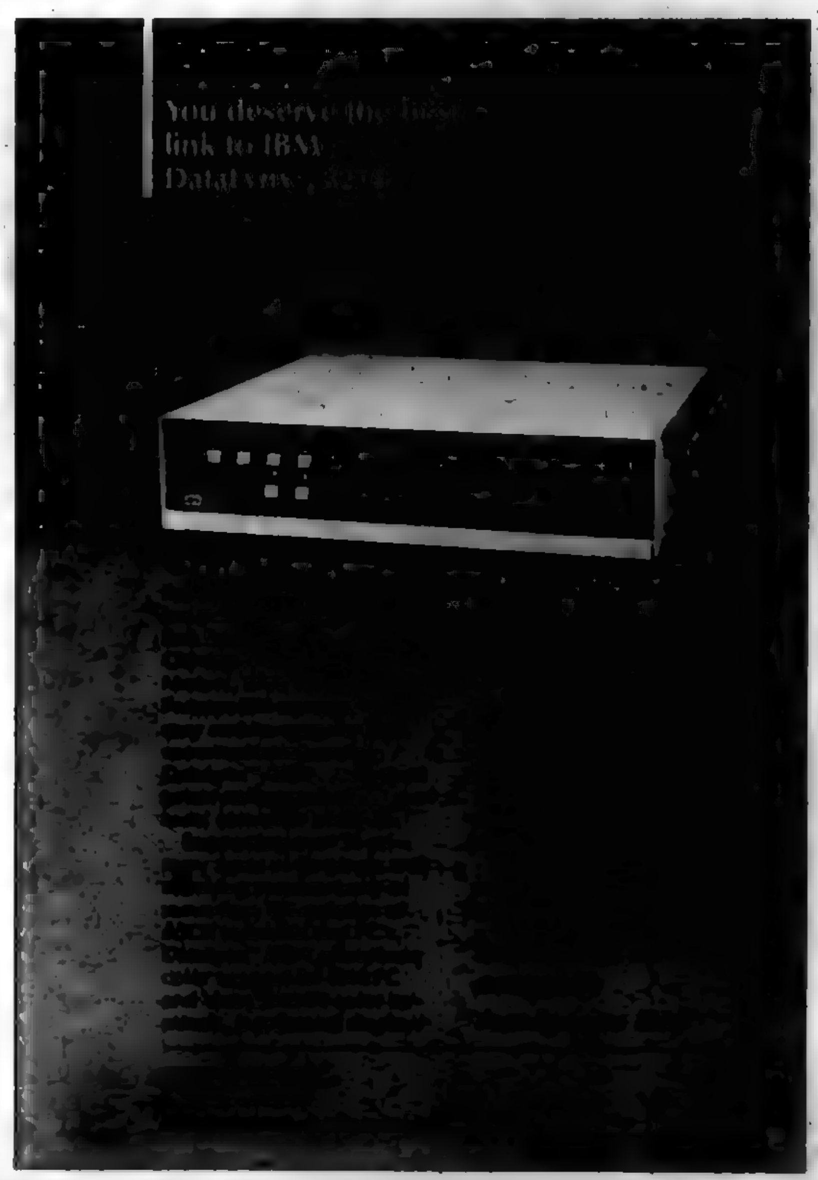

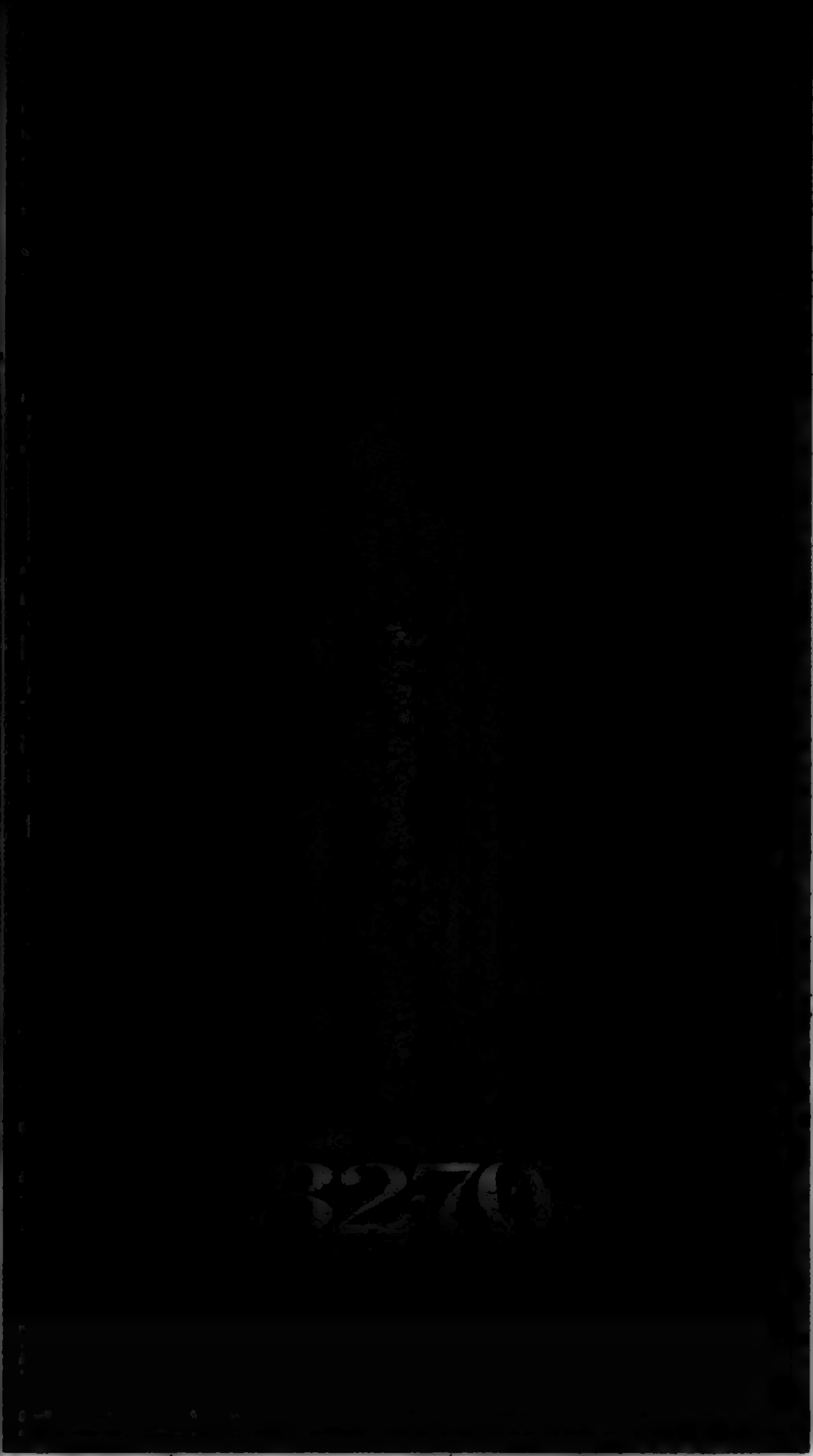

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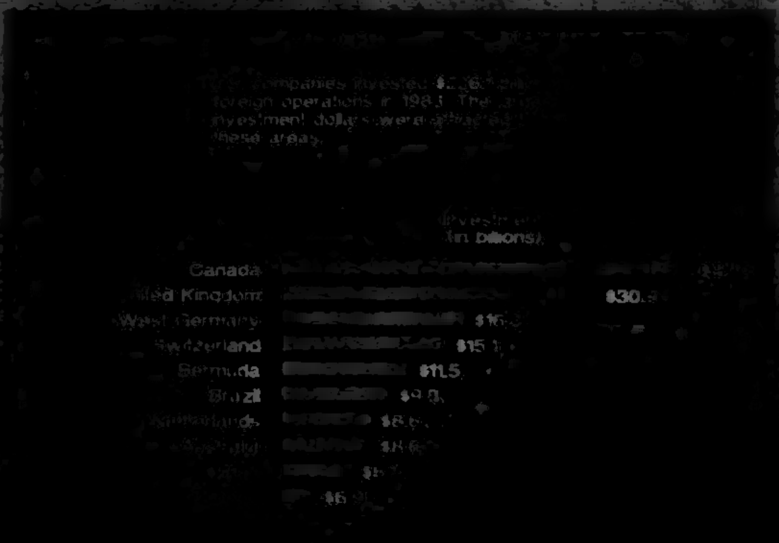

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Architecture establishment

The selection of enabling technology research and development projects is influenced by several factors, including specific user-functional requirements. The operating divisions provide input in the form of answers to questions such as: What problems should be researched? What are the information services desired? What are the priorities for the research efforts? When are results needed?

This is a two-way dialogue — the technology research groups provide guidance to the system builders as to what is happening in computing technology and when can they expect solutions to their technology problems.

The architecture definition process is also influenced by the direction of national and international standards. Because gradual conformance to standards is strategic, Boeing is vitally interested in their development and implementation in products. The company both monitors and participates in several standards bodies that are developing networking standards.

Technology trends, both as they affect industry and specific vendor products, are another major influence on Boeing's architecture research methodology. Boeing predicts its future products and capabilities through close liaison with its vendors.

In addition, Boeing leverages the vendor community to respond to its needs, particularly those for architecture network applications. Potential vendor technology time lines are mapped against BNA time lines. Boeing also may work with its vendors to develop products that accelerate the availability of networked applications.

Architecture research must incorporate a final set of criteria — the corporate strategic interests. These corporate considerations may be different from the user's functional requirements.

The result of this planning process is a set of applied research projects on various components of computing technology. These may take the form of advancing technology itself, exploring applications for the technology, a feasibility study, a field-oriented prototype or a full-scale engineering pilot.

These research projects occur throughout the technology and systems organizations in Boeing and are coordinated by the technology planning subgroup of the Architecture Management Council.

Architecture implementation

Architecture considerations must be balanced against other factors in designing actual applications. Systems managers choose a specification, akin to selecting the right tool from a tool kit, when building systems or products. Factors such as the installed base of equipment, cost and desired functions are balanced against available vendor products (not trends), architecture specifications and local operating requirements.

In Boeing, the interconnect strategy is considered important enough that to go outside the architecture, a system builder must receive a waiver from executive management and must demonstrate a plan to merge back into the architecture eventually.

As BNA is implemented and systems become electronically integrated, there is an increase in the software coupling between processing environments. This fact, not usually recognized when the industry discusses distributed processing and other resource-sharing technologies, complicates the management of the global network.

Times have changed, and the single-organization management approach is not necessarily applicable when sharing resources across multiple sites. Intelligence exists at all nodes of the network, and compatible functions may exist also, requiring more effective and efficient management of the environments.

In effect, operational management must be performed in a distributed systems management environment. This fact is incorporated in BNA through a standard operational methodology.

When Boeing began using its network architecture to link its data centers, it organized a task force of management and staff from operations across Boeing Computer Services — the people responsible for production delivery systems. These individuals were chartered to agree how to perform problem management, change management and configuration management in a network environment that crossed geographic as well as organizational boundaries.

The task force worked for six months to establish a common set of policies, procedures and standards to allow the implementation of the architecture. Basically, a set of BNA control centers, one per data center, was planned and implemented as the local focus for user problems and as the control center for change to the common network.

Command media

Earlier, BNA was compared to a set of building codes. Instead of building codes, Boeing uses the phrase "command media." Command media is a set of written technical specifications that have been validated through research and development work and can be implemented. Command media can be grouped in three categories:

■ A statement of direction analyzes trends and implications pertaining to an architectural element and proposes a best-guess course of

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	WALL DATA BCF 1000	PCI 270	MICOM 74016	LOCAL DATA DataLynx/3274	RENEX RTM 74-16
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3. Can you just download protocol software when new protocols become available? Or when software enhancements are made? You can with Wall Data. You can't with the other four.
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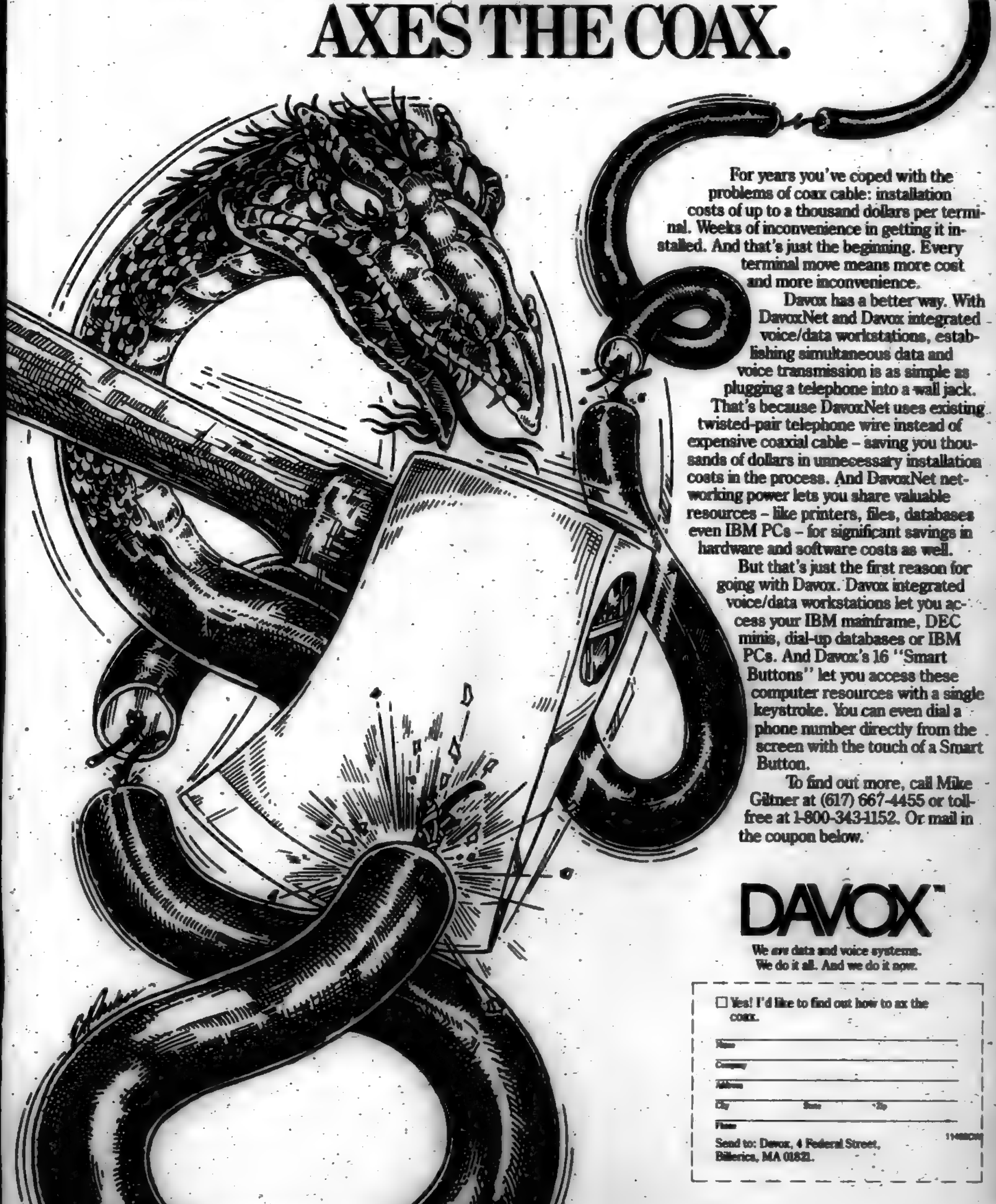

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action while additional research is performed.

- A standard specifies quantitative and qualitative criteria for determining the acceptability of the product implementation of an architectural element.
- An implementation guideline describes a method of performing a task to achieve an architectural objective and/or standard.

The body of command media is kept purposely small. Each is global or strategic in nature; for example, each applies across all organizations. This helps ensure that the architecture media is read, understood and used. The media needs not focus on one application but can combine specifications for compatible system and network architectures.

In effect, BNA command media is a set of rules for integration of all key Boeing computing environments and application systems, enabling the company to pool its critical information resources selectively.

Architecture models help provide clarity and a common basis of understanding. Various models have been developed over time and have proved very useful in indicating what computing direction is needed for what piece of the technology and the ramifications for management. The models serve as a common frame of reference for all aspects of the technology.

The basic BNA model has three information processing tiers: central, organizational and local. Information (text, data, graphics, image, voice) is shared between applications, both within and between levels.

At the local processing level, users perform such tasks as business forecasting, software engineering or text processing. Delivery systems at the local tier are workstations and local-area networks. Organization-level processing pertains to those non-application-specific functions required by multiple users; for example, intraorganization data dictionary, electronic mail and storage and retrieval services delivered through minicomputers. The central tier, or large-scale data center, addresses these same requirements on an interorganizational basis. The model allows Boeing managers to communicate the impact on services and products as technology changes occur.

There are many detailed versions of this model specific to the technologies of systems access and data access, but all are consistent in the use of the three tiers and in their nomenclature.

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> *Architecture models help provide clarity and a common understanding. . . . The models serve as a common frame of reference for all aspects of the technology.*

BNA provides the systems access and data access specifications for integrating these tiers across multiple vendors, both within and between tiers. For example, central servers are connected to organization and workstation devices via industry/vendor-standard wide-area networks. Organization and workstation servers are linked with IEEE local-area networks. The OSI protocols lie at the heart of this interconnection.

In the current implementation of BNA, batch and interactive access to information can be provided between a variety of application systems, including CAD/CAM, manufacturing support and inventory. The computing environments are connected utilizing many physical media, such as microwave, land lines and satellite, and IEEE networks are installed. Vendor architectures such as SNA, DEC's Decnet and DSN link each vendor's own systems together, while SNA gateways provide for intervendor access to information.

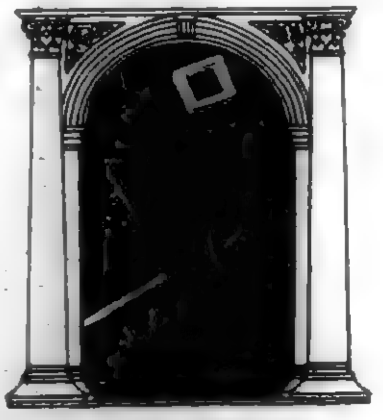
Intervendor electronic mail exchange of text, data and graphics is being planned and implemented. Until international standards for electronic messaging/mail are better established (for example, CCITT X.400), IBM's DIA/DCA-compatible products are being used. IMS provides a baseline standard for data base technology in IBM environments and will continue until the technology to link different vendors' data bases matures.

Network volumes have grown as users understand the new capability. Application designers are taking advantage of the resource sharing to use high-speed printers and graphics devices in other locations, and data bases are being accessed between locations. Major pieces of the information network for a single-system image are in place.

Over time, there have been significant advances in workstation technologies, such as processors, printers and software. Multiuser, multitasking desktop workstations are available with the capabilities of mainframes from a decade earlier. True distributed applications can now be constructed that take advantage of the capabilities provided by workstations and the enabling technologies of systems access and data access to find, control and move data across computing systems.

These distributed applications take the form of software tools that automate common tasks of data reduction from multiple sources. The tool kits that can be constructed include kits for software engineering, finance, industrial engineering, administration and mechanical engineering. The kits are integrated with each other and provide distribution of function across the three tiers.

Common utility software, designed for the requirements of information exchange, underlie these tools. Boeing is developing some of these distribtuted applications today, utilizing AT&T Unix as a common operating system to provide portability and multitasking across different hardware systems. ■



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Gateways grow up

By Grace Zimmerman

Gateways act as traffic cops on the data highways between local-area networks and host mainframes. If they do a good job, users don't know they are there.

PHOTO: STOCK BOSTON, CARY WOLINSKY

As sophisticated personal computer users demand more powerful application resources, communications tools become more of a necessity than a luxury. With the growing emphasis on "work group" business computing, users in many industries now regard communications networking as a vital means of boosting productivity by allowing the sharing of information as well as of expensive, high-performance peripherals.

Personal-computer user sophistication first drove the demand for microcomputer-to-mainframe links and then, more recently, the push for local-area networks that provide access to shared peripherals. Now, the emergence of another personal computer communications tool, the local-area network gateway, expands further the corporate repertoire of productivity-enhancing tools.

Modern portable local-area network gateways provide cost-effective network-to-mainframe connections, particularly when compared with more costly cluster controller alternatives. Better still, these gateways offer a growth path that can help remove the risks of choosing the wrong local-area network or media types. In short, they can help reduce the risk of local-area network obsolescence.

Gateway products differ widely in performance, configuration, cost and network compatibility. No single product is best for all applications. Therefore, local-area network users and DP managers should understand the new gateways and what features are available to make successful product choices for specific communications applications.

Traffic cops for data highways

Local-area network gateways act as traffic cops on the data highways between personal computer networks and host mainframes as well as between the local-area networks themselves.

Gateways' duties are simple. They effectively manage data traffic between the personal computer-based local-area networks and mainframes

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Grace Zimmerman is director of marketing at Pathway Design, Inc., a Wellesley, Mass., vendor of gateway products for micro-mainframe networks.

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> *Compatibility with IBM's Systems Network Architecture (SNA), an industry de facto communications standard, is desirable for all general-purpose network gateways. . . . A gateway should support multiple, concurrent SNA or bisynchronous sessions without visible performance degradation.*

so that the gateways' operations are transparent to users.

To do their job well, gateways should satisfy certain fundamental criteria. They should provide the throughput necessary to serve multiple users in a variety of application environments.

In addition, gateway designs should be flexible enough to ensure cost-effective upgrades to new local networks and accommodate increased user numbers without risking obsolescence.

Hardware vs. software

Gateway products differ according to all these criteria, but the most important initial difference is between hardware-based products and those that are software based, requiring minimal hardware.

Hardware-driven gateway designs typically operate as stand-alone network nodes that house multiple communications processing boards. They appear to host mainframes as 3274/3276 controllers and interact with networked personal computers via minimal personal computer-resident software.

Hardware designs can produce very high performance in throughput and device-support capacity, but users pay the penalty of high cost and low reconfiguration flexibility when product modifications or enhancements are required.

Software-driven gateways are becoming increasingly popular for business local-area network applications because of their lower cost per micro connection and greater flexibility and modular implementation.

Software gateways typically use a single communications adapter, a printed circuit board that resides in the "gateway server" personal computer. Although the gateway server manages interactions between the local-area-network and one or more host processors, it does not necessarily have to be dedicated to gateway applications.

SNA support

Compatibility with IBM's seven-layered Systems Network Architecture (SNA), an industry de facto communications standard that governs the interface between IBM data access methods and various peripherals, is desirable for all general-purpose network gateways. SNA's first two layers deal with the physical interface, while other layers oversee data organization and sequential processing for eventual translation and presentation by the seventh, or presentation, layer.

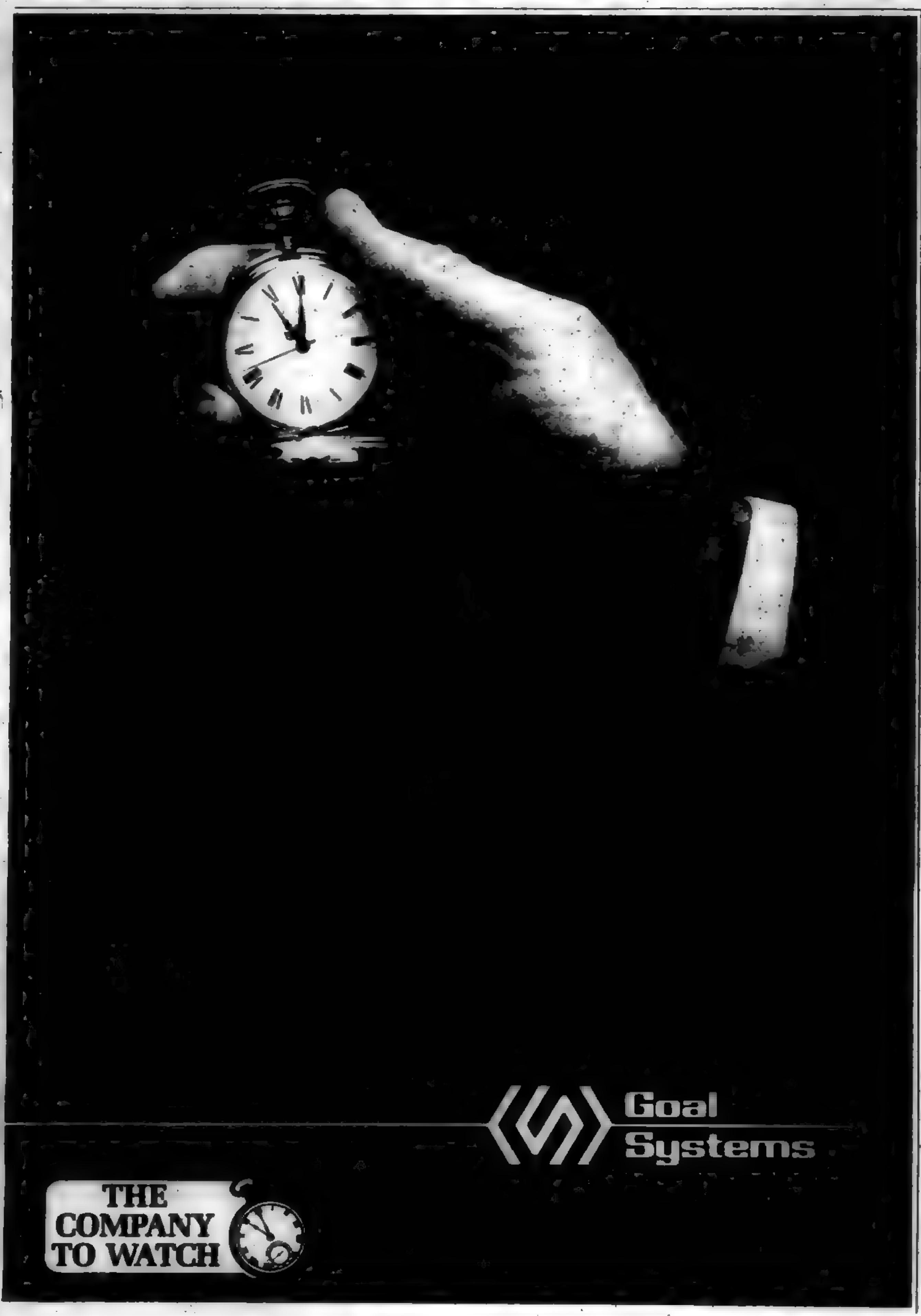
A gateway should support multiple, concurrent SNA or bisynchronous sessions without causing visible performance degradation. Most software-driven gateways permit as many as 32 concurrent sessions, whether allocated as one session for each of 32 different personal computers or as multiple sessions per personal computer with fewer operating personal computers.

Some networks will have more possible sessions than a gateway can support. Gateways differ in the way they handle this situation. Some, for example, support a fixed 32 sessions that must be manually reallocated when additional sessions want access to an IBM mainframe.

Other gateways have a "floating node" capability that automatically reallocates sessions on a first-come, first-served basis.

Design approach

The design approach for a software gateway is important because it determines overall network performance. For example, while



some local-area network gateway vendors place all seven SNA network layers in the gateway-server personal computer, other vendors distribute copies of the top layer, which determines application emulations, to each personal computer in the network.

This latter approach benefits performance by placing personal computer-specific SNA intelligence within each user personal computer. It also relieves the gateway-server personal computer from translation chores that are better carried out by the user personal computers.

Another feature to look for in SNA local-area network gateways is session hold capability, which allows users to exit communications emulation mode and run other DOS applications while maintaining the host connection.

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> *Gateways must be designed to maintain compatibility with popular local-area network architectures and to support ease of future enhancements.*

Other options include emulation features such as user-definable keys and key sequences, nondisplayable and protected-fields security support and multiple concurrent printer support.

Design flexibility

Gateways must be designed to maintain compatibility with popular local-area network architectures and to support ease of future enhancements. Compatibility with popular IBM host computers, communications controllers, access methods and applications is critical, as is ease of porting to new local-area network architectures.

One networking operation system, the Novell, Inc. Netware product, is a current popular choice for a gateway system architecture because it supports a number of contemporary local-area networks. These include Novell's Netware/S, Proteon Associates, Inc.'s Pronet, Corvus Systems, Inc.'s Omninet, 3Com Corp.'s Etherlink, Orchid Technology, Inc.'s PCnet and others.

Crucial to the success of a gateway is an enhancement path from a single micro-to-mainframe solution to a local-area network gateway. This way, users can gain experience with simple personal computer-to-host communications, then add local-area network operations as applications needs proliferate or personal computer users are added.

A compatible enhancement path consists of similar commands for comparable user operations in both environments, such as file transfer and remote print support. This path will minimize the new-feature learning curve through consistent command techniques.

"User friendly" may be an overworked term, but the idea is no less critical in gateway communications than in other personal computer-

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> ***Crucial to the success of a gateway is an enhancement path from a single micro-to-mainframe solution to a local-area network gateway. This way, users can gain experience with micro-to-host communications, then add network operations as applications needs grow or users are added.***

intensive applications. With gateways, user friendliness applies both to end users and programmers.

End users should be able to run host applications packages, download host files to individual personal computers or to the local-area network gateway server/file server for use by all connected personal computers, process data locally and then send updated files back to the host. Additionally, menu-based user tools should be available to expedite local-area network gateway installation, configuration and operation.

In the case of programmers, an interface command shell should be available to help them create end-user menus such as micro applications to the host emulation software and port the software to new networks or to specialized processors.

Cost comparisons

Gateways vary in cost from a few thousand dollars for software-driven versions to as much as $10,000 for high-performance hardware implementations.

Perhaps most crucial for business applications, software gateways are typically more cost-efficient than comparable cluster controller communications solutions currently marketed for micro-mainframe communications.

For example, a typical cluster controller configuration for 16 personal computers totals about $29,600, including $10,000 for the cluster control unit, $17,600 for 16 communications boards and $2,000 for a modem.

The same users could go with a software-driven gateway for $20,300. This would include the personal computer gateway processor at $3,000, a $2,000 modem, 16-station SNA gateway software for $2,300 and the local-area network itself for $13,000. Per-node cost for the cluster controller system is $1,850; for the gateway, $1,270.

The advantages of the local-area network gateway solution, as compared with the cluster controller alternative, are further accentuated when considering the cost saving associated with shared memory, printer and host access.

Shared resources like these make it possible to have the highest quality solution at reduced costs. These advantages are not possible with the cluster controller solution.

As cost-effective as they are today, gateways promise to pay even greater dividends in the future, as local-area networks and communicating personal computers grow in number.

Gateway intelligence will increase to take advantage of newer SNA features such as LU6.2 and Document Interchange Architecture/Document Content Architecture presentation services. Enhancements to computer horsepower will benefit gateway operations as well as newer generations of personal computers. ■

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FUSION.

NEW PRODUCTS

DEC unveils first in micro series

Digital Equipment Corp. of Maynard, Mass., has announced the first series in its Packaged Automation System family of Micro/PDP-11 computers for industrial I/O applications.

The first series is the IPQS packages that combine DEC's I/O subsystem with the Q-bus version of the Micro/PDP-11 computer running on the DEC Micro/RSX operating system.

The IPQS series has two models. Both models are said to come with 512K bytes of main memory, an RX50 400K-byte dual diskette and an RD52 31M-byte Winchester disk. The IPQS is packaged in a 60-in.-high cabinet that includes an I/O subsystem master chassis with I/O control, power supply and mounting space for 10 I/O modules.

Model IPQS1-AA/AD costs $22,100. It includes a Micro/PDP-11/23-Plus computer, the I/O subsystem, 512K bytes of memory, a 31M-byte Winchester disk, dual 400K-byte floppies, cabinet, Micro/RSX operating system license and advanced program kit license, according to the vendor.

Model IPQS2-AA/AD costs $23,000. It includes a Micro/PDP-11/73 computer, the I/O subsystem, 512K bytes of memory, 31M-byte Winchester disk, dual 400K-byte floppies, cabinet, Micro/RSX operating system license and advanced program kit license.

The IPQS series can be optionally expanded with up to two 10-slot expansion chassis, up to three 10-slot screw terminal mounting racks, up to 30 process I/O modules and up to 30 screw terminal strips. Add-on cabinets can accommodate a total of eight I/O chassis for up to 2,000 monitor and control points.

Software support is available under DEC's RSX operating systems, which are real-time, multitasking systems programmable in Macro-II, Fortran 4 and Fortran 77.

Tandy portable drive out

Battery-powered unit used for laptop machines

Tandy Corp. of Fort Worth, Texas, has introduced the battery-powered Tandy 200/Model 100 Portable Disk Drive for Tandy's Model 200 and Model 100 laptop computers.

Tandy Corp. 200/Model 100 Portable Disk Drive

The portable disk drive is said to provide 100K bytes of information storage on 3½-in. floppy diskettes. Operating from a menu, it reportedly lists the files on the floppy diskettes and offers functions such as format, save and load.

According to a spokesman, the data transfer rate is 19.2K bit/sec. Operation requires four AA batteries or an optional adapter.

If the portable disk drive senses low voltage during an operation, it will reportedly finish the job in progress, and, if the batteries are low, it will not initiate a new function.

A battery warning lamp on the front of the drive alerts the user to low batteries. There is also a disk access lamp that informs the user when the diskette is being accessed.

The portable disk drive is 2 in. by 4 5/16-in. by 6¼ in. and weighs only 1¾ lb. Operating software is included on the floppy diskette that comes with the disk drive. The drive is initiated by typing in a three-line Basic program.

The Tandy 200/Model 100 Portable Disk Drive will be available this month at Radio Shack Corp. computer centers and Radio Shack dealers. The drive is priced at $199.95.

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Testing, debugging package debuts for IBM CPU software

Application Development Systems, Inc. of Minneapolis has enhanced Xpediter, its testing and debugging software package for IBM and compatible mainframes.

Xpediter was designed for use in Cobol and assembler environments under IBM's MVS, MVS/XA and VM/CMS operating systems. The package automates the testing and debugging phase of the program development and maintenance life cycle.

The version uses full screen technology to support the debugging process. A scrolling full screen display of the source code allows the user to watch the source code during execution, which helps to isolate the logical errors and the sources of abends.

Other features

Other features include display of variable values during execution and overtyping to change data values.

All features of the existing Xpediter package will be supported, including abend interception, optional batch mode operation and storing commands in procedure files for repetitive use or regression tests.

The product uses a symbolic data set that shields the source code from test activity, reduces maintenance and eliminates the need to compile-in/compile-out debugging statements.

Xpediter runs interactively with various operating environments including CMS, BTS and Roscoe and can also be used in batch mode.

The enhanced version of Xpediter is available through this year at current prices of approximately $30,000 to $50,000. Beginning in January, prices will range from $33,000 to $55,000.

DEC enhances graphics interface

Digital Equipment Corp. has announced Version 2 of its MicroVMS Workstation software, the standard graphics interface for its Vaxstation I and II graphics workstation computer systems.

Version 2 of MicroVMS Workstation enables programmer developers to write applications programs in which users can create, manipulate and draw into windows displayed on the Vaxstation screen. Users will also have the ability to enlarge or reduce the windows.

Developers and end users will be able to emulate various terminals, including DEC's VT100 and Tektronix, Inc.'s 4014, in the different windows and to log on to each terminal. Users can reposition existing windows anywhere on the screen and can move windows to the top or bottom of the screen's stacking order.

Version 2 of the MicroVMS Workstation software is licensed at $1,000 and will run on both Vaxstation I and Vaxstation II, including the AI Vaxstation.

Motorola systems

Motorola/Four-Phase Systems, Inc., a subsidiary of Motorola, Inc. of Cupertino, Calif., has added two configurations to its line of AT&T Unix-based supermicrocomputers.

The System 290/5 has been added to the Series 2000 family, and the System 6350 has been added to the Series 6000 family. According to a spokesman, the primary enhancement to both of these systems is a 60M-byte, ¼-in. streaming tape drive that provides a simple and convenient method of backing up the systems' internal hard disk.

Both supermicro systems are based on Motorola's 68010 32-bit processor, and both support the company's Business Assistant series of integrated software services.

The System 290/5 features a 52M-byte Winchester hard disk and 1M byte of error-correcting random-access memory (RAM). The system costs approximately $22,600.

The System 6350, priced at approximately $16,700, features a 655K-byte, half-height floppy disk drive, up to 2M bytes of RAM and a choice of either a 37M- or 70M-byte Winchester disk that is expandable to up to 140M bytes.

Net interface out for IBM MVS users

Westinghouse Electric Corp. of Pittsburgh has announced Network Control Interface (NCI) software providing a single common entry point to online IBM MVS applications.

NCI's single-point entry capability reportedly permits the end user to design an entry panel that acts as the central switching point for application logon. Application selection is determined by a user-defined program function key, and connection to the application is executed automatically by NCI.

NCI executes as an IBM ACF/VTAM program under MVS. The perpetual license price for the product is $8,500.

Information appearing in the New Products section has been provided by manufacturers and has not been independently validated by Computerworld.

NEW PRODUCTS

PRICE REDUCTIONS

General Computer Corp. has reduced the price of its **Hyperdrive and Hyperdrive 20** internal hard disks for the Apple Computer, Inc. Macintosh personal computer.

The new price of Hyperdrive is $1,695. The new price of Hyperdrive 20 is $2,195.

General Computer, 215 First St., Cambridge, Mass. 02142.

■

Data Technology Corp.'s Teammate Division has reduced the prices on the **Model 1110, 1213, 1120, 1223, 1132, 1120AT, 1132AT, 1132AT/H, 1160AT, 1320/R10** and **1420/R10**, the company's IBM-compatible fixed Winchester subsystems and removable drives.

The new prices are as follows: Model 1110, $995; Model 1213, $2,095; Model 1120, $1,195; Model 1223, $2,295; Model 1132, $1,895; Model 1120AT, $895; Model 1132AT, $1,295; Model 1132AT/H, $1,395; Model 1160AT, $2,495; Model 1320/R10, $2,495; and Model 1420/R10, $2,795.

Data Technology, Teammate Division, 2525 Walsh Ave., Santa Clara, Calif. 95051.

■

Texas Instruments, Inc. has reduced its suggested list prices on the **Model 855, Model 865** and **Model 855/Automatic Sheet Feeder** of its letter-quality **Omni 800** micro printer line.

The new cost of friction Model 855 is $739, and the tractor version is $799. The Model 865 is now priced at $999. Fourth-quarter shipments of the Model 855/Automatic Sheet Feeder are priced at $999.

TI, H-814, P.O. Box 809063, Dallas, Texas 75380.

■

Lear Siegler, Inc. has reduced the prices of its **ADM 11, ADM 11Plus** and **ADM 12Plus** general-purpose VDTs.

The ADM 11 conversational-mode terminal is now priced at $549. The ADM 11Plus advanced conversational editing terminal is now priced at $569. The ADM 12Plus advanced editing, conversational/block mode terminal is now priced at $599.

Lear Siegler, 901 E. Ball Road, Anaheim, Calif. 92805.

■

NEC Home Electronics, Inc. has cut prices on the **JC-1216** and **JC-1460** monitors and the **PC-PR103A, PC-PR105A** and **PC-8027A** dot matrix printers.

The NEC JC-1216 and the JC-1460 monitors are now priced at $499. The PC-PR103A printer now costs $399, as do the IBM-compatible PC-PR105A and the transportable PC-8027A.

NEC Home Electronics, Suite 10, 700 Nicholas Blvd., Elk Grove Village, Ill. 60007.

■

Borland International has announced that it is adding **Reflex: The Analyst**, an analytical data base developed by Analytica Corp., to its site licensing program.

Until March 31, 1986, Reflex customers can purchase a master disk and make up to 2,000 copies for $29,500 or an unlimited number of copies for $60,000. After March 31, the price will be $42,000 and $85,000, respectively.

Primary software upgrades will be available for 30% of the site license fee, and secondary upgrades can be purchased for 10% of the license fee.

The price for single copies of Reflex has been reduced from $495 to $99.95 through March, when it will cost $149.95.

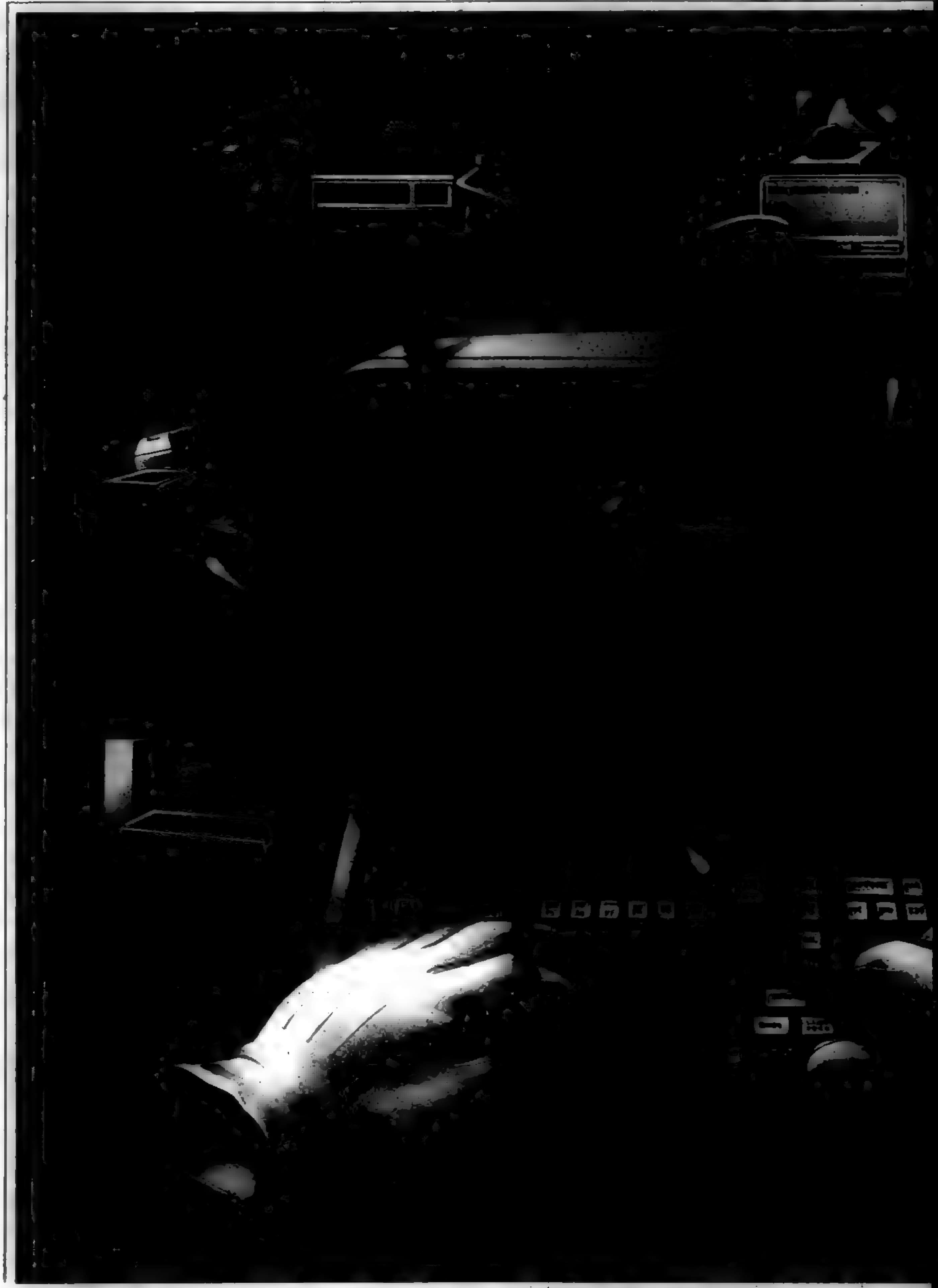
Reflex was designed for use with the IBM Personal Computer, Personal Computer XT, AT and compatibles running on IBM's PC-DOS or Microsoft Corp.'s MS-DOS Version 2 or later operating systems.

Borland International, 4585 Scotts Valley Drive, Scotts Valley, Calif. 95066.

SOFTWARE & SERVICES

Systems software

Peregrin Systems, Inc. has introduced **PNMS III**, a fourth-generation network management software system for the IBM 370, 3000 or 4300 systems using MVS/VTAM and for several mini



and supermicro systems using AT&T Unix.

PNMS III lets users record, track and resolve problems that occur in a network. It includes a relational data base manager, a format manager and a report writer.

Users can access system data, create customized problem entry and analysis formats using data from many different files and generate user-defined reports.

PNMS is implemented with Peregrine Four, Peregrine's fourth-generation applications environment software.

Prices range from $6,000 to $35,000.

Peregrine Systems, Building C, 15530 Rockfield Blvd., Irvine, Calif. 92714.

Productivity aids

American Research Corp. has released a multiple file interface program, **Multifile**, designed for users of the SPSS, Inc. SPSS Information Analysis System on Tandem Computers, Inc. equipment.

Multifile functions as a link between up to 64 Tandem files. Users can create new data files by drawing on data selected from different files, facilitating data management and statistical analysis. Multifile can be used in interactive, real-time or batch environments.

The first-year Multifile license fee for Tandem SPSS sites is $4,500. For users who do not have Tandem SPSS, the fee is $7,500. Network and corporate licensing agreements are available.

American Research, Suite 20, 2885 E. Aurora Ave., Boulder, Colo. 80303.

■

Software World, Inc. has introduced **Dataprep**, a software utility for Digital Equipment Corp., Prime Computer, Inc. and IBM Personal Computer users that enables automatic data entry without programming.

Dataprep allows people without DP experience to design and install screen formats without programming, while DP professionals and other system integrators can create interactive systems for a variety of applications.

It has the functionality of a key-to-disk system, including browse and edit, keypunch verification, form mobility and multiple records per screen.

Dataprep is supported on DEC VAX, Microvax, PDP-11, -10, -20 machines and on Prime and IBM personal computers. It can be used on a variety of terminal types, including DEC's VT series. The software is written in Fortran.

Prices for Dataprep range from $2,800 to $4,000 on DEC VAX and Prime personal computers. The DEC PDP price is $2,300, and the IBM price is $795. Maintenance is 15% of the purchase price.

Software World, Suite 1905, 888 Seventh Ave., New York, N.Y. 10106.

Application packages

Goal Systems International, Inc. has announced **Release 2.1**, a new version of it performance monitor Explore/VM.

Release 2.1 provides enhancements to the product's real-time and batch-reporting facilities. The enhancements to the real-time facility include complete extended color support, security for controlling the use of Explore/VM and additional report commands.

The batch reporting facility of Explore/VM now supports variable plotting with dynamic scaling and the ability to categorize users into performance groups, as well as to concatenate multiple history files for reporting. Six tabular reports have also been added.

The price for Explore/VM is $5,600 for a permanent license or $140 per month for a three-year renewable license.

Goal Systems International, 6455 N. High St., Columbus, Ohio 43212.

Data base management systems

Softlight Corp. has announced the menu-driven **Filing Systems Organizer** (FSO) for the IBM System/36.

FSO enables users without programming knowledge to establish and maintain computer-based indexes for their paperwork and files, client lists and program libraries.

The system features a free-form notes screen and a formatted information screen.

A data dictionary is supplied to link information stored to IBM's Query/36 and Displaywrite/36 so users can create custom reports and

Continued on page 90

Manage all elements of your high-speed DataComm universe.

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If you're moving into a new high-speed T1 network and want to provide finger-tip control from the computer room to every desk in your organization, General DataComm has an off-the-shelf solution.

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N.M.T.C.—Alcove D • COMDEX FALL—Booth 2366

NEW PRODUCTS

Continued from page 89

mass mailings.

FSO runs on the System/36 under Release 3 or later of the System Support Program.

FSO is priced at $250.

Softlight, 303 S. Woodrow St., Clinton, S.C. 29325.

Training

Nastec Corp. has announced a video-based software engineering training curriculum, called **SETC**, designed for managers and practitioners of software development.

SETC contains 26 video modules covering aspects of software engineering from project planning to testing.

The videotapes are accompanied by six workbooks, a software engineering textbook, guidelines, checklists, exercises with answers and a detailed training guide.

An SETC 12-month site license is priced at $9,950 through this year. In 1986, a 12-month site license will be $13,900, and a 12-month renewal license will cost $5,900.

Nastec, 24681 Northwestern Highway, Southfield, Mich. 48075.

MICROCOMPUTERS

Software

Westinghouse Electric Corp. has announced **Scepter**, an on-line programming system that allows IBM DOS/VSE users to migrate to IBM's VSE SP2.1 enhancement of DOS.

Scepter provides users with simultaneous access to VSE and SP2.1 libraries, including a procedure library. To update a procedure, users copy it from the old library into a Scepter work file. Scepter changes the IBM JCL and catalogs the procedure directly into the SP2.1 procedure library.

Scepter costs $6,000.

Westinghouse Electric, Westinghouse Building, Gateway Center, Pittsburgh, Pa. 15222.

■

Intel Corp. has announced **Aedit-DOS**, an editor for creating and editing source and object code as well as text.

Aedit-DOS runs on computers using IBM's PC-DOS 3 as well as on Intel's Intellec Series III and IV development systems and on Intel's Irmx operating system.

Aedit-DOS is menu driven. Also included is a macro library.

Aedit-DOS costs $350, the vendor said.

Intel, 5200 N.E. Elam Young Pkwy., Hillsboro, Ore. 97123.

■

Bradford Information Systems has announced that its **Interactive Distribution Planning System** (IDPS) software is now available for IBM Personal Computers and compatibles.

IDPS is an application package for vehicle routing, distribution planning and network optimization designed for companies that distribute products with their own truck fleet.

IDPS features various models, including vehicle routing, optimum location and optimum assignment of customers to distribution centers. It also has an order entry system.

IDPS interfaces with Lotus Development Corp.'s 1-2-3, Ashton Tate's Dbase III and Information Builders, Inc.'s PC/Focus for additional capabilities in reporting, data base analysis and graphics.

System requirements are an IBM Personal Computer XT with 512K bytes of memory and an Intel Corp. 8087 math coprocessor. IDPS also runs on Compaq Computer Corp.'s Compaq 286, Compaq Plus and Deskpro.

The price for the IDPS software is $10,000 for one copy, including upgrades to any future versions.

Bradford Information Systems, 5701 Nasco Drive, Austin, Texas 78756.

■

Writing Consultants, a division of Microlytics, Inc., has announced **Version 2.2** of its memory-resident electronic thesaurus software **Word Finder**.

Version 2.2 allows the user to select the nearest matching word when the exact word is not found, switch between 12 word processors, unload from random-access memory (RAM) and specify a DOS path.

Word Finder runs on the IBM Personal Computer, Personal Computer XT, AT and compatibles with DOS 2 or higher and 128K of RAM as well as on Digital Research, Inc. CP/M-based computers.

It costs at $79.95.

Writing Consultants, 300 Main St., East Rochester, N.Y. 14445.

■

Unilogic, Ltd. has enhanced its **Scribe Document Production** software to integrate automatically graphics images created on the Apple Computer, Inc. Macintosh personal computer with multiple-font text to produce typeset pages.

Scribe software allows users to produce documents of all types. The enhancement allows users to include a variety of merged graphics, such as bar charts, pie charts, flow diagrams, line drawings, curved shapes and halftones, in their documents.

Scribe runs on Digital Equipment Corp. Decsystem-10, Decsystem-20, VAX/VMS and VAX/Unix mainframes as well as mainframes from Prime Computer, Inc., Gould, Inc., Pyramid Technology Corp. and IBM and workstations from Apollo Computer, Inc. and Sun Microsystems, Inc. It supports Adobe Systems, Inc.'s

Continued on page 94

WHAT IF...
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Amdahl's Modeling and Analysis Package (MAP*) is a software tool for performance analysis and capacity planning to help manage growth in both TSO and CMS environments. With MAP, you can make informed choices as you plan and manage the growth of your computer systems.

Learn how you can attend the MAP training class and use MAP at your site free for sixty days. Call Bill Davis, Software Product Manager, at (408) 746-8861, to find out about this special offer.

MAP offers an easy-to-use, powerful, and economical way to answer your "What If...?" questions. What if your transaction rate doubles? Should you upgrade your CPU...or add more DASD? What if you're planning to install a new CPU? Will there be any surprises?

MAP
Users Can Easily and Quickly Determine Each Option's Impact on System Performance:

- **Model complex** hardware configurations and operating **system environments**, including **MVS/XA**, MVS/370, VM, DOS/VSE, VS1, and ACP.
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- Evaluate the effects of memory size and paging/swapping on performance.
- Automatically generate models from MVS system measurement data.
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For IMS systems, Amdahl's System Utilization Reporting Facility/IMS (**SURF/IMS**) lets you use prototyping to find out how changes in software affect your total system.
- Simulate new IMS applications.
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*Developed for Amdahl by Quantitative System Performance (QSP) Inc., Seattle, Washington

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SPECIAL REPORT

Protecting the Corporate Information Resource

Issue Date: November 25 · Advertising Close: November 8

As corporations continue to expand their computer systems and data bases, the need to secure corporate information is becoming increasingly important. *Computerworld's* November 25 Special Report on Protecting the Corporate Information Resource will address the many complexities surrounding the corporate security issue.

This Special Report will present a "nuts-and-bolts" perspective of securing the entire computer facility, including physical security (from mainframes to micros), data security, and disaster recovery. And its message will reach *Computerworld's* audience of 687,303 computer-involved professionals.

Our many features and tutorials will explore the importance of audit software, the differences between "hot" and "cold" sites, and methods for securing local area networks — plus creation of a disaster recovery plan and new technologies for determining user authentication. We'll also examine security legislation being studied in Washington and look at the vital roles played by the data processing manager and chief security officer.

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THE NEW VECTRA PERSONAL COMPUTER

FROM HEWLETT-PACKARD.

In today's fast-moving business environment, you need a personal computer that has the flexibility to fit perfectly with changing business needs and opportunities. The new Hewlett-Packard Vectra PC is just such a computer: flexible and versatile.

You get the *performance* you need, because you can select the power, speed and memory capabilities that suit you best; the *software* you need, because it's compatible with the IBM PC/AT; and the *hardware flexibility* you need, because it's designed to access a full range of accessories and peripherals.

The HP Vectra PC is a high performance computer. It's 30% faster than the IBM PC/AT. And with the addition of the optional co-processor, it can run even faster.

And since the Vectra PC is compatible with the IBM PC/AT, it runs PC-DOS 3.1 programs—without alteration. Like Lotus® 1-2-3,® MultiMate,™ and R:BASE™ 5000, plus HP's new AdvanceWrite word processing series, TextCharts presentation graphics, and more.

There are several internal and external memory storage

HP Vectra Specs:

MEMORY
256K expandable to 3.64MB

MICROPROCESSOR
Intel 80286; runs at 8MHZ
Optional: Intel 80287; co-processor runs at 5.33 MHZ

OPERATING SYSTEM
MS-DOS 3.1 (compatible with PC-DOS 3.1)

DATA STORAGE
5¼" internal flexible discs (360K or 1.2MB capacity)
20MB internal hard discs
3½" stand-alone flexible discs; 20MB stand-alone hard disc.

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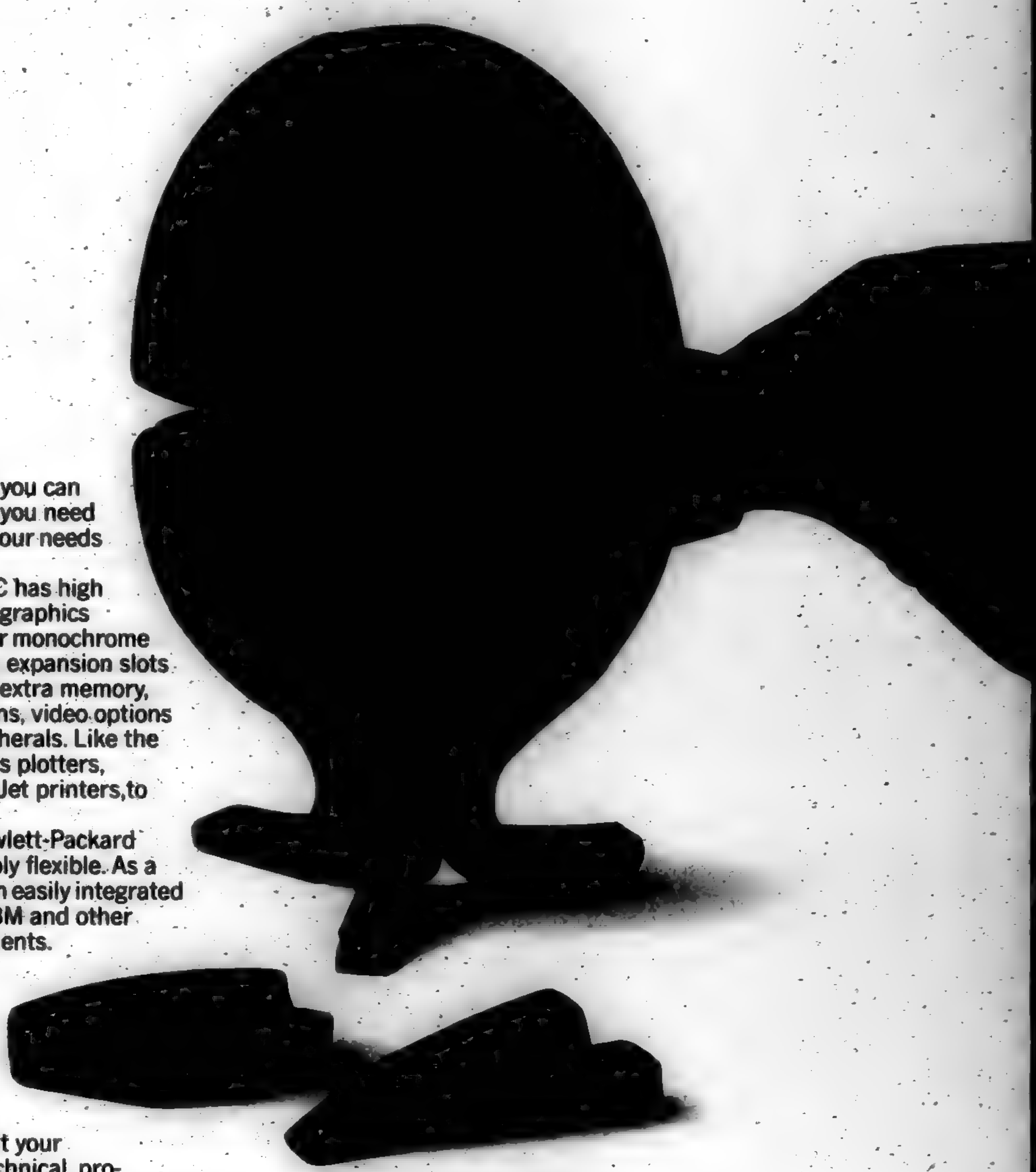

options, as well. So you can choose the storage you need now. Or expand as your needs change.

The Vectra PC has high resolution text and graphics capabilities. Color or monochrome displays. And seven expansion slots to add accessories, extra memory, data communications, video options plus a host of peripherals. Like the popular HP graphics plotters, ThinkJet and LaserJet printers, to name a few.

In all, the Hewlett-Packard Vectra PC is superbly flexible. As a stand-alone, or as an easily integrated addition with HP, IBM and other computer environments. And, because it comes from Hewlett-Packard, you know you're getting a quality product.

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HEWLETT PACKARD
Business Computing Systems

Lotus 1-2-3 business graphics shown. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. MultiMate™ is a U.S. trademark of Multimate International. R:BASE™ is a U.S. trademark of Microrim, Inc.

PG02513

NEW PRODUCTS

Continued from page 90

Postscript, a page description language used with Apple's Laserwriter printer as well as other laser printers.

Scribe ranges in price from $4,000 to $25,000.

Unilogic, Suite 240, Commerce Court, Four Station Sq., Pittsburgh, Pa. 15219.

■

CPAids, Inc. has introduced **Time & Billing**, software designed for businesses that bill clients on a time-spent basis.

Time & Billing is a menu-driven program that can be used to calculate, print and process all billing; maintain staff files for up to 100 employees; print a list of billable hours and expenses on an invoice and maintain another list of actual hours and expenses incurred for in-house management use; and maintain an accounts receivable section.

Time & Billing is available on either 8-in. or 5¼-in. hard or floppy disks and runs on Digital Research, Inc. CP/M 80; IBM PC-DOS; and Microsoft Corp. MS-DOS. It costs $995.

CPAids, 1061 Fraternity Circle, Kent, Ohio 44240.

■

Ken Orr & Associates, Inc. has unveiled a version of its computer-aided software engineering tool, **Documentorr**, for the IBM Personal Computer XT, AT and compatibles.

Documentorr is designed to automate the production of project management and systems development documentation. It enables project managers to monitor progress, schedule resources and attain timely documentation.

Documentorr can be used in two modes. Development mode is for producing and maintaining documentation. Review mode is for reviewing and approving completed work. The software costs $6,900.

Ken Orr & Associates, 1725 Gage Blvd., Topeka, Kan. 66604.

■

Generic Software, Inc. has announced a computer-aided design and drafting package, **Generic CADD**, for IBM Personal Computers and compatibles.

Generic CADD is a two-dimensional design and drafting package featuring multiple layers, multiple line types, user-definable fonts and rubber banding line and windows.

Minimum system requirements are IBM PC-DOS or Microsoft Corp. MS-DOS 2 or higher, 256K bytes of memory, Intel Corp. 8087 numeric coprocessor, video graphics board, video monitor and two floppy disk drives. Generic Cadd costs $99.95.

Generic Software, No. 203, 6 Lake Bellevue, Bellevue, Wash. 98005.

■

Softstyle, Inc. has introduced its **Printworks for Lasers** software for the IBM Personal Computer, Personal Computer XT, AT and compatibles; the Hewlett-Packard Co. Laserjet and Laserjet Plus; and the Canon USA, Inc. LBP-8A1 and LBP-8A2 Laser Beam Printers.

Printworks for Lasers is an instant-access memory-resident program designed to make features of laser printers accessible through menus. Users can select type fonts, image size and other printer features. It allows users to merge files and images from different software programs, combining text from Micropro International Corp. Wordstar and graphics from Lotus Developent Corp.'s 1-2-3, and print them.

Printworks for Lasers requires Microsoft Corp. MS-DOS or IBM PC-DOS 2 or higher and a minimum of 60K bytes of memory although 256K bytes of memory are recommended. It costs $125.

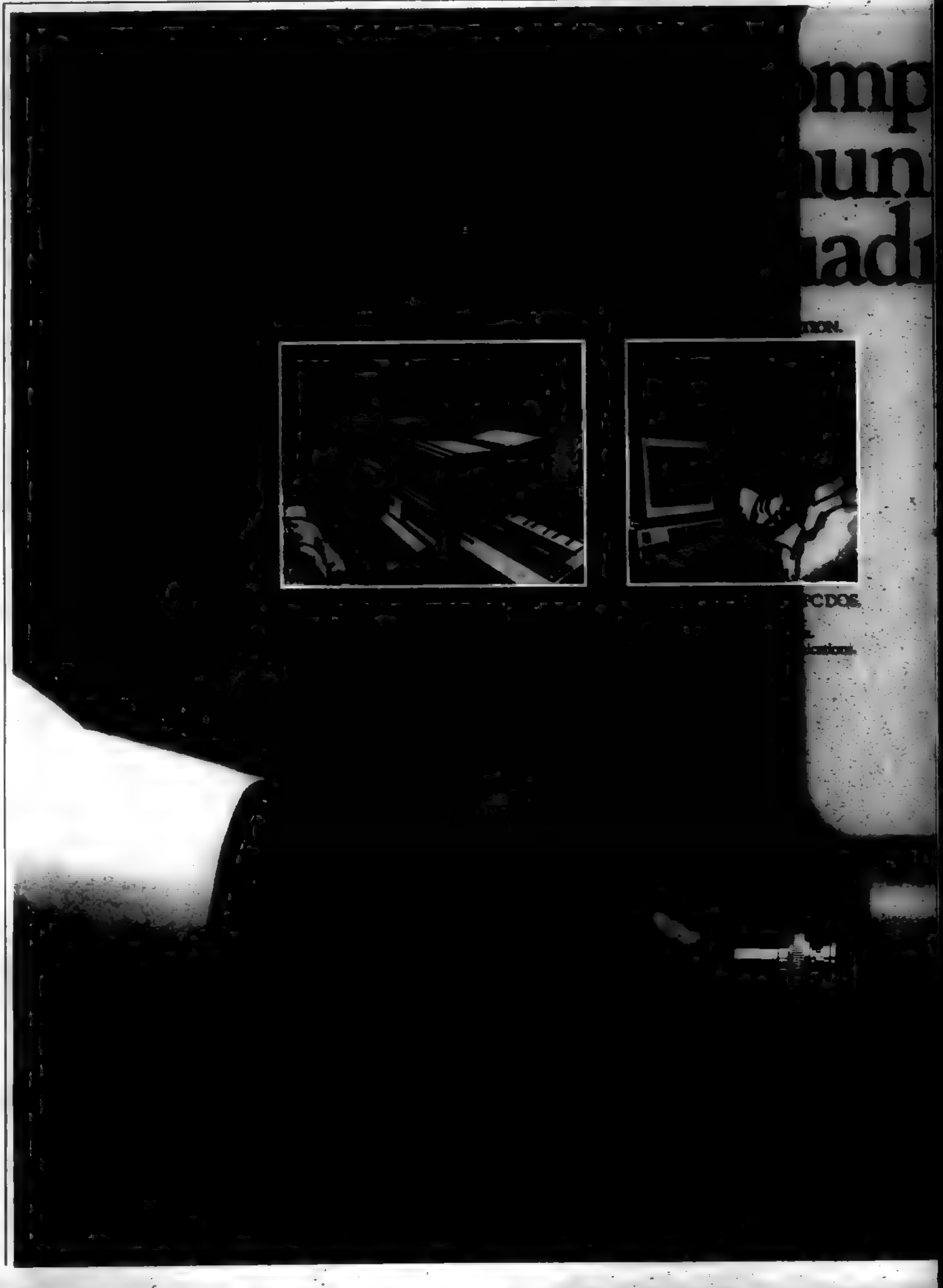
Softstyle, 2080 S. Carboy Road, Mount Prospect, Ill. 60056.

■

Corona Data Systems, Inc. has released **Version 3** of its **LP-300 Laser Printer** software, featuring additional fonts and new commands.

There are now 38 fonts included with the LP-300. Features include automatic downloading of diskette-based fonts and more than 30 additional text, graphics and printer commands.

LP-300 runs on the Corona Personal Computer and other personal computers running under Microsoft Corp. MS-DOS or IBM PC-DOS. A 1.89M bit/sec. IBM-style personal computer controller board



NEW PRODUCTS

with a 64K-byte recirculation video buffer provides the hardware interface between the personal computer and the laser engine.

Existing users of LP-300 can upgrade to Version 3 for $65. The tool costs $3,395.

Corona Data Systems, 275 E. Hillcrest Drive, Thousand Oaks, Calif. 91360.

■

Contel Information Systems, Inc. has ported its **RTFile** interactive relational data base management system to microcomputers.

RTFile is now available for the Digital Equipment Corp. Professional 300 series running under DEC P/OS, DEC Rainbows running under Microsoft Corp. MS-DOS and IBM Personal Computers running under IBM PC-DOS. It has the identical functionality of the RTFile used with larger DEC computers.

RTFile's menu-driven functions include data base definition and display format generation.

Single-CPU, site and corporate RTFile licenses range from $500 to $20,000, depending upon the operating system.

Contel Information Systems, 4330 E. West Highway, Bethesda, Md. 20814.

■

Phoenix Computer Products Corp. has upgraded two of its software utilities, **Plink 86 Plus** and **Pfix 86 Plus**, and has included them in a package called **Pfantasy Pac 1**.

Pfix 86 Plus is a symbolic debugger that offers programmers in Microsoft Corp. MS-DOS environments configurable menus, configurable keys and trace-backs.

Plink 86 Plus is a linkage editor featuring overlay caching, object-file merging and overlay reloading upon function return.

Pfix 86 Plus and Plink 86 Plus are priced at $395.

Plink 86 Plus and Pfix 86 Plus are also part of a package of programming tools being offered by Phoenix. Pfantasy Pac 1 also includes Ptel, a file transfer tool; Pmate, a text editor; Pmaker, a version of AT&T Unix's Make utility; and Pfinish, a symbolic program/operating environment analyzer.

Until Dec. 31, Pfantasy Pac 1 costs $995. After that, it will cost $1,295.

Phoenix Computer Products, Suite 220, 1416 Providence Highway, Norwood, Mass. 02062.

■

Vaxon, Inc. has released **Concurplus**, a concurrent multitasking multiuser package.

Concurplus runs up to 10 application programs concurrently in the background; one keystroke brings programs to the foreground. The software allows connection to two serial RS-232 terminals for a three-station multiuser operation. The terminals may be plugged into personal computer communications ports or used with a modem hookup.

Designed for IBM Personal Computers, Personal Computer XTs, ATs and compatible microcomputers running IBM's PC-DOS, Concurplus requires at least 256K bytes of memory. It costs $395.

Vaxon, Suite 127, 6363 Wilshire Blvd., Los Angeles, Calif. 90048.

■

Concurrent Sciences has unwrapped a Microsoft Corp. MS-DOS version of its software debugger, **Soft-Scope**, and an in-circuit emulation package called **Hard-Scope**.

Soft-Scope supports the five MS-DOS languages offered by Intel Corp.: C, Pascal, Fortran, PLM and ASM.

Working with the Mice-II in-circuit emulator for Intel 8086 processors, Hard-Scope provides a symbolic interface for code generated by Intel high-level languages.

Both tools report breakpoints and stepping with the actual source line corresponding to the next line to be executed. Hard-Scope can display the 2,048-cycle trace buffer in terms of the user's source code, showing each source line passed through during real-time execution previous to a breakpoint.

Soft-Scope and Hard-Scope automatically display all variable types, including Pascal records, PLM and C structures, multidimensional arrays and real types. Users can qualify structure and array references to display the name and current contents of each field.

The products require an IBM Personal Computer, Personal Computer XT, AT or compatible processor; 256K

Continued on page 96.

lete family of
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am connection.

3270 SNA GATEWAY.

- 3274 cluster controller emulation.
- Links your network to SNA via SDLC.
- Provides up to 32 simultaneous 3278 LU emulations.
- Modem pooling.
- Synchronous speeds from 2400 through 9600 plus 56KB speed.
- LAN Bridging.

5251 TERMINAL EMULATION.

- 5251 and 5292 terminal emulation.
- Hot key between PC applications and emulation mode.
- Intelligent file transfer and file inquiry.
- Allows PC printer support.

UPGRADEABLE MODEMS.

- User upgradability from 1200 to 2400 baud.
- Hayes compatibility.
- Supplied with Crosstalk communications software.
- Bridge to tomorrow's technology.

NEW PRODUCTS

Continued from page 56

bytes of random-access memory; and IBM PC-DOS 2 or higher.

Soft-Scope and Hard-Scope cost $500 each.

Concurrent Sciences, Box 9666, 106 E. Third St., Moscow, Idaho 83843.

■

Nothing-But-The-Facts, a demographic data base of 3,137 U.S. counties and 957 cities with populations exceeding 25,000, has debuted from **Melissa Data Co.**

Designed for IBM Personal Computers and compatible processors, the Nothing-But-The-Facts data base contains information on agriculture, crime, education, health, housing, labor force, income, population, poverty, vital statistics, trade and more.

Priced at $295, Nothing-But-The-Facts consists of 8.5M bytes of information on 32 diskettes.

Melissa Data, 12 Balboa Coves, Newport Beach, Calif. 92663.

■

Scenic Computer Systems Corp. has enhanced **Scenicwriter**, its text publishing system, to run on Microsoft Corp. MS-DOS computers.

Scenicwriter drives laser printers such as Hewlett-Packard Co.'s Laserjet and Laserjet Plus, and the Apple Computer, Inc. Laserwriter. Running on an IBM Personal Computer AT, the text publishing system can compose up to 180 camera-ready layouts per hour.

Scenicwriter costs $995.

Scenic Computer Systems, 14852 N.E. 31st Circje, Redmond, Wash. 98052.

■

Articulate Publications, Inc. has released **Adept**, a data base programmer tool kit for its Medical IS and Dental IS practice management software.

Adept contains 20 machine language and relocatable object functions that allow users to write programs to access the Medical IS and Dental IS data base.

Priced at $500, Adept is available for Digital Research, Inc. 8-bit CP/M and 16-bit CP/M, Microsoft Corp. MS-DOS and IBM PC-DOS computers.

Articulate Publications, 402 N. Larchmont Blvd., Los Angeles, Calif. 90004.

■

Interpath Corp. has unveiled **Assist**, interface software that simplifies commands in application software for the IBM Personal Computer, Personal Computer XT and compatible computers.

Assist is a menu-driven package that automatically generates program inputs and answers program requests, prompting the user for responses as necessary.

Toggled on and off with one keystroke, Assist interfaces with Lotus Development Corp.'s 1-2-3, Micropro International Corp.'s Wordstar and Microsoft Corp.'s Word software.

Assist functions include Load, Save, Create and Print, which require one keystroke to provide the same prompt sequences for each application program. It costs $69.95.

Interpath, Suite 253, 3333 Bowers Ave., Santa Clara, Calif. 95054.

Type-Set-It, a desktop typesetting system that uses font display on the IBM Personal Computer screen and produces near typeset quality on a dot matrix printer, has bowed from **Good Ideas.**

Type-Set-It generates 1,200 fonts, including italic, bold and condensed. All typefaces are available in 75 sizes from 5/64 in. to 1¼ in. in height.

Type-Set-It uses plain English, pop-up menus and no mnemonic coding. It requires an IBM Personal Computer with at least 256K bytes of memory, one disk, a Hercules Computer Technology Co. graphics card, monochrome monitor and Epson America, Inc. FX series or IBM Graphics dot matrix printers.

The package sells for $395. A $10 demonstration disk is also available.

Good Ideas, 175 Lowell St., Andover, Mass. 10810.

Wordtech Systems, Inc. is offering **DBChart**, a graphing utility for Ashton-Tate Dbase II and Dbase III users.

DBChart represents data in column, line, step, deviation, pie and doughnut charts that can be output to a printer, displayed on screen or used with peripherals.

Users can produce pictograph charts that use symbols to represent quantities. Basic symbols are supplied in an image library; custom symbols may be created.

The program requires an IBM Personal Computer, Personal Computer XT or compatible processor with at least 128K bytes of random-access memory, a color graphics display unit and an Epson America, Inc. FX or IBM printer. DBChart lists for $99.

Wordtech Systems, P.O. Box 1747 Orinde, Calif. 94563.

Rio Grande Software, Inc. has announced **File & Report** data management programs that produce reports, lists and summaries for the Apple Computer, Inc. Macintosh, Apple IIc, Apple IIe and IBM Personal Computers and compatibles.

File & Report utilities include a record manager that offers options to add, change, find or view records, a report manager and a file manager, according to the vendor.

The program costs $89.95.

Rio Grande Software, P.O. Box 5906, 221 Nolana, McAllen, Texas 78504.

■

Management Graphics, Inc. is offering **Personal Business Slideware** (PBS) for designing business graphics for subsequent processing into

NEW PRODUCTS

slides, prints or overhead transparencies.

Users design slides on the personal computer and then transfer slide files via modem or courier either to a slide service center or in-house slide making system. The slide files are then processed into presentation-quality 35mm slides, 4-in. by 5-in. prints or 8-in. by 10-in. overhead transparencies.

PBS runs on the IBM Personal Computer, Personal Computer XT, AT, Compaq Computer Corp. Compaq Plus, Compaq and compatible systems.

It is compatible with the vendor's TTS/Plus and QM-1 Quickchart Concentrator computerized slide making systems.

PBS sells for $995.

Management Graphics, 1401 E. 79th St., Minneapolis, Minn. 55420.

International Expense Account Manager, a package that maintains business travel and entertainment records, has been announced by **Adaptive Software.**

The software converts foreign currency expenditures to U.S. dollars even if rates change within a given day or report. It reminds users of frequently overlooked expenses and calculates and categorizes common business trip expenditures.

Thirty-two travel expense items are supplied, along with prompts for information required by the Internal Revenue Service regarding business entertainment.

International Expense Account Manager for IBM Personal Computers and compatible processors costs $99. A version without foreign conversion, matrix format or graph options for the Apple Computer, Inc. Apple sells for $89.

Adaptive Software, 1868 Cavell Ave., Highland Park, Ill. 60035.

■

Gould's Basic Squeezer, a utility that compresses Basic programs to use less random-access memory, is available from **Waverly Systems, Inc.**

Gould's Basic Squeezer removes remark and comment lines from the source code. The compressed program is harder for end users to modify.

System requirements are an IBM Personal Computer, Personal Computer AT or compatible processor with 128K bytes of memory, DOS 2 or higher and graphics capability. The package will compress Basic programs written under current versions of IBM's PC-DOS.

Gould's Basic Squeezer costs $34.

Waverly Systems, 1003 Aline St., New Orleans, La. 70185.

■

Datalight has offered a compiler, called **Datalight C**, that implements the AT&T Unix System V C language for IBM and compatible personal computers running Microsoft Corp.'s MS-DOS.

A two-pass optimizing compiler, Datalight C provides Intel Corp. 8087 software floating support, a Make program, MS-DOS object file compatibility, type checking that flags mismatches and library/start-up source code.

Optimizations include common subexpression and dead code elimination, branch optimization, constant folding and strength reduction.

The library contains 125 Unix-compatible functions.

Datalight C produces DOS object files that can be used with the DOS linker, debugger and standard libraries and third-party libraries compatible with Lattice, Inc.'s Lattice-C.

The compiler costs $60.

Datalight, 11557 8th Ave. N.E., Seattle, Wash. 98125.

■

Virtu, software that lets multiple personal computers print files on a Wang Laboratories, Inc. VS printer, has debuted from **Math Strategies, Inc.**

The package converts personal computer print files into VS documents that can be output via the Wang VS with a laser or other word processing printer. Besides running on the Wang VS or personal computer, Virtu can work with the Wang Local Communications Option for the IBM Personal Computer, which includes Wang Word Processing with document filing.

Virtu uses a keyboard macro to drive document filing so no input is required from the user. The Virtu personal computer installation program requests user identification, password, VS document number and lines per page, which are stored as default values in a file for use at run-time.

Virtu licenses for $1,750 per VS CPU plus a $175 annual maintenance charge. There is no charge for personal computers attached to the licensed VS.

Math Strategies, Suite 306, Green Valley Building, 604 Green Valley Road, Greensboro, N.C. 27408.

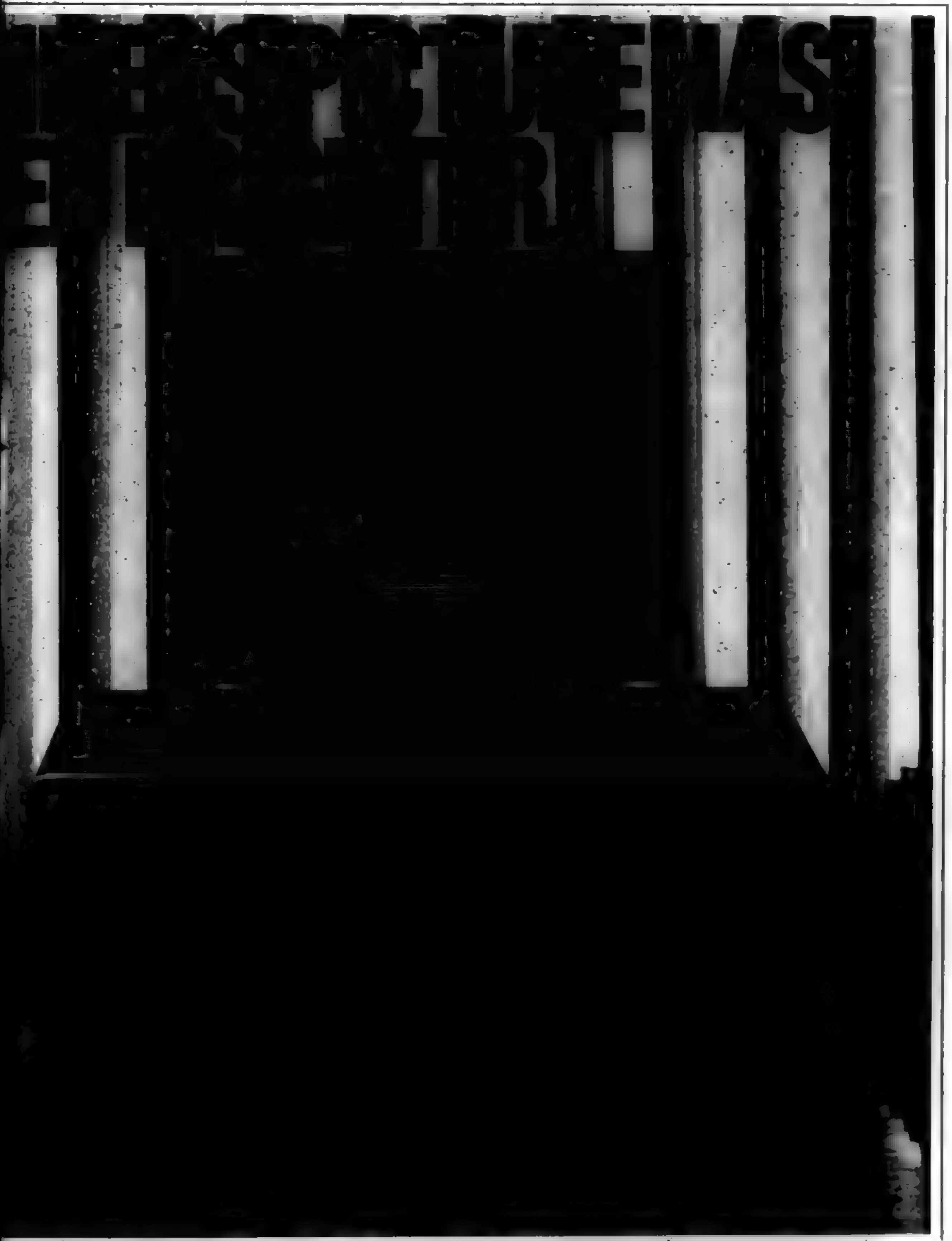
■

True Basic, Inc. is offering **four libraries** for users of its **True Basic** language system for the IBM Personal Computer, giving programmers direct access to operating systems and communications ports plus the ability to develop data management software.

A forms management library, True Basic developer's tool kit, communications support library and Softcraft, Inc.'s Btrieve file management package comprise the set.

The forms management library creates a user interface by letting program developers define a screen's layout and I/O. True Basic developer's tool kit allows a programmer to work with the computer's operating

Continued on page 98



Continued from page 97

system to manage logical bit operations and hardware registers.

The communications support library gives modem owners the ability to build communications applications. It supports two serial ports simultaneously running at speeds up to 19.2K bit/sec.

An interface to the Btrieve file management package enables programmers to develop data management programs.

Each library runs on IBM Personal Computers and compatible processors using IBM PC-DOS 2 or 3.

Prices are $40 for the developer's tool kit, $50 each for the communications support and forms management libraries and $65 for the Btrieve interface.

True Basic, 39 S. Main St., Hanover, N.H. 03755.

Samkhya Corp. has introduced **Sweep'r**, a disk cleaner that erases the contents of deleted files from floppy or hard disks for IBM Personal Computers and compatible Microsoft Corp. MS-DOS or IBM PC-DOS microcomputers.

Sweep'r was designed to allow users to avoid erasing an entire disk and prevent unauthorized users from recovering data.

Sweep'r can erase data with a particular pattern. The utility displays the cleaning as it occurs.

Requiring 64K bytes of random-access memory, Sweep'r can clean a 360K-byte floppy disk in 40 sec. and a 10M-byte hard disk in 30 sec./Mbyte.

Sweep'r costs $19.95.

Samkhya, Suite 3000, P.O. Box 142, 47 Sixth St., Petaluma, Calif. 94953.

Omtool Corp. is offering **MCBA Micro Level I** accounting, distribution and manufacturing packages for the AT&T 7300 personal computer.

The Micro Level I packages were developed for use with Softbol, Omtool's programming language that lets Dibol programs written for Digital Equipment Corp. computers run on most microcomputers without changing the applications.

Micro Level I packages run on Digital Research, Inc. CP/M 80 and CP/M 86; Microsoft Corp. MS-DOS and Xenix; IBM PC-DOS; and AT&T Unix and look-alike operating systems.

The tools cost $1,300 to $1,950.

Omtool, P.O. Box 477, Tewksbury, Mass. 01876.

■

Inner Loop Software, Inc. has unveiled **Boxes & Arrows**, a block-diagram editor for the IBM Personal Computer, Personal Computer XT, AT and compatible personal computers that run DOS Version 2 or higher.

Boxes & Arrows creates and maintains block diagrams plus associate spreadsheet-type calculations with diagram objects. It edits text, boxes, points and lines that comprise block diagrams and has the ability to automatically move lines connected to an object, as well as the object itself.

Diagrams can be up to 800 times larger than a screen, with large diagrams printed in strips according to the width of the printer paper.

It requires 384K bytes of memory, one double-sided diskette drive and a monochrome or graphics display.

The single-copy price is $395.

Inner Loop Software, 5456 McConnell Ave., Los Angeles, Calif. 90066.

■

PrintQ, a print spooling subsystem for IBM Personal Computers, Personal Computers XT, AT, PCjr and compatibles has been unveiled by **Software Directions, Inc.**

The program lets users execute application programs while printing. Once loaded with the program disk, PrintQ remains resident. It intercepts documents bound for the printer, spools them to disk and then prints them according to user commands.

Priced at $69, PrintQ requires IBM PC-DOS or Microsoft Corp. MS-DOS Version 2 or higher, one 360K-byte or 1.2M-byte diskette drive and 30K bytes of random-access memory.

Software Directions, 425 Rt. 10, Randolph, N.J. 07869.

■

Mortgagease, software that lets lenders analyze mortgage products and borrowers, has bowed from **General Electric Mortgage Insurance Co.**

Mortgagease, which runs on the IBM Personal Computer and compatibles, simulates a loan's performance in a range of economic scenarios and the effects of varying product features such as interest rate and payment caps.

The program provides debt-to-income and loan-to-value ratio analysis for a loan's term by projecting the growth of borrower income, nonhousing debt, taxes, insurance and fees and housing appreciation rates.

Users can run simulations with historical data, lender-supplied forecasts or worst-case information.

Mortgagease costs $2,195. A demonstration disk is available for $20.

General Electric Mortgage Insurance, 6601 Six Forks Road, Raleigh, N.C. 27609.

■

Cotton States Mutual Insurance Co. is marketing an insurance agency automation software package, called **Partners**, designed to benefit both the agent and the home office.

Partners is a menu-driven system used for generating applications, storing files on clients and word processing.

Partners runs on multiterminal supermicro computers under the AT&T Unix operating system.

Prices range up from $1,500 per agent, depending on volume.

Cotton States Insurance, P.O. Box 105303, Atlanta, Ga. 30348.

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The **IS-687 Printer** is plug-in compatible and interchangeable with the IBM 3287 Printer, Models 2, 3, 4 and 5. It can be used with S/370, 43XX and 30XX Processors or compatible systems.

The IS-687 connects directly via coaxial cable to the IBM 3274 (Local/Remote) and 3276 control units, to the 4300-series Processors and to the IS-674 Communication Controller.

The IS-687 is a low-noise, heavy duty matrix printer, in an attractive tabletop design. It operates at a speed of 200 cps in data processing mode, and **provides an option for near-letter quality printing at 50 cps.** It fully supports BSC and SDLC/SNA communication protocols. Advanced self-test and diagnostic procedures achieve high standards of reliability and seviceability.

The IS-687 is a straightforward replacement of IBM 3287 printers, while achieving better printing performance at substantial cost savings.

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NEW PRODUCTS

Systems

System Development Corp. has announced the **B26WST-Master**, the **B26WST-Stand-Alone** and the **B26WST-Cluster**, three Tempest-accredited microcomputer workstations based on Burroughs Corp. B25 microcomputers.

The B26WST workstations are built around the Intel Corp. 80186 microprocessor. The B26WST-Master supports a 10M-byte fixed disk, one 630K-byte floppy disk and up to 1,024K bytes of memory. The B26WST-Stand-Alone supports two 630K-byte floppy disks and up to 1,024K bytes of memory, and the B26WST-Cluster supports up to 1,024K bytes of memory.

The B26WST can be clustered in configurations of up to six workstations sharing data, printing and communications resources. They support BTOS, Microsoft Corp. MS-DOS and Digital Research, Inc. CP/M 86 operating systems; Burroughs B25 software; and Basic, Cobol, Fortran and Pascal programming languages.

Prices are $9,478 for B26WST-Master, $7,973 for B26WST-Stand-Alone and $7,077 for B26WST-Cluster.

System Development, 7925 Jones Branch Drive, McLean, Va. 22102.

■

Comark Corp. has unwrapped an industrial NEMA 4 microcomputer called **Dac Pac**.

The product provides three standard microprocessors: an Intel Corp. 8088 CPU, a Zilog, Inc. Z80 for display processing and an Intel 8048 for keyboard processing. The Intel 8087 for math processing and 8089 for I/O processing are optional.

Dac Pac contains up to 16 sockets for random-access memory or erasable programmable read-only memory, battery backup, time of day, 12 programmable counters/timers, 16 interrupts, 40 I/O ports, four RS-232/449 serial ports and four 8-bit system bus expansion sockets.

Dac Pac costs $2,995.

Comark, P.O. Box 474, 93 West St., Medfield, Mass. 02052.

Communications

Dialogic Corp. has introduced the **Audio Services Package**, designed to enable users of IBM's Personal Service/PC software to create and review audio messages and to forward voice files to others using a network.

The Audio Services Package was designed for the IBM Personal Computer, Personal Computer XT, AT or 3270 Personal Computer running Personal Service/PC. It consists of a Dialog/1 voice I/O expansion board, Personal Voice Messenger software and a telephone handset interface adapter used to connect a modular telephone handset to the Dialog/1 for record and playback capabilities.

The Audio Services Package costs $350.

Dialogic, 60 Baldwain Road, Parsippany, N.J. 07054.

■

The Software Link, Inc. has announced an enhanced version of **Lanlink** that runs under IBM's PC-DOS 3.1 operating system.

Using the IBM Personal Computer's standard RS-232 serial port, Lanlink allows the user to set up a server micro or to daisy chain micros.

The enhanced version coordinates multiuser access to the central file, with the use of the new DOS Share command. In addition, a Swap command allows users with multiple printers to define more easily which printer is being accessed.

Enhanced Lahlink costs $495 for the server micro and $195 for each satellite workstation.

The Software Link, Suite 632, 8601 Dunwoody Place N.E., Atlanta, Ga. 30338.

Storage

Kustom Electronics, Inc. has added the **Sunflower MS 10 IR** to its line of removable hard-disk systems.

The MS 10 IR is an internal 10M-byte removable hard-disk kit designed specifically for the IBM Personal Computer, Personal Computer XT, AT and AT&T PC 6300. It is transparent to IBM's PC-DOS and Microsoft Corp.'s MS-DOS.

The product costs $2,245, including interface cable, power supply, documentation and controller board.

Kustom Electronics, 8320 Nieman Road, Lenexa, Kan. 66214.

Printers/Plotters/Peripherals

TAT Graphics Group, Inc. has announced the **Sextant Color Print Feature**, a software driver package that provides a method of creating inexpensive, high-resolution 16-color, 8½- by 11-in. overhead transparencies and prints.

The Sextant Color Print Feature supports the IBM Color Printer, the Dataproducts Corp. 8072, the Advanced Matrix Technology, Inc. 250 and the Fujitsu America, Inc. M333C. It prints 800 by 600 dot/in. in 16 colors from a palette of 4,096.

The package costs $150.

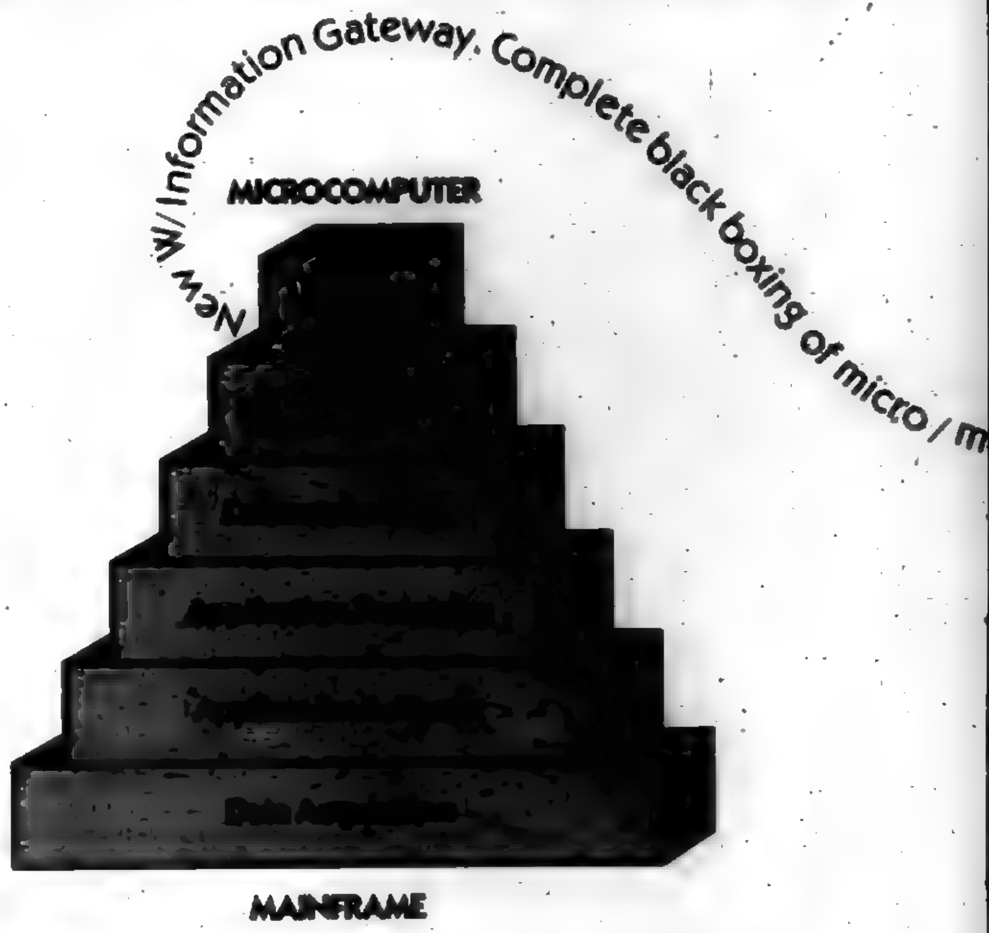
TAT Graphics Group, Building E, 1270 Lawrence Station Road, Sunnyvale, Calif. 94089.

■

Numonics Corp. is offering the **Model 5624R** multipen plotter for personal computers that accepts C- and D-size roll paper in addition to standard cut-sheet paper so that sheet-to-sheet setup is not required.

The Model 5624R provides a grit roller transport system and a speed of 13¾ in./sec. diagonally with 0.3% accuracy, a spokesman claimed.

Functions include commands for vectors, circles, arcs, curve fitting, the full set of ASCII characters,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symbols including bar and character symbols, axes, hatching, pen location coordinates, status and alpha controls.

The plotter can interface to most microcomputers including the IBM Personal Computer and Texas Instruments, Inc. Professional Computer, according to the spokesman.

Prices start at $8,000.

Numonics, 418 Pierce St., Lansdale, Pa. 19446.

■

Corporate Data Sciences, Inc. has upgraded its **CDS 2300 laser printer** to include 19 resident forms, a spreadsheet graphics mode compatible with Lotus Development Corp.'s 1-2-3 and native graphics mode programmability.

The graphics spreadsheet mode lets users combine the printer's 300 dot/in. resolution with 1-2-3 graphics. Native mode allows users to program features such as reverse block printing and polygon fills with a range of patterns and dot-dash-line capability to create forms or other graphics.

Nineteen read-only memory-based fonts and five type styles are supplied in sizes down to six-point type.

Designed to work with the IBM Personal Computer XT and AT, the CDS 2300 costs $5,995.

Corporate Data Sciences, Suite 102, 2560 Mission College Blvd., Santa Clara, Calif. 95054.

■

The **Legend 808** dot matrix printer offering 100 char./sec. draft speed and near-letter-quality print at 50 char./sec. is out from **Cal-Abco Co.**

The printer provides nine-wire square-dot technology, a 95-char. ASCII set with ascenders and descenders plus seven programmable printing pitches. Four external switches allow users to toggle print mode, pitch, paper out detect and remote programming.

Other features include standard friction and tractor feed accommodating 4-in. to 10-in. paper and bit image graphics capability.

The printer costs $199.

Cal-Abco, 6041 Variel Ave., Woodland Hills, Calif. 91367.

■

NEC Home Electronics, Inc. has increased the size of its **PC-8401A-LS Portable Office LCD** to 80 by 16 char. on a 9½- by 3-in. screen.

Resolution remains unchanged at 480 by 128 dots.

The PC-8401A-LS costs $999.

NEC Home Electronics, Personal Computer Division, Suite 10, 700 Nicholas Blvd., Elk Grove Village, Ill. 60007.

Board-level devices

Advanced Logic Systems, Inc. has announced two memory boards, **ADD-RAM 64** and **ADD-RAM 256**, which reportedly add 64K bytes and 256K bytes of memory to the Apple Computer, Inc. Apple IIe micro.

The two memory boards are compatible with Apple's Prodos operating system and cost $99 and $199, respectively. The company will upgrade customers' systems to 256K bytes from 64K bytes for $129.

Advanced Logic Systems, 1195 Arques Ave., Sunnyvale, Calif. 94086.

■

National Software Associates, Inc. has announced a synchronous modem plus a synchronous data link control communications interface adapter, called **Adaptmodem**, combined on a single personal computer plug-in card.

The modem portion of the board features AT&T 201 compatibility; IBM Personal Computer, Personal Computer XT and AT bus compatibility; autodial; autoanswer; and communications speeds up to 2,400 bit/sec.

The Adaptmodem board was designed for use with three of National Software Associates' emulation software packages. AdaptSNA RJE is an IBM 3770 emulator. AdaptSNA 3270 is an IBM 3270 emulator, and AdaptSNA PCcom allows a central personal computer to be used in a network control center.

The series runs on an IBM Personal Computer, Personal Computer XT, AT or compatible with 192K bytes of memory and IBM PC-DOS Version 2 or later.

AdaptSNA RJE with Adaptmodem and AdaptSNA 3270 with Adaptmodem cost $1,380. PCcom with Adaptmodem costs $1,270.

National Software Associates, 19491 Sierra Soto, Irvine, Calif. 92715.

■

New Media Graphics Corp. has announced the **PC-Graphover/6300** plug-in graphics board set for the AT&T PC 6300 micro.

The PC-Graphover/6300 allows a single monitor to serve the dual purpose of high-resolution color graphics display as well as system console for the AT&T PC 6300.

The PC-Graphover/6300 offers 640- by 400-pixel resolution in up to 4,096 simultaneous colors.

Prices start at $1,990.

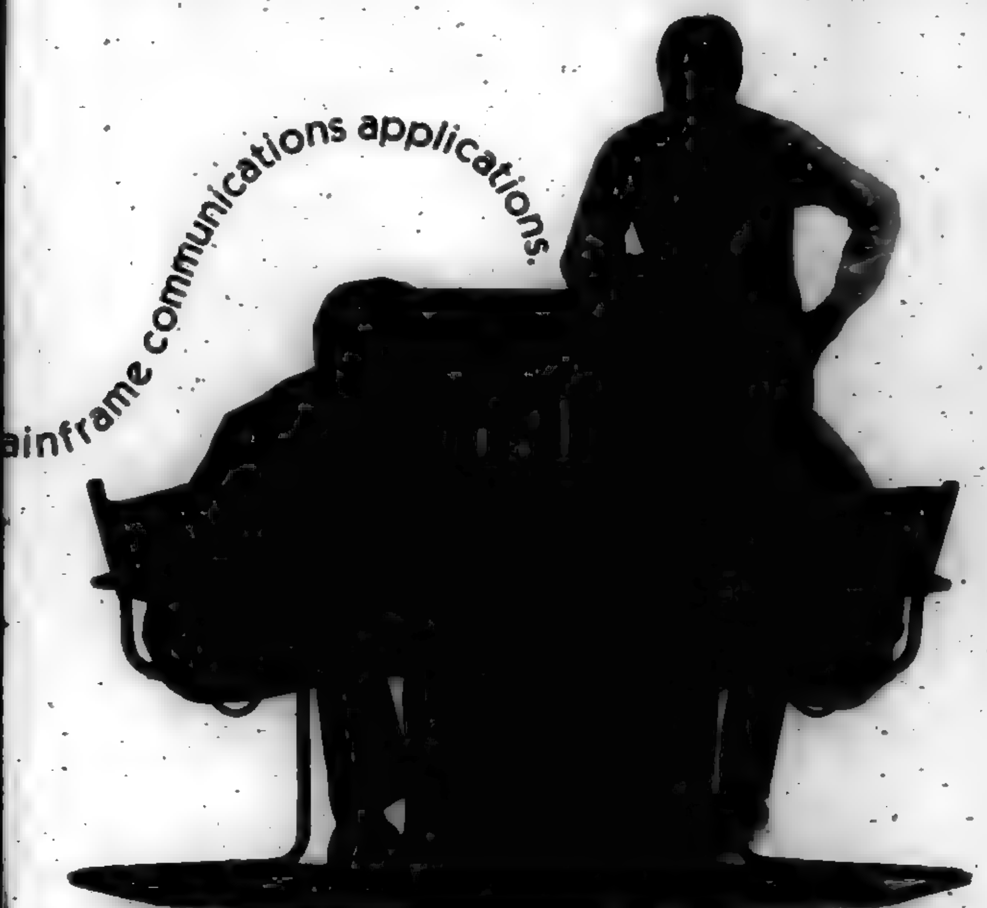
New Media Graphics, 279 Cambridge St., Burlington, Mass. 01803.

■

Emulex Corp. has introduced the **Persyst Supercharger**, a combination high-speed Intel Corp. 8086 microprocessor chip and 512K-byte high-speed 16-bit memory board for the IBM Personal Computer.

The 8086 processor chip on the Supercharger board will run at either 9.54 MHz or 4.77 MHz, selectable by

Continued on page 102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SYSTEM W

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Continued from page 101

the user with a switch on the back panel or with software.

The Supercharger board is compatible with most IBM Personal Computer operating systems, applications software and peripherals.

It is priced at $995.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

■

Everett/Charles Marketing Services, Inc. has announced the **PC Turbocharger**, an enhancement board for the IBM Personal Computer and Personal Computer XT that reportedly increases processing speeds.

The PC Turbocharger replaces the Intel Corp. 8088 central processor in the IBM Personal Computer or XT with an Intel 8086 central processor. It includes an Intel 8088 emulation mode for timing-sensitive programs.

Features include 640K bytes onboard random-access memory (RAM); compatibility with interpretive programs written in IBM Basica; RAM disk; and print-spooling and disk-caching utility software.

The suggested list price is $1,295.

Everett/Charles, 6101 Cherry Ave., Fontana, Calif. 92335.

■

Parallax Graphics, Inc. is offering the **1200-PC series** and the **600-PC series** user-microprogrammable graphics coprocessors for the IBM Personal Computer AT bus.

The 1200-PC series provides 1,280- by 1,024-pixel 60Hz noninterlaced display, up to 2,048- by 2,048- by 8-bit addressable memory and up to 25M pixel/sec. drawing performance.

Maximum block image transfer speed and squeeze/expand function speed are each 12M pixel/sec., while raster operations occur at up to 5M pixel/sec.

The 600-PC series offers 640- by 480-pixel 30Hz interlaced or 60Hz noninterlaced display plus up to 1K- by 1K- by 32-bit or 2K- by 1K- by 16-bit addressable memory. Maximum drawing performance, block image transfer and squeeze/expand are each 12M pixel/sec.

Both the 1200-PC and 600-PC series feature user-programmable 12-MHz bit- slice processor, on-board tablet/mouse support, Graphical Kernel System and video display input support plus programmable memory organization and display format. In addition, both coprocessor families can emulate IBM Personal Computer graphics via a monochrome, color or extended graphics adapter.

Drawing modes are said to include select pixel or bit-plane memory organization, load bit-plane mask, load/select opaque table, load/select read map, load/enable SRC/DST X and Y translation registers, and load/enable clipping window.

Prices are $4,500 for the 600-PC and $6,000 for the 1200-PC.

Parallax Graphics, 1095 E. Duane Ave., Sunnyvale, Calif. 94086.

■

PC-Slave, a 16-bit single-board processor that allows users to add up to 31 workstations to an IBM Personal Computer, Personal Computer XT, AT or compatible processor has bowed from **Advanced Digital Corp.**

PC-Slave is an 8-MHz board containing an Intel Corp. 8088 CPU, 256K bytes of bank-selectable dynamic random-access memory, PC Bus interface and two serial ports. When plugged into the PC Bus, the PC-Slave can make a dumb terminal act like a second personal computer.

With PC-Slave and the vendor's RTNX Executive software to run two or more users, the original personal computer becomes the master processor that shares disks, peripherals and data with slaves. Advanced Digital's PC-Exbus expansion chassis can accommodate up to 12 PC-Slave processor boards. RTNX Executive software is said to permit PC-Slave to run Microsoft Corp. MS-DOS with IBM PC-DOS emulation plus provide file and record locking.

PC-Slave costs $995 in single quantities.

Advanced Digital, 5432 Production Drive, Huntington Beach, Calif. 92649.

■

Tripas Technologies, Inc. has announced a single-board controller for IBM Personal Computers and compatibles, called **PCChannel**, that allows terminal and workstation users on local-area networks to run IBM Personal Computer software.

PCChannel allows terminals and workstations to become the user's personal computer console. It supports the Digital Equipment Corp. VT100, VT220 and IBM 3278 terminals as well as workstations with VT100 emulation.

PCChannel is RS-232C compatible. The RS-232C port operates at up to 19.2K bit/sec.

PCChannel costs $595.

Tripas Technologies, 37053 Cherry St., Newark, Calif. 94560.

■

Macdasher, a Data General Corp. terminal emulator for the Apple Computer, Inc. Macintosh, was released by **Kaz Business Systems, Inc.**

Macdasher simulates the operation of a DG D210 terminal through the Macintosh's serial ports. It supports D210 screen attributes and provides printer pass-through plus file transfer capabilities.

Function keys and cursor controls are supported through pull-down menus and keyboard combinations. Macdasher can transfer files to and from the host computer.

The terminal emulator costs $59.

Kaz Business Systems, 10 Columbus Circle, New York, N.Y. 10019.

Training America's Leaders

How General Electric Information Services Company Cut Training Unit Costs by 70 Percent

"Computer-based training (CBT) made sense to us when it came to expanding training," says Ruanne Pengov, Vice President and General Manager of Application Marketing Operation for General Electric Information Services Company, "so we evaluated major CBT vendors."

"We evaluated all CBT vendors and chose Crwth."

GE Information Services is the world's largest commercially available teleprocessing network. The corporate commitment to quality in all levels of operation made the selection of a quality CBT vendor essential.

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"Crwth's Information Center curriculum not only matches our training needs—it anticipates them."

They were impressed with Crwth's full Information Center curriculum that steps users through computer basics, DP skills, on-line editors, and fourth-generation languages.

Also unique is Crwth's Unlimited Access Agreement, which allows customers to use all courses, as many times as necessary, for one annual fee.

Ruanne Pengov, Vice President and General Manager of Application Marketing Operation for General Electric Information Services Company.

Another plus, according to Pengov: consistent style and quality of the courses, all produced under the direction of best-selling data processing author Gary DeWard Brown.

"I assumed the best CBT would be the most expensive. I was wrong."

"Crwth's Unlimited Access Agreement allowed us to save money when compared to both conventional stand-up and mixed-media instruction," Pengov explains.

"Students learn much faster with good CBT. Crwth courses really are interactive, unlike other vendors'. When end users finish Crwth courses, they've actually used the computer to build data bases, create business graphics, and much more.

"The quality of [illegible] and instructional design put Crwth in a class by itself."

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"For example, we determined that the cost of training *just 16 students* in *one* fourth-generation language via conventional training costs the same as the price of Crwth's *full* curriculum.

"At General Electric, [illegible]"

"Quality is what distinguishes GE from the competition," stresses Pengov, "and it's also what sets Crwth apart from other CBT vendors."

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NEW PRODUCTS

Auxiliary equipment

Insight Development Corp. has announced the **Lasercontrol** system, which reportedly allows the Hewlett-Packard Co. Laserjet printer to emulate most printers from other leading vendors.

Lasercontrol is available as software for the IBM Personal Computer series; a circuit board for IBM and Texas Instruments, Inc. personal computers; or a stand-alone box.

Each product allows the Laserjet to emulate other printers, including the Epson America, Inc. MX-80 with Graftrax Plus; the Diablo Systems, Inc. 630; the NEC America, Inc. 5510 and 7710; and the Qume Corp. Sprint V.

The Lasercontrol 100 software diskette runs on the IBM Personal Computer, Personal Computer XT and AT and the TI Professional. It costs $150.

The Lasercontrol 200 board, also for IBM and TI micros, is said to print 25% to 35% faster than the 100 software and to use no system memory. It costs $499.

The Lasercontrol 300 is a stand-alone box reportedly compatible with Digital Research, Inc. CP/M-based micros as well as minis, mainframes, networks and dedicated word processors equipped with a Centronics Data Computer Corp. parallel or RS-232C serial port. It is priced at $749.

Insight Development, 2005 Vine St., Berkeley, Calif. 94709.

■

Polytel Computer Products has announced the **Keyport 60** touchpad, sized to fit along the top of a regular keyboard, that provides 60 additional user-programmable function keys.

The Keyport 60 connects to any IBM Personal Computer, Personal Computer XT, AT or true compatible through an analog control adapter. Each of the 60 keys can be defined on-line in both regular and shift modes, providing 120 available macros. Each key can be labeled by the user with words, symbols or illustrations.

The Keyport 60 costs $99.

Polytel, Suite 310, 1250 Oakmead Pkwy., Sunnyvale, Calif. 94086.

■

Digital Vision, Inc. has announced **Computereyes**, a version of its video acquisition system for Apple Computer, Inc. Apple IIc computers.

Computereyes plugs into the Apple IIc's Serial 2 and joystick ports and connects to any standard video source. A black-and-white image is acquired in less than six seconds and the multiscan mode can be used to provide realistic gray-scale images.

Computereyes requires an Apple IIc or compatible with Applesoft in random-access memory (RAM) or read-only memory, 48K RAM, one disk drive and DOS 3.3.

Computereyes costs $129.95.

Digital Vision, Suite 2, 14 Oak St., Needham, Mass. 02192.

■

Inmac Corp. has introduced **6-ft cables** for the Apple Computer, Inc. Macintosh and Apple IIc.

The cables can attach the Apple IIc or the Macintosh to modems and serial printers. Inmac's printer cables are said to be compatible with any RS-232 serial printer. The modem cables can be used with any Hayes Microcomputer Products, Inc.-compatible 300 or 1,200 bit/sec. modem. The cables cost $29.95 each.

Inmac, 2465 Augustine Drive, Santa Clara, Calif. 95054.

■

PC Security Enterprises, Inc. has announced a key-operated security lock, **the Powerlock 1000-PC**, for the IBM Personal Computer and Personal Computer XT.

The Powerlock 1000-PC restricts access to the computer by replacing the on/off switch with a keyed lock. It offers master keying and three security levels. It costs $69.95.

PC Security Enterprises, P.O. Box 510, Newton Centre, Mass. 02159.

■

Data Spec, a division of **Alliance Research Corp.**, has introduced the **Printer Jack**, a serial-to-parallel interface for the Apple Computer, Inc. Apple IIc.

The Printer Jack interfaces the serial-only printer port of the Apple IIc to a Centronics Data Computer Corp.-type parallel port, enabling the Apple IIc to connect to most parallel printers. On one end of the unit there is a cable with a 36-pin Centronics-type connector that connects to the printer. On the other end is a 5-pin DIN connector that connects to the Apple IIc's serial printer port. The Printer Jack costs $87.95.

Data Spec, P.O. Box 4029, 20120 Plummer St., Chatsworth, Calif. 91313.

■

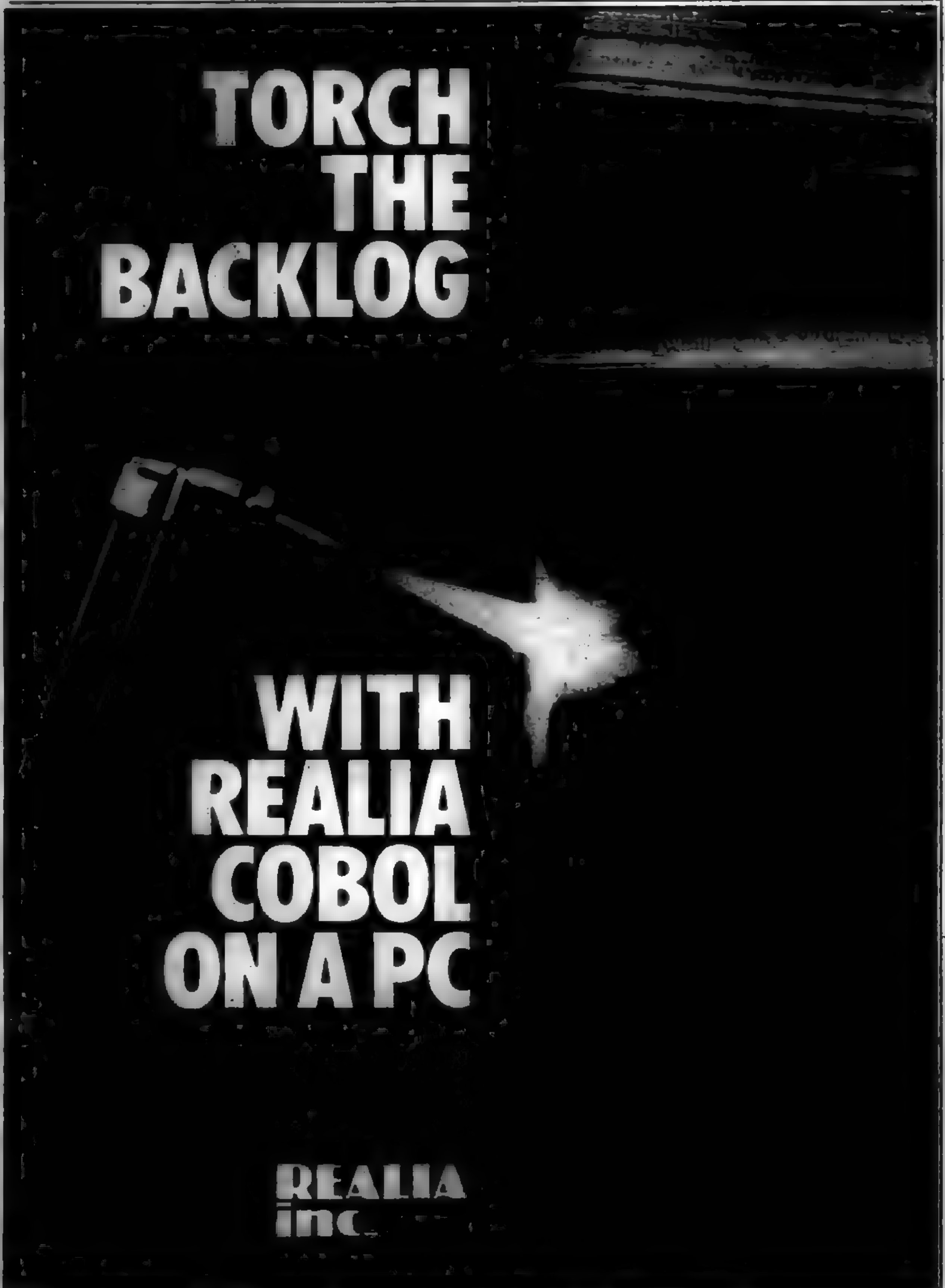
TAT Graphics Group, Inc. has announced that its **Sextant** dual-mode graphics display subsystems now support Autodesk, Inc.'s Autocad microcomputer computer-aided design system.

Sextant systems provide dual-mode operation for supporting low-resolution applications such as Lotus Development Corp.'s 1-2-3 plus high-resolution applications like CAD.

Prices for Sextant subsystems including the Galaxy display controller and a monitor range from $1,995 for a 640- by 640-pixel resolution system to $4,895 for a 1,024- by 768-pixel system.

TAT Graphics Group, Bldg. E, 1270 Lawrence Station Road, Sunnyvale, Calif. 94089.

Continued on page 106



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From page 104

Auxiliary equipment

Microfield Graphics, Inc. is offering the microprogrammable **T4 Color Graphics Controller**, which provides bit-slice graphics for the IBM Personal Computer AT.

The T4 controller is said to provide 1,024- by 800-pixel resolution and writing speeds of more than 1 million pixel/sec. A bit-slice emulation feature allows a user to run programs like Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar on these high-resolution displays, according to the vendor.

A Microfield Virtual Device Interface (MVDI) connects the T4 and the AT, allowing users to draw device-independent graphics and to make previously developed graphics applications portable from other computers.

Also available are T4 Development Tool Kits that include an AT; the T4 Color Graphics Controller running a Microsoft Corp. MS-DOS editor; a T4 simulator; MVDI source code; bit-slice source code; microcode assembler, linker and loader; debug tools; and programming guides.

The T4 Color Graphics Controller costs $3,200. Development kits cost $100,000, and the MVDI sells for $16,000.

Microfield Graphics, Suite 161, 8286 S.W. Nimbus Ave., Beaverton, Ore. 97005.

■

Jones Futurex, Inc. has unveiled **Autocrypt I**, an electronic security program for the IBM Personal Computer and compatible computers.

Called Autocrypt I, the software works with the Jones Futurex Encryptor 300 series of data encryption standard processors that store the encryption key. Because the key is not stored on disk or in internal computer memory, it is not subject to tampering or deciphering, the vendor claimed.

Data transmitted to and from disks can be encrypted at 12K byte/sec., according to the vendor.

Autocrypt I costs $95.

Jones Futurex, 9700 Fair Oaks Blvd., Fair Oaks, Calif. 95628.

■

Isolation Systems, Inc. has announced the **Access Control Module**, a microcomputer security package for the IBM Personal Computer, Personal Computer XT, AT and compatible systems.

The Access Control Module offers two levels of security: It limits use of the system to individuals with authorised passwords, and it limits access by using data encryption.

Aspects of the product's password management reportedly include storing passwords in encrypted form, archiving up to 30 passwords to prevent reuse or duplication, time delay on password violation and automatic lockout after a maximum password violation count.

The package can be installed without loading any dedicated applications software and will not interfere with IBM PC-DOS-compatible applications programs, the vendor claimed.

Isolation Systems, 26 Six Point Road, Etobicoke, Ont., Canada M8Z 2W9.

■

PC Cooler, a cooling system for the IBM Personal Computer XT and compatible computers, is available from **B. H. Thrasher & Associates**.

PC Cooler uses two existing mounting holes in the IBM chassis as well as the power outlet normally used by the monochrome monitor. The monitor connection moves to an auxiliary outlet on PC Cooler, a spokesman noted.

PC Cooler operates on ac power, so it adds no load to the dc power supply, according to the spokesman.

Using an axial fan, the system is said to increase the flow rate of cooling air through the chassis by more than 350% without increasing the noise level significantly above that of a typical hard disk drive.

PC Cooler delivers a maximum 50% reduction in the temperature rise of the chassis, the internally mounted integrated circuits and disk drives, the spokesman claimed.

PC Cooler is priced at $49.50.

B. H. Thrasher, 3996 N.W. Hield Road, Palm Bay, Fla. 32907.

■

Microsense, Inc. has announced **Microbug Model II**, an upgraded version of its computer security system that links into central alarm systems to protect computers from unauthorised access.

The product uses motion-activated sensors that attach and protect up to five computer components. When a component is moved, a 92db alarm sounds to alert central security of a possible theft.

A key-activated system controls computer access, and a battery back-up guards against tampering and power failures. Microbug II sells for $295.

Microsense, Protective Products Division, 628 S. Main St., Spring Valley, N.Y. 10977.

Voice/data communications

Dataprobe, Inc. has announced the **4-Talk System**, which allows alternate voice/data communications over four-wire leased lines.

The 4-Talk System consists of an automatic switching unit and a modified four-wire telephone. The product automatically switches the leased line from the modem to the four-wire

Continued on page 110

FOR OEM AND VAR USERS

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SORD—Japan's most innovative computer corporation—introduces a full line of high-performance 68000-based computers and boards for the OEM/VAR market. Taking advantage of the incredibly high-speed (10MHz) 16/32 bit CPU and large address space (16MB), SORD has developed state-of-the-art computer systems to meet any OEM requirement from the low-cost (less than $2000) new M68MX to the UNIX-based, multi-user UNIBOX* with VME bus.

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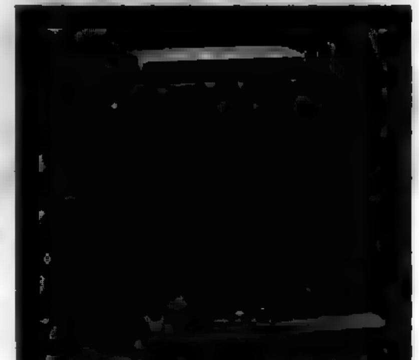
M68MX: Sample price—$1,995



M68: Sample price—$3,235

UNIBOX: Sample price—$4,695

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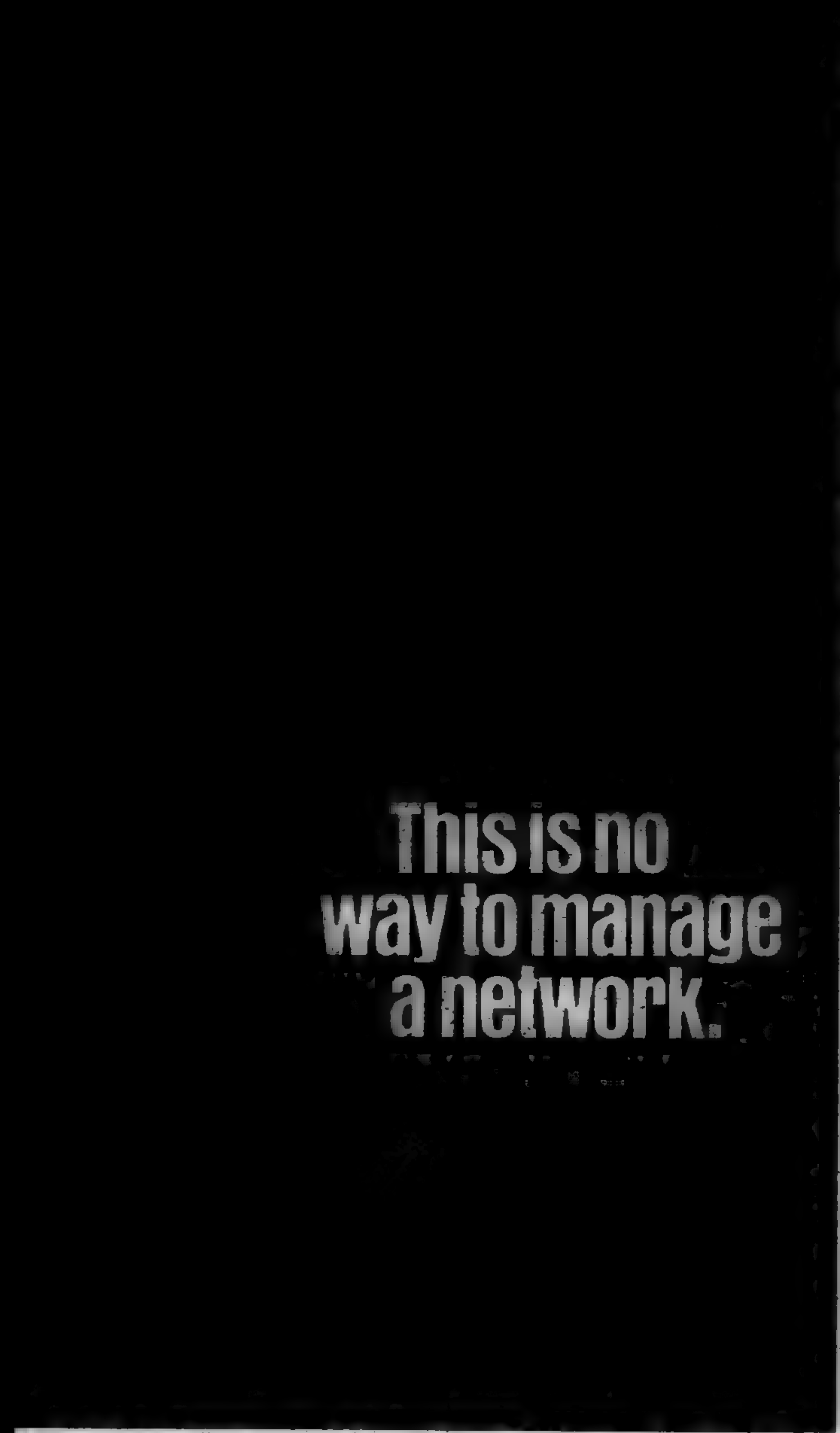

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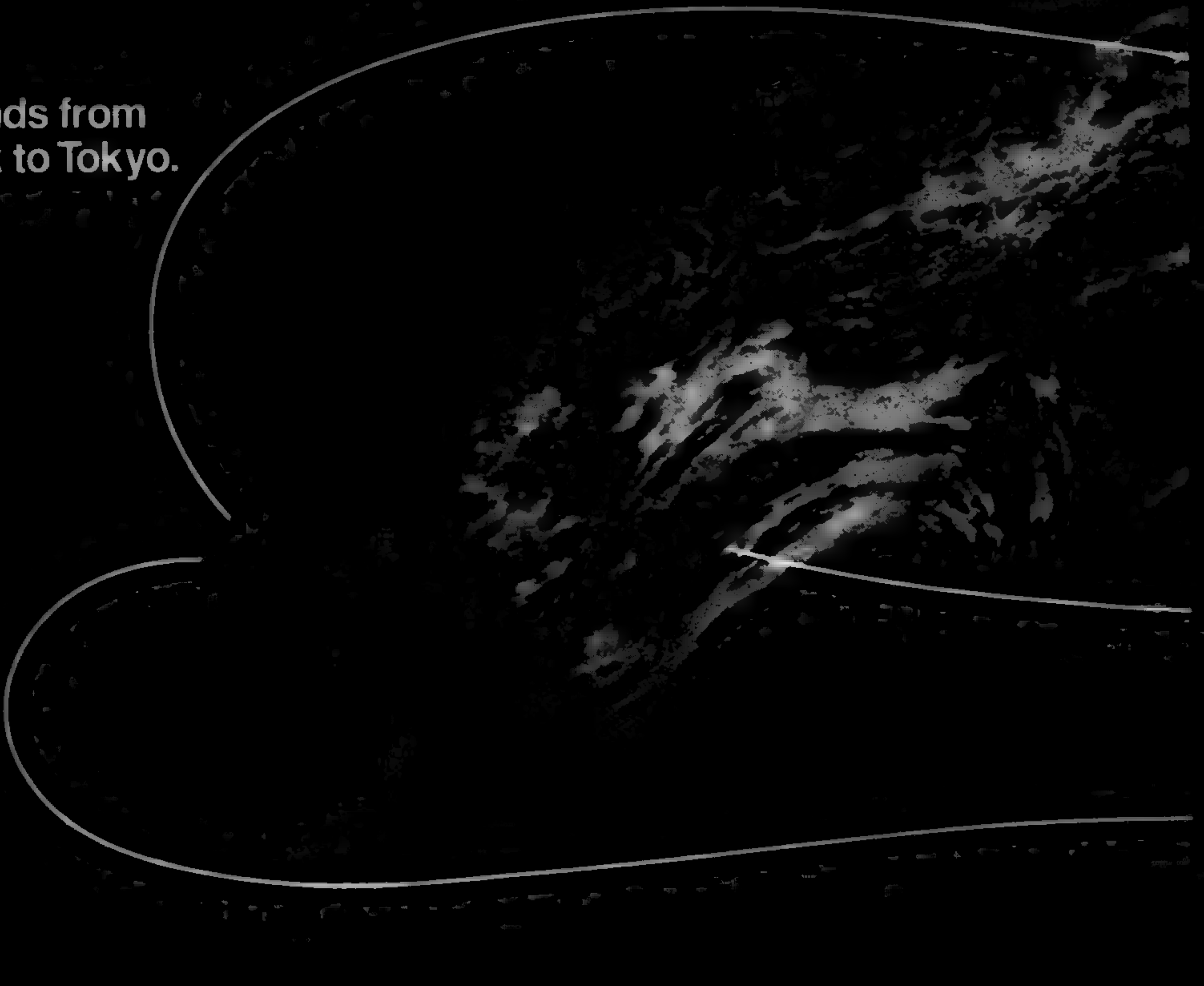

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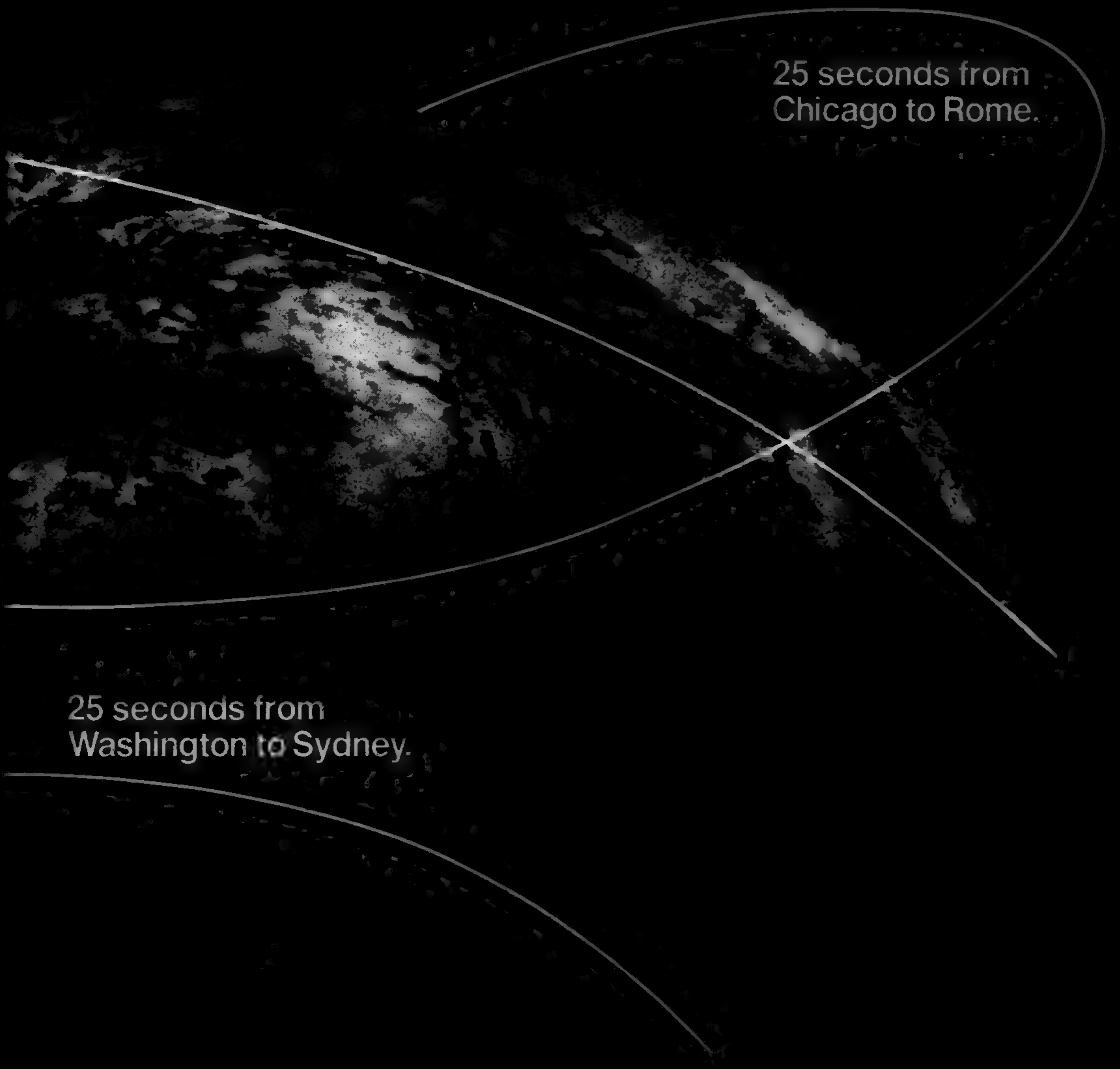

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NEW PRODUCTS

Continued from page 108

telephone when voice communications is desired. Voice calls are initiated by dialing a two-digit code. Audible and visual alarms indicate incoming calls.

The system costs $450, including one automatic unit, four-wire phone and modular interconnect cord.

Dataprobe, 110 W. Palisade Blvd., Palisades Park, N.J. 07650.

■

Wizard Computer Products has announced **Wizard Talk**, a computer-generated voice output system for converting text to speech.

Wizard Talk is an option to Wizard Mail designed to allow users to have computer-based mail messages read with only a Touch-Tone telephone. It is a turnkey system that includes software, Digital Equipment Corp.'s Dectalk voice synthesizer and Wizard's own protocol converter.

The price of Wizard Talk when Wizard Mail is already installed is $6,700. When both are installed at the same time, the total cost is $9,700. The annual maintenance fee is $185.

Wizard Computer Products, P.O. Box 1867, Greenville, S.C. 29602.

Software

Gejac, Inc. is offering a version of **Hasp**, its communications package for Digital Equipment Corp. VAX-11 computers, which runs on the Microvax.

Hasp reportedly connects mainframes, networks and minicomputers for bulk transfers.

This Hasp version supports DEC's DPV-11 communications board, which uses direct memory access capabilities at speeds up to 56K bit/sec. Hasp is supported also on the DUV-11 synchronous interface.

The Microvax version can be licensed for $4,000.

Gejac, P.O. Box 188, Riverdale, Md. 20737.

Multiplexers/modems

The **Ethermodem** line of products that transform a baseband Ethernet local-area network into a broadband network have been announced by **Chipcom Corp.**

The line includes two-port modems for single- and dual-cable systems and frequency translators for single-cable systems. The two-port modems support a 10M bit/sec. transmission speed, are equipped with collision detection capabilities, comply with IEEE 802.3 standards and are compatible with IBM's PC Network.

Baseband users can convert to broadband by removing a cable from a baseband transceiver and inserting it into an Ethermodem modem.

The product's diagnostics capabilities check circuits by use of a built-in packet generator that compares data on a bit-by-bit basis. A digital loop-back test is standard.

The two-port modem is $4,250. The frequency translator is $4,500.

Chipcom, 31 Thorpe Road, Needham, Mass. 02194.

■

Lockheed-Getex, a division of Lockheed Corp., has introduced **GTX-100 Security Modem**, a security subsystem designed to prevent computer intrusion via telephone lines.

The product offers a sequence of call-back and password acceptance for ensuring user authorization. Features include three security levels, memory for 16 user passwords and an audit trail of the last 16 attempts to call in, successful or failed.

The modem offers full-duplex, asynchronous transmission at 300 or 1,200 bit/sec. It is direct connect, AT&T 212A compatible and features autodial/autoanswer, speed-dialing, Touch-Tone or pulse dialing and RS-232C compatibility.

A Remote-On option allows callers to turn their computers on and off from different locations while maintaining security. The modem costs $995 or $1,195 with the Remote-On.

Lockheed-Getex, Suite 945, 1100 Circle 75 Pkwy., Atlanta, Ga. 30339.

■

Everett/Charles Marketing Services, Inc. is offering **Super Modem 1200**, a communications system for use with RS-232C-compatible computers and terminals.

The Super Modem 1200 performs at 300 or 1,200 bit/sec., automatically adjusting to the transmission rate set in the computer. It is AT&T 103- or 212A-compatible and features autodial/redial, Touch-Tone, rotary dial pulse dialing and on-line operation in full- or half-duplex modes.

The Super Modem 1200 costs $299.

Everett/Charles, 6101 Cherry Ave., Fontana, Calif. 92355.

■

Gammalink, Inc. has announced **Gammamodem**, a stand-alone version of its synchronous modem card that links IBM System/34, 36 and 38 mainframes and remote IBM Personal Computers, Personal Computer XTs and ATs at 9.6K bit/sec.

Gammamodem features autodialing of a preprogrammed number and automatic fallback to 7.2K and 4.8K bit/sec. as required. It conforms to the CCITT V.29 specifications and works over ordinary dial-up lines.

Gammamodem costs $1,995.

Gammalink, 2452 Embarcadero Way, Palo Alto, Calif. 94303.

■

Data General Corp. has announced **Model 5400GP**, an interface for high-speed data transfer between DG Eclipse and Eclipse MV/Family computers and external devices.

The Model 5400GP General Pur-

Continued on page 112

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NEW PRODUCTS

Continued from page 110

pose Burst Multiplexer Channel interface is fully supported on DG's AOS/VS operating system. It includes a 32-bit AOS/VS software driver. It can operate at speeds of up to 7M bit/sec.

The 6400GP is priced at $7,600.

DG, Rt. 9, Southboro, Mass. 01772.

Local-area networks

Turbo Desnet, a local-area network that interconnects 8-bit and 16-bit Digital Research, Inc. CP/M programs and Microsoft Corp.'s MS-DOS programs, is available from the **Destek Group.**

Turbo Desnet runs with the firm's Turbodos operating system and includes hardware and software for connecting S-100 and IBM Personal Computer bus computers.

Turbo Desnet provides the carrier-sense multiple access/collision avoidance network access scheme and single-board communications.

The local-area network can be upgraded to broadband or to fiber optic. Prices start at $650, which includes hardware, plus $100 for a communications software site license.

Destek Group, 830 E. Evelyn Ave., Sunnyvale, Calif. 94086.

Test equipment

ECC has introduced the **Communications Analysis Terminal Model CAT-32**, an analyzer that automatically sequences through all the normal RS-232C conditions and identifies the proper protocol and handshake used in an echo-mode environment.

The CAT-32 has a display that provides information on the data rate, the number of stop bits, parity, the number of data bit/char. and whether XON/XOFF handshake is required. It has eight LEDs that indicate the switching of the transmit and receive lines and the presence of the handshake requirements.

A manual mode allows the CAT-32 to be transparent while allowing the selection of port parameters. The manual mode provides repeat transmitting, ensuring transmission of continuous predefined data plus an activation port capability to identify RS-232C ports requiring special characters and/or codes to activate the port.

The CAT-32 is priced at $2,985.

ECC, 4482 Sunburst Drive, Oceanside, Calif. 92056.

Auxiliary equipment

Backus Data Systems, Inc. has unveiled **Dialsafe SL**, a data security system that protects a single modem line and one host computer port.

The system protects single dial-in ports with mainframes, minicomputers and microcomputers against unauthorized users entering computer systems via dial-up maintenance ports.

As users call in, Dialsafe SL intercepts the calls and requests identification and a password.

When validated, the information is matched to a previously programmed phone number, and the unit dials the user back to establish normal computer connection.

The Dialsafe SL security system lists for $495.

Backus Data Systems, Suite 110, 1440 Koll Circle, San Jose, Calif. 95112.

Paradyne Corp. has unveiled the **Info-Lock Model 2811-11** link encryptor, which offers automatic dial key management.

The Info-Lock 2811-11 monitors Electronic Industries Association lines to sense call establishment and disconnect and automatically performs key management functions. When configured for the dial environment, a new session key is established and erased for each connection.

Info-Lock protects data transmitted over microwave, cable and satellite facilities.

It can be programmed to operate on synchronous links at rates up to 9.6K byte/sec. and asynchronous links up to 19.2K byte/sec.

Users can program the encryptor to function as a host or remote unit in point-to-point, multipoint or dial network environments. The device is transparent to the user, even in dial applications.

Info-Lock encrypts data using the National Bureau of Standards Data Encryption Standard algorithm as specified in Federal Information Processing Standard 46.

The Data Encryption Standard encryption process depends on a secret key variable that specifies the formula for scrambling data.

Model 2811-11 can generate, store and use up to 140 keys. Levels of key security include identification codes and multiple-courier distribution. Penetration of the unit zeros key variables and results in an audible alarm.

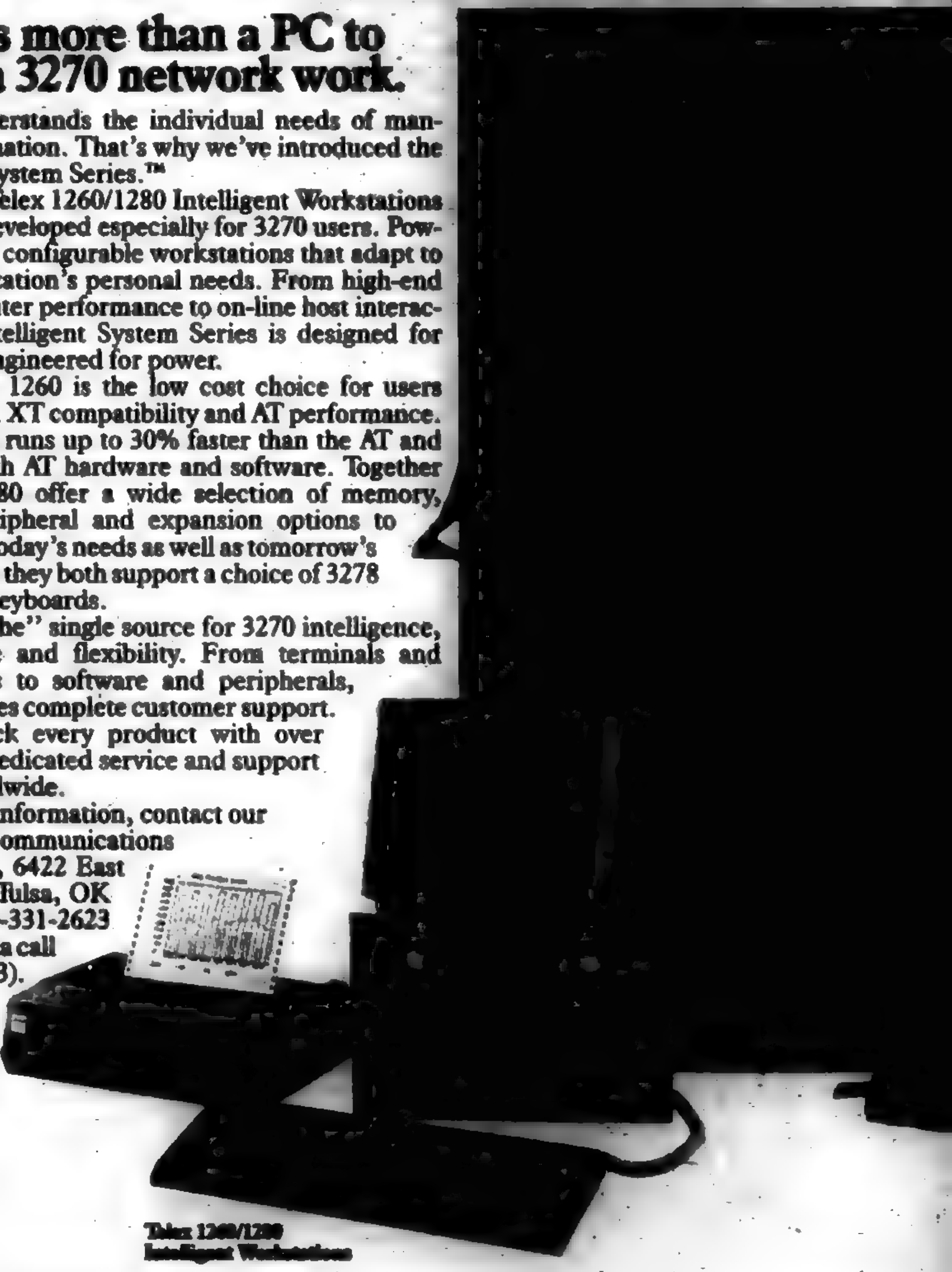
The Info-Lock Model 2811-11 costs $2,900.

Paradyne, P.O. Box 1347, 8550 Ulmerton Road, Largo, Fla. 33540.

Turnkey systems

Brock Control Systems, Inc. has announced **Sales Activity Manager**, a multiuser turnkey computer system designed to automate the activities of sales organizations.

Sales Activity Manager was developed for the AT&T 3B line of AT&T Unix-based computers. It incorporates proprietary software and voice/data terminals to provide a telemarketing and management system. It allows up to 44 users to input sales prospecting information into a centrally located relational data base. The information can be retrieved to produce reports, forms and forecasts.



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For more information, contact our Marketing Communications Department, 6422 East 41st Street, Tulsa, OK 74135. 1-800-331-2623 (In Oklahoma call 918-628-3113).

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NEW PRODUCTS

Other features include an integral word processor, electronic mail messaging and an on-line laser printer.

Pricing is based on the number of installed users, with costs averaging $3,400 per installed station.

Brock Control Systems, Suite 100, 1600 Parkwood Circle, Atlanta, Ga. 30339.

Terminals

Intecolor Corp. has introduced the **Intecolor 3860** color graphics terminal.

The 3860 has a 13-in., 80-char. by 48-line display. It offers a 160- by 192-pixel low-resolution graphics format. The user has a choice of eight foreground colors on eight background colors.

The terminal features a color printer software driver and associated serial I/O port, three character sets, selectable bit/sec. rate and parity plus front-access manual degaussing and brightness control.

The 3860 is priced at $2,195 in quantities of 100.

Intecolor, Intecolor Drive, 225 Technology Park, Norcross, Ga. 30092.

■

Chromatics, Inc. has announced the **CT 1024 Colorgraphic Terminal.**

The CT 1024 was designed to meet the needs of business, computer-aided design and manufacturing, computer aided engineering, mapping, C^3I and scientific applications. It features both 1,024- by 1,024-pixel resolution and 512- by 512-pixel resolution switchable bit-map images in a modular 19-in. monitor.

The display can be operated in a 1,024- by 768-pixel resolution, 30Hz interlaced refresh mode or a 512- by 384-pixel resolution, 60Hz noninterlaced refresh mode under program control. It supports nondestructive zoom, pan, blink and graphics primitives in eight or 16 colors.

The CT 1024 Colorgraphic Terminal is priced at $8,495, including a 19-in. raster scan display, detachable 92-key keyboard, RS-232C I/O port, color lookup table and red-green-blue video out port and monitor, in an office environment or rack-mount enclosure.

Chromatics, 2558 Mountain Industrial Blvd., Tucker, Ga. 30084.

■

Lear Siegler, Inc. unveiled **ADM 364**, a VDT that provides Digital Equipment Corp. VT220 functionality with an alternate keyboard layout.

ADM 364 offers VT220, VT100, VT52 and ANSI X3.64 code compatibility with a Lear Siegler keyboard layout. The layout is based on two of the vendor's general-purpose ASCII terminals — ADM 11Plus and ADM 12Plus. It provides three-level function keys for 15 fixed functions, 15 programmable functions and 15 programmable nonvolatile functions; 80- or 132-col. display; and a 14-in. green or amber screen.

The terminal costs $895.

Lear Siegler, Data Products Division, 901 E. Ball Road, Anaheim, Calif. 92805.

Printers/Plotters

Misco, Inc. has added a printer accessory, called **Printnet**, to its latest direct-mail catalog.

Printnet is a networking printer spooler that allows users to form a printer sharing network with up to 15 computers and 15 printers.

Printnet costs $439.

Misco, One Misco Plaza, Holmdel, N.J. 07733.

■

Ziyad, Inc. has introduced the **Ziyad Model DSF-8**, an electronic sheet feeder for the Wang Laboratories, Inc. LPS8 Laser Printer.

The Ziyad Model DSF-8 adds two paper trays to the single paper tray resident on the Wang LPS8, allowing users to print up to 450 sheets of paper automatically. Paper sizes that can be accommodated range from 7¼ in. by 10½ in. to 8½ in. by 14 in.

The product supports any host system that works with the Wang LPS8 Laser Printer, including VS and the Office Information System.

The Model DSF-8 costs $1,895.

Ziyad, 100 Ford Road, Denville, N.J. 07834.

■

Hetra Computer and Communications Industries, Inc. has released the **Hetra Model 3024**, its first product in a series of laser printer systems.

The Hetra Model 3024, composed of an electronic nonimpact page printing engine and a printer controller, prints at a speed of 24 page/min. It has a print orientation of zero, 90, 180 and 270 degrees and stores up to 60 fonts on-line. It allows font sizes from four to 26 points, has 300 dot/in. density and line drawing capabilities.

Both serial RS-232 and parallel interfaces are offered and many protocols, including IBM Systems Network Architecture/Synchronous Data Link Control and IBM 3274, are also available.

The Hetra Model 3024 system is priced between $20,000 and $30,000, depending on the configuration.

Hetra, 1151 S. Eddie Allen Road, Melbourne, Fla. 32901.

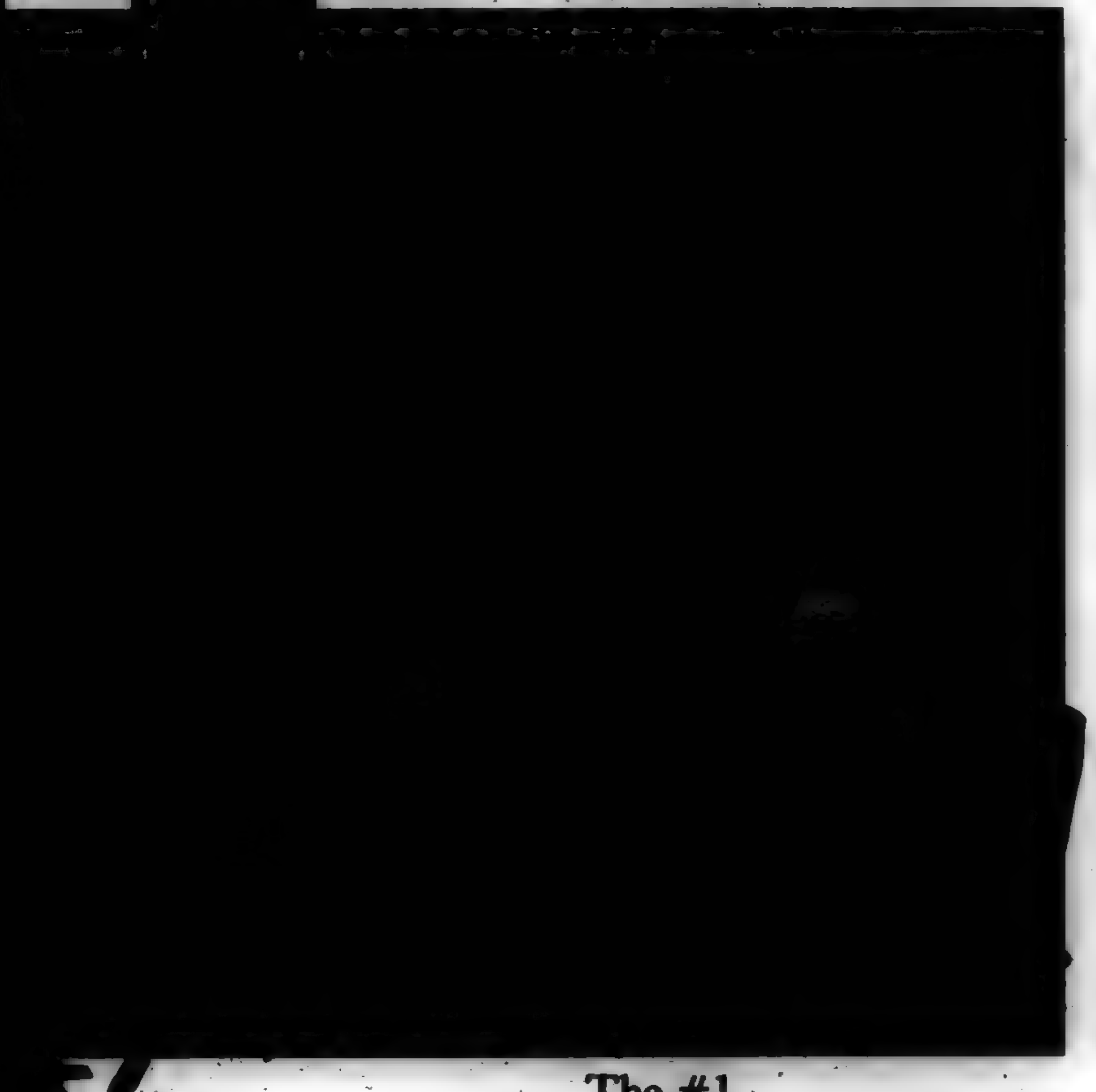
■

Digital Systems, Inc. has released a series of three IBM System/34, 36 and 38 twin-axial compatible band printers, the **Model 5230-01, 5230-02 and 5230-03.**

Model 5230-01 offers a speed of 300 line/min.; Model 5230-02 prints

Continued on page 118

CE AT WORK



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As a central processor, the System/36 can help pull a company together—it can connect PCs to mainframes. And the communications capabilities of the System/36 allow people throughout an organization to share information and resources to handle almost any job, anytime, from IBM Personal Computers or System/36 terminals.

In addition to its text and office function and its communications capabilities, each System/36 offers business graphics and general accounting applications, making it a truly integrated solution to the problems of running a business.

Introducing the IBM System/36 PC.

This new IBM computer marries the System/36 and the IBM Personal Computer to give you the best of both worlds. With a price starting at $5,995, the System/36 PC is an affordable standalone system for a small business. And it can be used in a larger company where multiple unit installations offer the best solution.

The System/36 PC is made up of a 5364 processor attached to an IBM PC, PC XT or Personal Computer AT* System.* And you can connect up to three more of these personal computers. Or you can connect terminals such as System/36 printers or displays.

The System/36 PC comes with a 1.2 MB diskette drive and either 40 or 80 MB disk storage, depending on your information storage needs.

The System/36 model 5362.

The middle-sized System/36 processor, the 5362 can support up to 22 local IBM Personal Computer terminals and up to 64 remote terminals. With 1 MB of main memory and 120 MB of disk storage, the 5362 is powerful for its size—about as big as a two-drawer filing cabinet. And, you can add memory and additional features with plug-in modules for easy growth.

The System/36 model 5360.

The largest of the System/36 Family, the 5360 has 1.75 MB of main memory, with disk storage capacity up to 800 MB. Working as the computer solution for many businesses, the 5360 can support up to 36 personal computers or local terminals and up to 64 personal computers or terminals remotely.

Easy to use.

All IBM System/36's are easy to use. Over 2,800 "help" screens assist first-time users over any rough spots. They're also easy to install. And they need no special operating environment.

No matter what business you're in, the System/36 Family of processors offers a system that will fit, now and in the future.

To learn more about the IBM System/36 Family, call your IBM marketing representative. Or for an IBM Product Center or authorized IBM remarketer, call 1 800 IBM-2468, ext. 90, LM.

If you're shopping for a business computer, choosing the best system is easier than ever. The hardest part is deciding how much System/36 is right for your business.

IBM

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NEW PRODUCTS

Continued from page 113

at 650 line/min; and Model 5230-03 operates at 1,000 line/min.

The 5230 family provides a 64-char. set as standard and an optional 96-char. set. The printers support forms up to 16 in. wide. A built-in diagnostic display lets users identify and correct off-line conditions.

Direct attachment to the IBM System/34, 36 and 38 is through standard twin-axial cable. The printers include a cable-through connector, terminator switch and address switches.

In addition, the units reportedly operate as fully functional IBM 5256 printers with paper-out and paper-jam sensing.

Model 5230-01 costs $9,600; Model 5230-02 costs $11,400; and Model 5230-03 costs $14,400.

Digital Systems, P.O. Box 0974, Waukesha, Wis. 53187.

■

The Model 5210-01 bar code/label printer that is compatible with the twin-axial connection of the IBM System/34, 36 and 38 is available from **Digital Systems, Inc.**

The Model 5210-01 can print 27 labels per minute or 140 char./sec. Users can specify block letters and line-drawing dimensions.

Bar codes include Code 39, Universal Product Code, Codabar, Interleaved 2 of 5, Plessey M-10, EAN 8 and EAN 13.

The system is said to provide 5,000 hours mean time between failure and a one-year warranty on the print head. Direct attachment to the IBM System/34, 36 and 38 is via standard twin-axial cable. The printer includes a cable-through connector, terminator switch and address switches.

The Model 5210-01 is priced at $6,195.

Digital Systems, P.O. Box 0974, Waukesha, Wis. 53187.

■

Infoscribe, Inc. has added Bar Code 39 print capability to its **Model 800** and **1100** dot matrix printers.

The bar code capability is implemented in read-only memory-based firmware that is accessed through an escape sequence from normal print routines. Bar codes can be printed in three densities with two contrast ratios. Print height varies in 0.01-in. increments.

The bar code option costs an extra $80 for each printer model. Users can purchase field upgrade kits for $125 or return their printers to the factory for an upgrade plus printer test and check for $150.

Infoscribe, 1808 Michael Faraday Court, Reston, Va. 22090.

Graphics systems

Xerox Corp. has announced a computer-aided system for mechanical design and drafting called the **Xerox Professional Mechanical System (XPMS).**

XPMS is designed for use in electronic design and documentation applications. It consists of an Ethernet-linked local-area network of workstations that can share data bases for design integration.

XPMS offers multiple window capabilities providing the functional equivalent of up to seven graphics terminals in a single display. Pro-Cad, a mechanical design and drafting software package, enables XPMS users to add drafting symbols, common geometric elements and construction devices.

A Professional Integrator library allows users to send and receive two- or three-dimensional geometric files written in CAD-system formats and to convert them from one format to another.

Prices range from $20,000 to $75,000, depending on the configuration.

Xerox, Xerox Sq. 006, Rochester, N.Y. 14644.

■

A graphics workstation, the **Megastation 3300**, which combines the Megatek Whizzard 3300 interactive graphics system and the Digital Equipment Corp. Microvax II 32-bit microcomputer, is available from **Megatek Corp.**

The Megastation 3300 supports graphics programs that run under the DEC VAX/VMS operating system including electronic or mechanical computer-aided design, simulation, C³I and mapping.

A direct memory access interface is said to provide parallel communications speeds of up to 1.5M byte/sec.

Standard Whizzard 3300 configurations provide a 1,024- by 1,024-pixel resolution, 19-in. monitor, real-time, two-dimensional transformations, keyboard and 16 displayable colors.

Options include a three-dimensional hardware clip and a rotate, scale and translate module for mixing 2- and 3-D graphics displays simultaneously.

Standard Microvax II features include 2M bytes of main memory, a 31M-byte Winchester disk, Ethernet interface, serial port floating-point processor and 800K-byte 5¼-in. dual floppy drive.

Megastation 3300 single-system end-user prices range from $50,000 to $70,000, depending on options, the vendor said.

Megatek, 9645 Scranton Road, San Diego, Calif. 92121.

Office systems

CPT Corp. has announced the **Office Dialog System (ODS) 100** member of its CPT ODS family of minicomputers.

The ODS 100 is an AT&T Unix-based system for departmental processing in small to midsize businesses and for departments and other work groups within midsize to larger businesses, the vendor said.

The system can support up to eight workstations. By adding the CPT Open Connection facility that costs $1,000, IBM Personal Computers can be part of the workstation configuration.

On-line storage ranges from 50M to 280M bytes, in addition to the individual storage of each workstation. The ODS 100 supports TTY, IBM 3270 and Digital Equipment Corp. VT52 terminal emulation through a communications package that costs $1,500.

The base price for the single-user CPT ODS 100 is $18,990, which includes 1M byte of main memory, 50M bytes of Winchester disk storage, two RS-232 ports and a 55M-byte ¼-in. tape drive for backup.

To include from two to eight users, an eight-port communications board costs $1,990, and an additional 0.5M bytes of memory that cost $2,490 are required.

CPT, P.O. Box 295, Minneapolis, Minn. 55440.

■

Property Technology, Inc. is offering **The Statistics Engine**, an integrated hardware and software package that provides statistical analysis and office automation in academic and scientific settings.

The hardware portion is the Charles River Data Sys-

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tems, Inc. Universe 32, a machine built around the Motorola, Inc. 68020 semiconductor. Hardware features include a 35M-byte disk, 140M-byte add-on disk, 45M-byte streaming tape, 4M bytes of random-access memory, 12 serial ports and the Unix System V operating system.

Software consists of the Minitab statistical application package, Q-Office word processing and office automation and Unify data base management system.

The price is $49,186, which averages to approximately $4,100 per user, the vendor said.

Property Technology, 90 Windom St., Boston, Mass. 02134.

Power supplies

International Power has introduced two uninterruptible power sources, the **IUPS400** and the **IUPS650**.

The IUPS400 is a 400W, 3.6A model for use with micros. The IUPS650 is a 650W, 5.75A model for use with minicomputers. Ferroresonant transformer design is said to provide a computer-grade sine wave with crystal-controlled frequency and instantaneous backup during blackouts.

The Model IUPS400 costs $1,095, and the IUPS650 costs $1,595.

International Power, Suite 710, 350 N. Lantana, Camarillo, Calif. 93010.

Isoreg Corp. has announced single-phase **Isoguard** uninterruptible power system (UPS) for computers, process control and instrumentation applications.

A static continuous on-line UPS, Isoguard stores electrical energy in batteries until needed and changes supplied power continuously from ac to dc and back to ac.

The UPS provides stable power to the load within 2% of correct voltage even when power line voltage deviates from normal by 10%, according to a spokesman. A sudden 50% load change is eliminated within 25 msec.

Isoguard is said to tolerate frequency deviations of 5% while the output frequency remains within 0.25%.

The units come with a two-step audible and visual alarm system that first warns users when utility power is lost and then issues a two-minute warning before battery power is lost.

Other features include input circuit breakers, battery circuit breakers, automatic bypass switch, manual bypass switch, alarm turn-off, reset switch and an internal battery pack with 10 minutes of power.

Options are an RS-232 computer interface terminal, remote alarm interface and remote generator-starting relay.

Isoguard units are rated from 500VA to 10 kVA single-phase and are available in 50Hz and 60Hz versions.

Prices for 60Hz models with a 10-min. full-load internal battery pack range from $1,566 to $19,809.

Isoreg, 410 Great Road, Littleton, Mass. 01460.

■

Sola Electric Co., a unit of General Signal Corp., has announced that it will unwrap a **3-kVA uninterruptible power system** (UPS) that uses multiple pulse width modulation.

The UPS is said to operate between the ac line and the load to provide continuous voltage regulation and isolation from noise and transients during normal line power conditions.

Battery reserve is on-line and automatically supplies the load with uninterrupted power, according to the vendor.

A 60-cell lead acid battery pack that provides 22 minutes of reserve power is available as an option.

A transistor-switching pulse width modulation inverter reportedly holds output voltage within 2% despite line voltage fluctuations ranging from 10% to -15%. Other features include two output meters, dc voltameter, primary ac breaker and battery breaker.

The 3-kVA UPS with one battery pack lists for approximately $7,000.

Sola Electric, 1717 Busse Road, Elk Grove Village, Ill. 60007.

■

GTE Control Devices Operation has developed the **CP-200 Smoothline**, an ac power-surge suppressor for personal computers and telecommunications, video and other electronic equipment.

The unit is said to protect personal computers and peri-

Continued on page 121

Looking for a software supplier who won't try to make one solution fit all your problems?

If somebody says their one solution is the answer to all your problems, be suspicious. Especially when it comes to applications development. Because a business application problem is almost always a combination of problems. So what you need is a combination of solutions.

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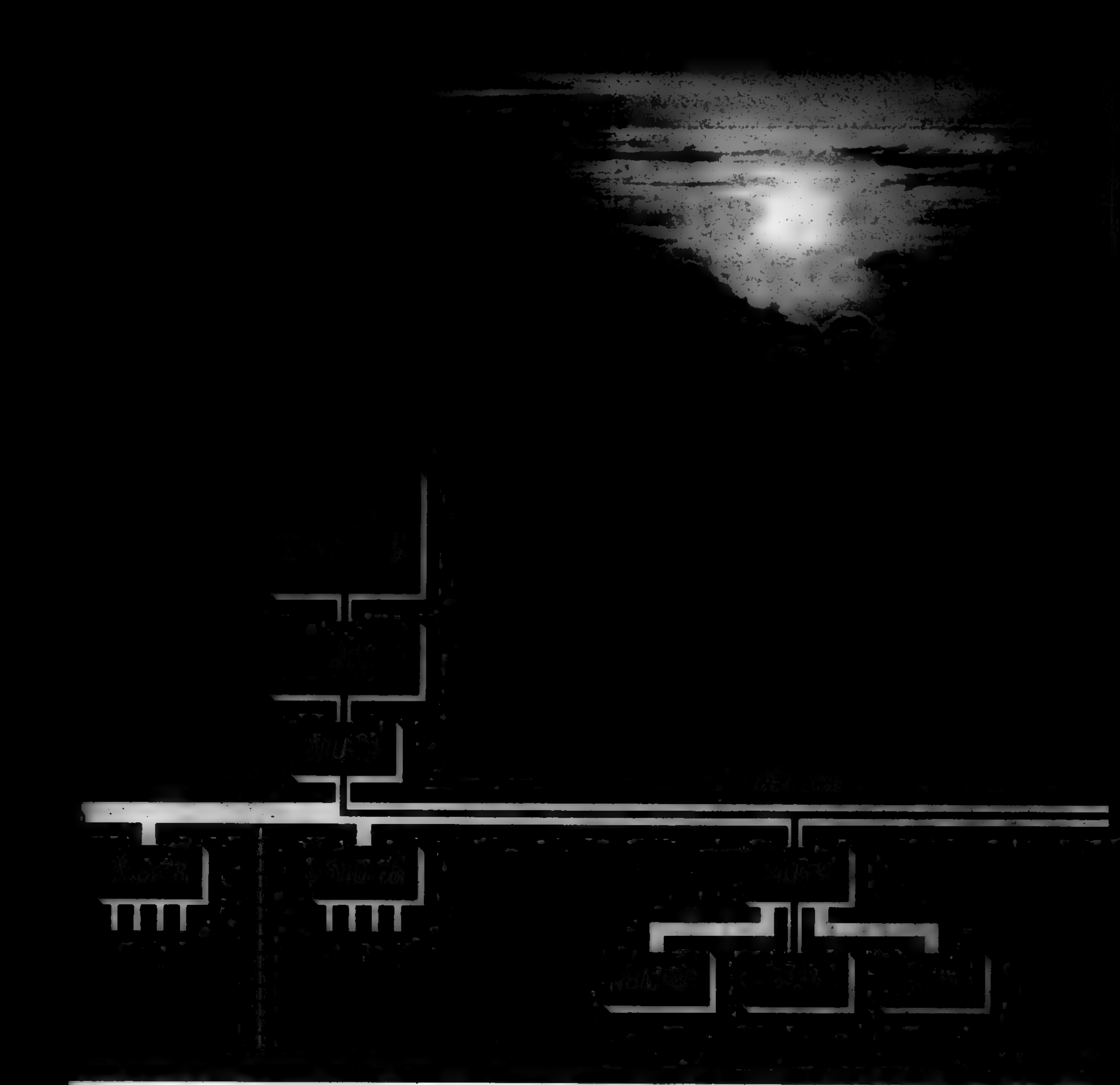

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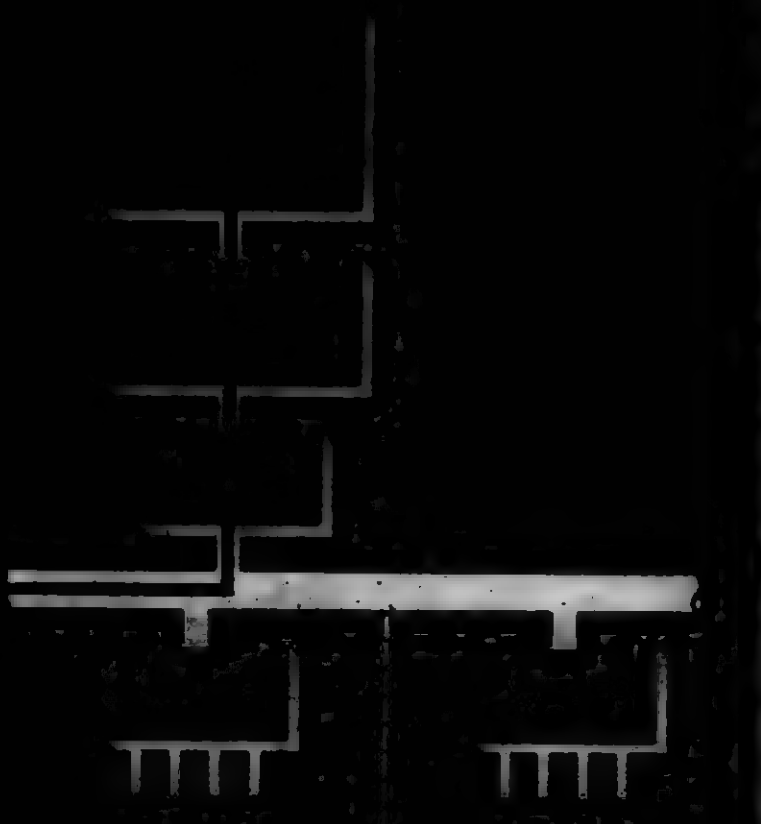

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Continued from page 117

pherals from power fluctuations that can cause data loss or equipment damage. It contains four outlets plus an exterior operating switch that lights when operational.

CP-220 Smoothline lists for $69.95.

GTE Control Devices Operation, Rt. 35, Standish, Maine 04084.

■

Control Concepts Corp. has unveiled the **Super Isolatrac** series of power-surge protection devices that protects computers and peripherals against power line disturbances caused by transients, spikes and short-term outages.

There are three models: The CP-2 single-outlet unit fills requirements up to 2.5A and is protected by a replaceable fuse. Model CP-7 provides four outlets and is protected by an 8A circuit breaker. The six-outlet CP-15 uses a 15A circuit breaker. The devices actively track input power.

Prices are $69 for the CP-2, $129 for the CP-7 and $199 for the CP-15.

Control Concepts, P.O. Box 1380, 328 Water St., Binghamton, N.Y. 13902.

Board-level devices

EMC Corp. has unwrapped its **HP600 series** of 1M-, 2M- and 4M-byte memory cards for Hewlett-Packard Co. HP 3000 Models 64 and 68 computers.

The HP600 series features on-board error check and correction capability. It can be installed with any combination of EMC- or HP-manufactured cards, the vendor said.

The HP601 costs $7,900, the HP602 costs $14,200 and the HP604 is priced at $25,500.

EMC, 12 Mercer Road, Natick, Mass. 01760.

■

Sierra Semiconductor Corp. has announced CMOS E2 programmable read-only memory (PROM) multiplexed address and data memory integrated circuits.

The memories are said to include on-board latches and an address decoder, 5V-only programming capabilities and self-timed write and erase cycles. According to the vendor, Sierra's process allows E2 PROM circuits to be combined with analog and digital functions on the same chip.

Prices range from $7.25 to $12.10 each and up to $15.15 each for high-speed versions.

Sierra Semiconductor, 2075 N. Capitol Ave., San Jose, Calif., 95132.

■

Audec Corp. has unwrapped the **Audec SSB-1000**, a voice recognition board that allows voice activation and control of numerous products.

The Audec SSB-1000 can be bought in an evaluation unit for $250. The evaluation board includes a headset with microphone and speaker and an RS-232 interface so that it can be run as a stand-alone unit or with a computer or terminal.

The 5-in. by 5-in. board has a digitizer and a chip set that includes Rockwell International Corp.'s 6500 chip with proprietary software. Boards that recognize 192 words cost $250 (in quantities of one), and one that costs $229 recognizes 78 words, a spokesman said. The chip sets are also available for $119. OEM quantity breaks are available.

Audec, 290 Market St., Saddle Brook, N.J. 07662.

■

Motorola Semiconductor Products, Inc. has introduced the **MVME117 monoboard**, a one-board microcomputer system that can run either stand-alone as a packaged single-board computer or as part of a modular, user-configurable VMEbus computer system.

The MVME117 monoboard includes two serial I/O ports, two parallel I/O ports, a small computer systems interface, a battery-backed real-time clock/calendar, three independent 16-bit timer counters, an interrupt handler, a VMEbus system controller, a VMEbus requester and 128K bytes of dynamic random-access memory. The unit also includes a socket for a Motorola 68881 floating-point coprocessor.

The unit with small computer systems interface costs $2,350. Without the interface, it costs $2,150; and with 512K-byte dynamic random-access memory instead of 128K bytes, it costs $2,575.

Motorola Semiconductor Products, P.O. Box 20912, Phoenix, Ariz. 85036.

■

Performance Interconnect, Inc. has released the **PII-V5000**, a VMEbus-based processor board that uses Motorola, Inc.'s 68020 processor.

The PII-V5000 processor is available with random-access memory in 2M-byte increments up to 8M bytes. The board can address up to 16M bytes of memory via the VMEbus, the vendor said.

The V5000 board provides sockets for Motorola's 68881 floating-point coprocessor and up to 64K bytes of erasable programmable read-only memory.

The V5000 CPU board costs $5,250, and the V5002M 2M-byte memory boards are $3,000.

Performance Interconnect, Suite 2144, 8950 Villa La Jolla Drive, La Jolla, Calif. 92037.

■

Imaging Technology, Inc. has announced the **Series 100**, a family of single-board, plug-compatible image processing modules designed to be

Continued on page 122

Lotus on a VAX?

dBASE II on a VAX?
Friday! on a Micro VAX?
Condor on a PDP-11?
PFS:File on a PRO?
Personal Pearl on a VAX?
QuickCode on a Micro VAX?
Spellbinder on a VAX?
WordStar on an MV/10000?
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Multiplan on a PDP-11?
PL/M on a VAX?
SuperCalc 3 on a PRO?
T/Maker Integrated on a VAX?
MS-BASIC on a Micro VAX?
Milestone on a PDP-11?
Palantir on a PDP-11?
SpellStar on a PRO?
MailMerge on a PDP-11?
PMS II on a VAX?
dBASE II on a PDP-11?
Lotus 1-2-3 on a PDP-11?
Open Access on a PRO?
MS FORTRAN on a VAX?
Condor on an MV/10000?
Multiplan on a PDP-11?
WordStar on a VAX?
SuperCalc 2 on an Eclipse?
PertMaster on a PRO?
Palantir on a VAX?
QuickCode on a PDP-11?
DISC-DBL on a VAX?
PerfectWriter on a PD
WordStar on a PDP-11?
Spellbinder on an Eclipse?
Friday! on a VAX?
PerfectWriter on a PRO?
RM/COBOL on a PDP-11?
RTCS/UDI on a VAX?
Mass-11 on a PDP-11?
Milestone on an Eclipse?
Lotus 1-2-3 on a Micro VAX?
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Virtual Microsystems, 2150 Shattuck Avenue, Suite 300, Berkeley, CA 94704

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Continued from page 121

compatible with Motorola, Inc.'s VMEbus, Intel Corp.'s Multibus, Digital Equipment Corp.'s Q-bus and IBM Personal Computer AT architectures.

The Series 100 modules are capable of digitizing analog video from standard RS-170, RS-330 or 50Hz Consultative Committee on International Radio sources, processing the digital images in real time and displaying the stored image in monochrome or pseudocolor.

The board features a feedback mode for its input look-up tables that allows incoming and stored images to be processed under program control in real time and a memory architecture that allows users to access randomly individual pixels from the onboard frame memory. This allows eight pixels to be moved and manipulated at once.

Other features include a 512- by 512-pixel resolution with 12 bit-plane/pixel, an 8-bit analog-to-digital converter for digitization to 256 levels of grey and the ability to synchronize with video tape recorders.

The Series 100 board is available in monochrome or pseudocolor versions for $3,995 and $4,495, respectively.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801.

■

Emulex Corp. has announced the SC41 controller for Digital Equipment Corp.'s PDP-11 and VAX-11 Unibus systems that feature mass storage control protocol.

The SC41 provides seek ordering, software transparency, large data buffering, high-performance circuitry and automatic revectoring and error recovery. The SC41 is transparent to the DEC operating systems for PDP-11 and VAX-11 computers.

The SC41 is a single hexadecimal board priced at $8,900.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

■

Motorola Semiconductor Products, Inc. has announced a VMEbus-compatible 1,024- by 1,024-pixel **memory graphics board set** said to provide flicker-free graphics for color and monochrome monitors.

The two-board set can be used for applications requiring either monochrome or red-greed-blue (RGB) color monitors with analog video RS-170 or RS-343A input. Its base board, MVME390-1, can be used alone for handling binary transistor-transistor logic (TTL) monochrome monitors with up to 1,024- by 1,024-pixel resolution, according to the vendor.

There are 384K bytes of display memory dual-ported to the VMEbus and to the display-refresh logic. Memory is organized as three bit-planes of 1,024 by 1,024 pixels simultaneously producing eight colors selected from a palette of 4,096 or eight gray-scale levels selected from a range of 16.

The addressing scheme reportedly allows memory to be accessed from the VMEbus on either a bit-plane or pixel basis.

Prices are $4,500 for the MVME390 two-board graphics set; $2,300 for the MVME390-1 VMEbus graphics display controller module with up to 60Hz refresh rate, monochrome and noninterlace with TTL outputs; and $2,300 for the MVME390-2, the memory expansion for the MVME390-1 that provides two additional 1,024- by 1,024-pixel bit-planes, color palette random-access memory and digital-to-analog converter for RGB RS-343A outputs.

Motorola Semiconductor Products, P.O. Box 20912, Phoenix, Ariz. 85036.

Auxiliary equipment

Raycom Systems, Inc. has unwrapped two cable extender models, the **2300/2302** and the **2320/2322**, which overcome the distance limitations imposed by standard Centronics Data Computer Corp.-compatible parallel printer interfaces.

Model 2300/2302 extends the 10-ft maximum computer-to-printer transmission distance to 3,000 ft, while the Model 2320/2322 increases the distance to a maximum of 500 ft.

Characters input into the Model 2300 at the computer are echoed by the 2302 at the printer transparently to the user. Both models support printer status and control signals.

The 2300/2302 uses fiber optics to provide immunity from static electricity, radio interference and grounding problems. The 2320/2322 uses twisted-pair wiring and an RJ11 modular phone jack connector.

Each cable extender can interconnect minis and personal computers that use a Centronics-compatible parallel interface with Centronics-compatible high-speed line printers.

Prices per pair are $695 for the 2300/2302 and $595 for the 2320/2322.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.

■

Intermec Corp. has released a bar code laser scanner, the **Model 1620**.

The hand-held laser scanner is said to project a concentrated beam of helium-neon laser light to allow the scanner to be held up to 23 in. from a bar code. This feature is said to be useful for inventory control and printed-circuit board scanning.

The 1620 scans low- to high-density bar code at a speed of 36 scan/sec. It can be used with any Intermec laser reader. It can also be used with eight Intermec wand readers when Intermec's 1820 Scan-Mate interface for converting a wand reader into a laser reader is used.

The unit costs $1,395.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynnwood, Wash. 98046.

The Panasonic®
Electronic Typing Station.
It fills the gap.

The KX-E828 shown with optional second disk drive.

Panasonic knows many of your customers want the benefits of a computer or a word processor, but don't want the often complicated learning process. For those customers, Panasonic offers the perfect solution: the KX-E828 Electronic Typing Station.

All it takes is a basic knowledge of electronic typewriters to take advantage of such features as full-screen text-editing and mail merge. It also includes unlimited disk memory and can check spelling automatically.

Unlike most word processors, the Panasonic Electronic Typing Station has an "Interrupt" feature. It permits customers to pause in the middle of a lengthy report and type a quick letter. Without disturbing the text on the screen.

Still, as impressive as the KX-E828 will be to your customers, there is also plenty to impress you. Like Panasonic's famous unparalleled dealer support. Everything from strong co-op programs to national advertising to big profit margins.

For more information on how both you and your customers can quickly profit from the Panasonic KX-E828 Typing Station, call 1-201-348-5394.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT
Clinton Wilder
CW Senior Writer

CDLA, IBM: A shaky alliance

Tracking the ever-changing relationship between the Computer Dealers and Lessors Association (CDLA) and IBM has always been a curious business. Theirs is an uneasy symbiosis: the players on each side know that the other is invaluable to their success, but that doesn't mean they have to be happy or fully cooperative in the relationship.

According to a recent International Data Corp. survey, 93% of CDLA members' and other firms' leases in 1984 were written for IBM or primarily IBM hardware. That's even down a tad from 96% in 1983, but the symbiosis is clear. The leasing industry is a huge secondary market for IBM with plenty of bucks — 40% of IBM's U.S. revenue, according to the CDLA — flowing back to Big Blue, while IBM CPUs and, especially, peripherals, are the lifeblood of the leasing industry.

At this point, the feeling of the CDLA toward IBM could best be described as cautiously optimistic. Surrounded by the autumn splendor of the Allegheny Mountains at their semiannual get-together late last month in Hot Springs, Va., CDLA members heard several of their directors report on their recent audience with IBM Chief Executive Officer John Akers in Armonk, N.Y.

That face-to-face meeting was a first for the CDLA, which is a very positive sign. "Akers went around the table and personally thanked each one of us for our business," said CDLA President Harry Goetzmann of CIS Corp. in Syracuse, N.Y. "I can tell you that means a lot."

Goetzmann said all of the leasing industry's hot topics were discussed:

Continued on page 132

Uccel on buying spree

Acquisition strategy steps up development efforts

By John Gallant

Uccel Corp. recently purchased Software Corporation of America (SCA) — a systems software vendor whose 1985 revenue is expected to be more than $6 million — for just under $10 million in cash.

By itself, Uccel's acquisition of Herndon, Va.-based SCA, pales in comparison to the billion-dollar takeover schemes that have come to dominate the financial news of late. But the purchase of SCA marks the ninth such acquisition of a software company by Dallas-based Uccel in slightly more than two years. Since September 1983, Uccel has paid out more than $52 million in cash to purchase a series of small microcomputer, banking applications and systems software firms.

Paul Newton, a senior vice-president, Uccel

Uccel has acquired six of those companies — at a rate of one company a month — since May of this year alone. And, according to Paul Newton, senior vice-president of Uccel's Software Products group, the company intends to continue on its aggressive acquisition campaign. Newton said two significantly larger acquisitions are in the works, one of which will be culminated by year's end.

The strategy behind Uccel's buying spree is simple, Newton said. Uccel's goal is to shift its revenue base so that more than three quarters of its revenue is derived from sales of software. The company is striving to reduce its reliance on revenue from the provision of services, which had been the primary focus of Uccel — known until recently as University Computing Co. — in the past.

In order to meet that goal, Uccel has stepped up its internal development efforts. Earlier this year the company unveiled a reported $20 million development

Continued on page 130

BUSINESS NOTES

News from the computer world

The management of Computer & Communications Technology Corp. (CCT) of Santa Barbara, Calif., will take the company private in a leveraged buy-out. The move will be financed by the sale of the management group's remaining 86% stake in CCT subsidiary Zeta Laboratories, Inc. to an undisclosed New York Stock Exchange-listed company. The group is headed by Chairman and Chief Executive Officer E. T. Bahre.

Continued on page 131

TI posts losses, plant closings

By Clinton Wilder

While some leading vendors such as IBM and Digital Equipment Corp. continued to post respectable profits, the recently reported third-quarter results spelled more calamitous news for Texas Instruments, Inc. and Computervision Corp.

Dallas-based TI, decimated by the semiconductor slump and also scarred by the microcomputer downturn, reported a pretax third-quarter loss of $113.7 million and a planned dismissal of 2,200 more employees. The dismissals include the closing of a chip making facility in El Salvador, a wafer processing facility in Houston and a plant in College Station, Texas, where the TI Professional Computer is assembled.

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INSIDE

Bell Atlantic won an FCC waiver from Second Computer Inquiry regulations, allowing it to market Centrex hardware and services jointly/**124**

The CDLA will step up its Congressional lobbying efforts by raising political action committee funds/**126**

INSTANT ANALYSIS

"The [leasing] industry is headed for a very stable period, extending perhaps to five years. Conventional wisdom is that we're entering such a five-year cycle with the introduction of the Sierra."

— James F. Benton
Computer Dealers and Lessors Association

Sperry, Altos suffer under industry slump; others gain

By Maura McEnaney

The computer slump continued across a broad spectrum of the industry with recent third-quarter results, led by profit declines from continuing operations at Sperry Corp. and Altos Computer Systems, Inc.

Sperry's sale of its farm equipment operations resulted in a net loss of $187.9 million for the New York-based mainframe manufacturer during the second quarter ended Sept. 30, Sperry said. Profits from its continuing operations were $42.7 million, or 75 cents per share, compared with $97.3 million the year before. Sperry also reported a $230 million loss on discontinued operations from the sale of the farm equipment unit.

Multiuser microcomputer maker Altos Computer Systems of San Jose, Calif., announced a first-quarter sales dip to $31.7 million, compared with $33.5 million during the first quarter a year ago. Net income was $2.3 million, compared with $3.8 million a year ago. Earnings were 16 cents a share, compared with 25 cents a share a year ago.

Other firms reporting results recently include the following:

- **Miniscribe Corp.** The Longmont, Colo., disk drive manufacturer recorded its first quarterly profit since a new management team took the reins last spring. Third-quarter sales were $28.5 million, compared with $26.1 million for the same period a year ago. Net income for the third quarter ended Sept. 29 was $329,000, compared with a loss of $2.5 million, or 13 cents per share, in the like period a year ago. For the first nine months of the year, Miniscribe recorded a net loss of $19.2 million on sales of $78.3 million.
- **Electronic Data Systems Corp.** Several new contracts, among them a 10-year systems integration contract with the U.S. Department of Agriculture, contributed to the 151% increase in net income for the Dallas-based computer services company in the third quarter. The company recorded income of $51.9 million, up from $20.7 million a year ago. Quarterly revenue increased 286% to $921.8 million, with General Motors Corp. revenue accounting for $668.7 million of this amount. Nine-month revenue increased 255% from year-ago totals to $2.36 billion. GM revenue accounted for $1.63 billion of this amount.
- **Mentor Graphics Corp.** Third-quarter sales were $34.3 million, up from $24.2 million a year ago. Net income totaled $1.42 million, or 9 cents a share, compared with $2.35 million, or 17 cents per share, for the third quarter last year. Sales at the computer-aided engineering firm increased 75% from $57.2 million to $100 million during the first nine months of the year.
- **Convergent Technologies, Inc.** Revenue at the San Jose, Calif.-based systems manufacturer slipped to $101.6 million from year-ago totals of $105.7 million, while earnings climbed from $2.7 million to $3.7 million. Year-to-date revenue hit $295 million, and earnings reached $6.4 million.

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Bell Atlantic Centrex deal OK'd

WASHINGTON, D.C. — The Federal Communications Commission recently granted Bell Atlantic Corp.'s request to be the prime contractor of Centrex services and Centrex terminal equipment, provided that the hardware is supplied by an unaffiliated vendor.

The permission constitutes a waiver of FCC rules, which require separation of regulated Centrex service from unregulated telephone equipment, as contained in the Second Computer Inquiry currently under review by the FCC.

Bell Atlantic pledged to the commission that it did not intend to own, install or maintain Centrex terminal equipment.

Bell Atlantic said that 40% of its subscriber lines in Washington, D.C., are Centrex lines and that the U.S. government, its largest user, was demanding a single-contractor to supply its telecommunications service. Bell Atlantic said its 1.2 million Centrex lines in the area produce $250 million in revenues.

THE PEOPLE AT ALBERT EINSTEIN ALMOST HAD TO BE EINSTEINS TO ACCESS DATA. UNTIL THEY GOT INTELLECT.™

"INTELLECT is the one tool in our Information Center that meets users' expectations about computer technology. It gives them instant English access to a wide variety of information about patients, physicians and more."
—Mr. Hal Augustine, Director, Computer Services, Albert Einstein Medical Center.

The Albert Einstein Medical Center (AEMC) in Philadelphia had 1,000-plus beds, four divisions, 800 admitting physicians, and one major challenge: giving their staff fast, easy access to the databases AEMC maintained.

Clearly, this kind of data retrieval and analysis would be a considerable task for just AEMC's Information Center to handle. The end-users had to become directly involved. So the Albert Einstein Medical Center healed itself by prescribing INTELLECT.

"We wanted a way to make information available to our users in a free-form, non-procedural manner. INTELLECT did it."
—Mr. Paul LoRusso, Vice President, Information Systems, AEMC.

About 30 high-level administrators use INTELLECT's natural language capabilities, including AEMC's President and the General Directors of all four divisions. One Assistant Director says that INTELLECT's immediate response to a series of English questions saved nearly 30 hours of staff work. The Administrative and Fiscal Offices spot and analyze admissions trends, referral sources, and average length of stay. With INTELLECT, you actually type questions such as "What's the average length of stay and average gross charge by discharging physician for DRG 127 (an illness category) during FY85?" and "Compare admissions by admitting diagnosis and principal final diagnosis for Dr. Smith"—and get the answers immediately.

"INTELLECT confirms our commitment to getting information to our users quickly and efficiently."
—Ms. Patricia Walkow, Manager, Information Center, AEMC.

INTELLECT performs so well in giving end-users fast, easy English access to information, AEMC's Information Center plans to develop new applications, including one on hospital personnel. And new INTELLECT/SX (the "personal computing" mainframe version of INTELLECT) will allow even *more* departments to develop their own applications with minimal Information Center involvement—which may end the need for some users to maintain micro-based databases.

"INTELLECT helped us in a way we never expected. It saved 400 hours of software testing by validating that a major new application was producing correct results from our database."
—Mr. Paul LoRusso, Vice President, Information Systems, AEMC.

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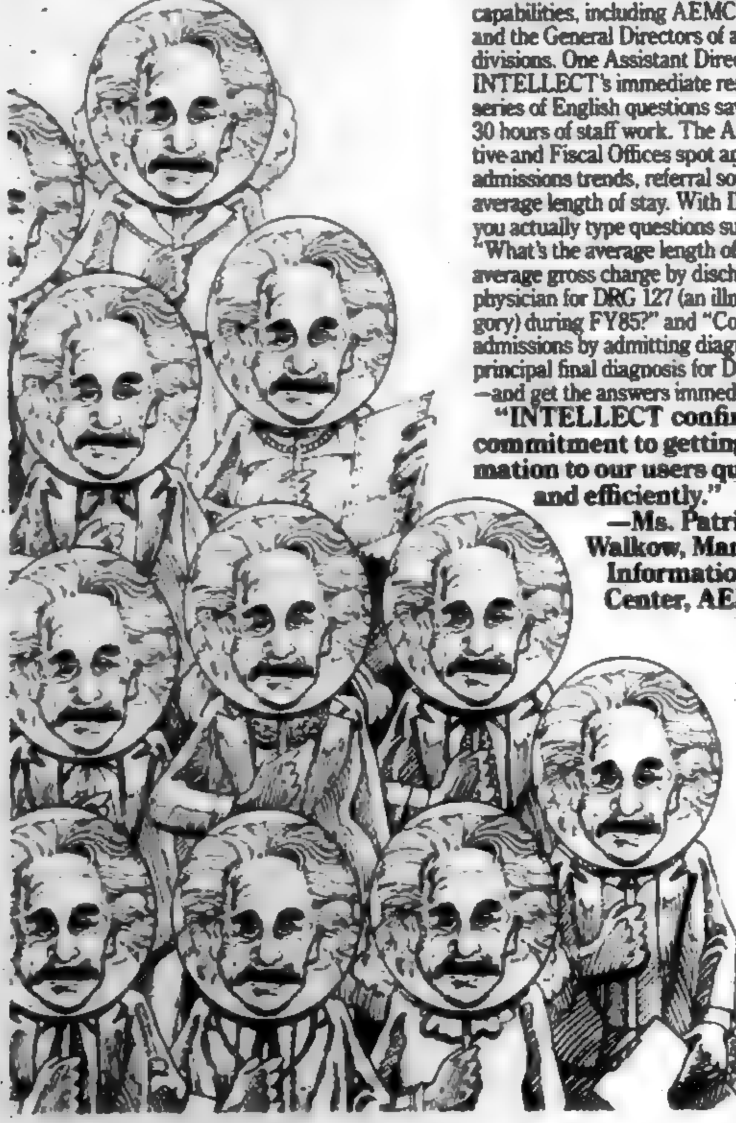
AEMC proves that INTELLECT is the first software that really makes the computer understand *you*. Find out what INTELLECT can do to make your organization healthier. Write for a free demo diskette. Or for fast action, call us now and ask for Extension #30.



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Wang gets government contract

WASHINGTON, D.C. — The U.S. Department of Health and Human Services has awarded the Federal Systems Division of Wang Laboratories, Inc. a contract valued at up to $14 million for Wang VS computer systems.

Wang was selected through a competitive bidding process to furnish and support computer systems for data processing and office automation over the next five years. The department placed an initial order for $4.4 million, Wang officials said.

Under the terms of the contract, Wang will provide VS computers, terminals, peripherals and communications and software products for the department's headquarters and field offices in 52 cities. The contract also requires Wang to provide training, support and maintenance services.

— Mitch Betts

MERGERS AND ACQUISITIONS

American Express Co. has announced that its wholly owned subsidiary, American Express Travel Related Services Co., has entered into a definitive agreement with **First Data Resources, Inc.** for the acquisition by Travel Related Services of all the shares of First Data Resources' common stock it does not already own at a cash price of $38.25 per share.

■

Gould, Inc. has acquired **International Cybernetics Corp.** The acquisition will be part of Gould's Factory Automation Group. International Cybernetics will continue to operate the firm.

■

Information Science, Inc. and **Cigna Corp.** have reached an agreement in

Continued on page 130

Why the three letters you think of first for System/38 add-in memory shouldn't be IBM.

EMC²
No one is more committed to memory.
12 Mercer Road, Natick, MA 01760
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EMC introduces its 1MB memory expansion card for the System/38.

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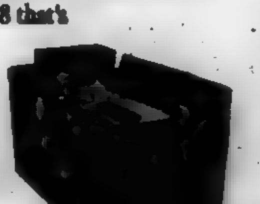

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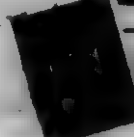

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CDLA fund-raising to benefit sympathetic politicians

By Clinton Wilder

HOT SPRINGS, Va. — The Computer Dealers and Lessors Association (CDLA) is charging hard into the political arena.

At its recent annual meeting, the CDLA formally kicked off its political action committee (PAC) fund-raising drive by soliciting pledges from its members. The CDLA hopes to raise $200,000 in PAC money in the coming year to contribute to congressional candidates who support its position on tax and other key issues, according to CDLA President Harry Goetzmann.

"I abhor special interest groups and I personally think [PACs are] not the way to run a country, but I won't get on my soapbox about it and go broke," Goetzmann said in an interview with *Computerworld*. "We're not trying to influence any votes, but we want to get our voice heard."

The CDLA had stepped up its Capitol Hill lobbying efforts in recent months, helping convince the U.S. Department of the Treasury to reduce its proposed "useful life" capital equipment depreciation schedule from eight years to five. The CDLA board told members during the closed business session here that they had decided to oppose a current provision of Rep. Dan Rostenkowski's (D-Ill.) tax proposal that would treat leased equipment less favorably than purchased hardware. The membership supported the position, said CDLA Legislative Committee Chairman Ken Bouldin, president of Memphis-based Econocom-USA, Inc.

Bouldin said the CDLA encourages leasing customers to support the association's political efforts. "I don't think many customers have a hard time recognizing the economic and tax benefits of leasing," he said. "If leasing is not on a level playing field, some of those customer advantages would be eliminated." The CDLA position is also supported by the American Association of Equipment Lessors, a trade group comprising capital goods lessors in the transportation, construction, computer and office equipment industries.

CDLA Vice-President Robert Gulko of Unicom Computer Corp. in Sausalito, Calif., said the CDLA is encouraging members to donate 0.1% of their annual salaries to the PAC.

•

CDLA derails California bill

HOT SPRINGS, Va. — As the Computer Dealers and Lessors Association (CDLA) geared up to fight national political battles with Political Action Committee fund-raising, it was claiming victory in a California political skirmish that its directors claimed to be highly significant.

At its annual closed business session last month, the CDLA told its members of the recent derailing of California Assembly Bill 1507, a consumer protection measure containing major implications for the leasing industry. According to CDLA Vice-President Robert Gulko, the bill would have mandated a six-month warranty period on all computers sold in the state, with a treble-damage provision for violators. But on leased systems priced at $25,000 or more, the manufacturer would have been exempted from the warranty requirements but not the lessor.

"This was a peculiar bill that really scared us a lot," Gulko said. "I think some legislators think of the computer business as one industry and don't understand the distinctions between hardware, software, services and leasing. They think of the computer business only in terms of whatever computer they're looking at on a particular day."

Gulko, who runs a leasing business in Sausalito, Calif., learned of the legislation after it had passed in the California Assembly last July and was sent on to the state Senate. There, CDLA-hired lobbyist Spencer Hathaway helped convince legislators to redraft the bill, which is still pending.

CDLA directors feared that the passage of Assembly Bill 1507 would have set a precedent whereby computer lessors could be at the mercy of lessees for a six-month period without recourse to the vendor. "It would have eliminated any collateral value on a leased computer," Gulko said. "There is not a bank in the country that would lend on a computer as collateral in that situation."

Gulko said the CDLA supports warranty protection legislation that does not threaten lessors. "We understand the personal computer industry; we've all bought software that doesn't work," he said. "But we're saying, 'Let's not throw the baby out with the bath water.' [Consumer protection] is a politically sexy issue that is not going to go away. We want to make sure our voice is heard."

— **Clinton Wilder**

AT&T seeks second waiver

By Bryan Wilkins

WASHINGTON, D.C. — AT&T, fresh from its recent victory at the Federal Communications Commission, where it was given permission to sell telephone and terminal equipment along with its basic network transmission service, has asked the FCC for similar treatment of its enhanced data communications product lines such as Net 1000.

AT&T said it is requesting the waiver from the FCC requirement to sell enhanced data service through a separate subsidiary, in this case AT&T Information Systems, because it will no longer be able to offer a combined enhanced service/hardware product effectively.

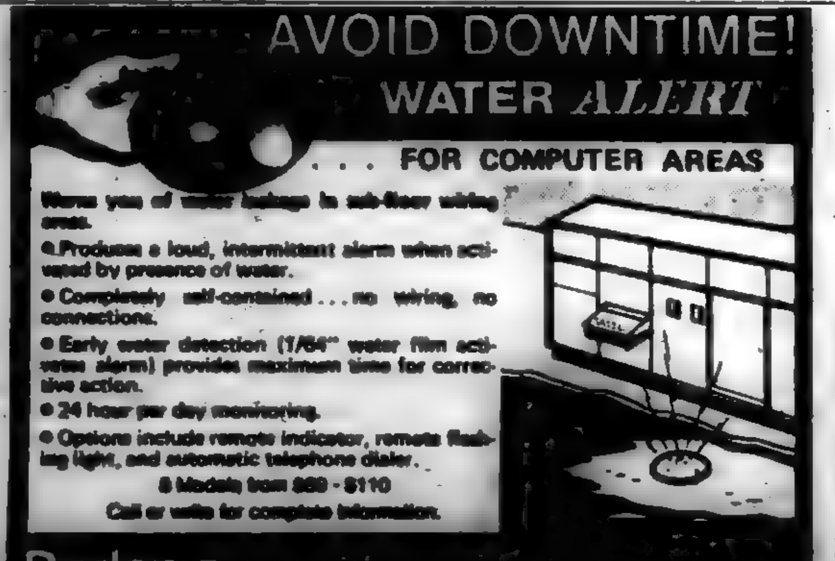
AT&T asked the FCC for expedited treatment of its waiver petition so that it might be able to offer both hardware and enhanced services with its transmission component. The FCC waiver to permit the selling and leasing of customer premises equipment with regulated transmission service is expected to go into effect around Jan. 1.

AT&T said customers of its enhanced data communications equipment, computers that massage data and perform protocol conversion before the data travels over the core network, will be confused because of "evolving regulatory requirements."

The FCC recently opened a new docket, the Third Computer Inquiry, in which it is reviewing the necessity for AT&T's use of a separate subsidiary to sell services when there is no danger of cross-subsidy and threat to competition. In essence, the latest petition asks the FCC for a temporary waiver of the separate subsidiary rules while it proceeds with the Third Computer Inquiry.

If the waiver is approved, AT&T said it will meet specific conditions to provide the enhanced service on an unregulated basis with separate accounting.

Initial public comments are due Nov. 4, and replies are due Nov. 12.



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From page 124

Mergers and acquisitions

principle by which Cigna would acquire the assets and certain liabilities of Dyer Wells Associates, a subsidiary of Information Science.

■

Marshall & Swift has announced the acquisition of the assets of the insurance services business of **McGraw-Hill Information Systems Co.** The deal was for an undisclosed cash sum.

■

Westinghouse Electric Corp. and **Lamb Technicon Corp.** have agreed to become equal owners of Mictron, Inc. Mictron had been a Lamb subsidiary.

■

Concept Omega Corp. announced the acquisition of **Science Management Corp.'s (SMC) Software Systems** division. The transaction provides complete rights to Concept Omega of SMC Software Systems' entire Thoroughbred series of Business Basic productivity tools, business applications and a line of educational programs.

■

Gould, Inc. announced that it has completed the cash sale of its **Measurement Systems Division** to Solartron Electronics, Inc., a subsidiary of Schlumberger, Ltd.

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From page 123

Uccel embarks on buying spree

project aimed at producing an integrated set of mainframe banking applications. And in June, Uccel announced an ambitious project — dubbed Synova — designed to tie together its line of mainframe systems software.

But internal resources alone are not enough, Newton said. "We had to accelerate the whole process through acquisitions," he said. "We feel that the software market, while it may have its weak spots, is going to be healthy for many years to come. But we cannot benefit from that if we do not reach our goals until the end of the decade."

How does the financial community view Uccel's aggressive approach? "Uccel has been very successful," said Bernie Goldstein, a partner with Broadview Associates, a merger and acquisition firm located in Fort Lee, N.J.

"It has improved its portfolio of products enormously and has become one of the major players in the systems software marketplace. I think the company is successfully moving from a generalist computer services company to a leading systems software company. That has been accomplished largely by the acquisition route," he said.

"Adding software products through acquisition is how major software companies grow," Goldstein added.

Four micro software buys

In the micro software arena, Uccel has purchased four companies: Open Systems, Inc. and Quest, Inc., vendors of financial applications; Spectrum Training Corp., a vendor of computer-based training products; and Micro Development Organization, which Newton said provided Uccel with "new micro development capabilities."

For banking applications, Uccel acquired Financial Software of America, Inc. and Pearl Data Systems, Inc. On the systems software side, Uccel has purchased Barlow Data, a supplier of capacity planning products; Corodale, Inc., which gave Uccel an entry into the IBM DOS/VSE systems software market; and Software Corporation of America (SCA).

The most recent of the acquisitions, that of SCA, gives Uccel five additional systems software products for the IBM MVS market. Those products include a data set performance measurement and analysis tool, a procedure library system and a disaster recovery facility. SCA boasted 1,500 installations of its products and nearly 60 employees. It will operate as part of the Software Products group.

Newton said the acquisitions have barely dented what he called Uccel's "sizable war chest" of cash, but they have stretched management a bit thin. He said the impact of the computer industry slump has accelerated the willingness of smaller software companies to be acquired. It has also allowed Uccel to pick up such companies for perhaps 10% to 20% less than it could have in 1983 or 1984. But the slump has caused Uccel management to ponder the wisdom of its acquisition policy.

"We have asked ourselves, 'Will this be a brilliant strategy because things will be fantastic in the software market again?' or 'Are we going to look stupid because this little glitch is going to turn into a major falling off in the market?' We think the truth is somewhere in between," Newton said.

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From page 123

News from the computer world

CCT also announced it will move its corporate headquarters to San Diego and its recording head manufacturing operations to Tijuana, Mexico. For the third quarter ended Sept. 28, CCT's profits fell to $103,000, or 1 cent per share, from $3.2 million, or 41 cents per share (excluding a one-time benefit), a year ago. Sales dropped from $31.6 million to $20 million.

■

The sell-off of pieces of Mohawk Data Sciences Corp. continued last week with the sale of its UK and Ireland subsidiaries to Dasa Corp., a Stoneham, Mass., vendor of electronic directory dialing systems. The preliminary sale price was $1.4 million in cash.

■

Seymour Merrin, founder, chairman and chief executive officer of Westport, Conn.-based microcomputer retailer Computerworks, Inc., has resigned to join the Gartner Group, Inc. Merrin will be a vice-president and head the Personal Computing Service of the Stamford, Conn., market research firm.

■

Another founder's resignation came at Masstor Systems Corp. in Santa Clara, Calif., where founder and Chairman Erik O. J. Sajbu left to pursue venture capital interests. President David Addison took over the chairman's post.

■

Effective last Friday, Hewlett-Packard Co. consolidated its captive semiconductor operations to work almost exclusively on HP's Spectrum program to develop computers based on reduced instruction set computing technology. The moves are reportedly designed to hasten development of a 32-bit, four million instructions per second microprocessor at the firm's Fort Collins, Colo., integrated circuit division. The newly formed Integrated Circuit Group melds several operations that are not directly related to the Spectrum effort and places them under the Information Systems and Networks Sector.

■

Amidst a storm of bad financial news, Texas Instruments, Inc. received a ray of sunshine recently: Its Japan-based bipolar semiconductor operation became the first completely U.S.-owned company to win Japan's coveted Deming Award for quality control.

■

George Raymond, president of Automatic Business Centers of Moorestown, N.J., was named chairman of the board of the Association of Data Processing Service Organizations, Inc. for 1986. Other officers are Software Design Associates President Jay Goldberg, vice-chairman; and Pansophic Systems, Inc. Vice-Chairman and Chief Executive Officer David Eskra, treasurer.

The four functional vice-presidents for 1986 are Advanced Computer Techniques Corp. President Oscar Schachter, Computer Task Group President Jack Courtney, Electronic Data Systems Corp. counsel P. Michael Nugent and Management Science America, Inc. Chairman and CEO John Imlay.

■

Irwin Rubin is back at the helm of Computer Memories, Inc., the Chatsworth, Calif., disk drive maker that recently lost its contract to supply drives to IBM. Rubin was renamed to his former post as Computer Memories' chairman and chief executive officer, following the resignation of Finis Conner [CW, Oct. 21]. Rubin, 57, had been vice-chairman since Conner took over in September.

■

Britton-Lee, Inc. reported that third-quarter pretax profits fell to $461,000, or 3 cents per share, from $1.5 million, or 11 cents per share, a year ago. Both sets of results exclude extraordinary credits. Revenue increased 12.7% from $6.3 million to $7.1 million.

■

A former Perkin-Elmer Corp. chief financial officer has joined Cauzin Systems, Inc. of Waterbury, Conn., as vice-president and chief financial officer. Michael D. Stashower will control the purse strings of Cauzin's Softstrip System product effort. The system is a data storage method in which information is stored in the form of highly condensed, encoded patterns on paper, which are then scanned by Cauzin's Softstrip Reader and entered into IBM or Apple Computer, Inc. microcomputers.

■

Domestic employment in U.S. electronics firms rose slightly in June, according to a recently released study by the American Electronics Association. However, the 0.4% rise could not offset a 0.8% decline in U.S. electronics jobs for the first six months of the year.

■

Computer Associates International, Inc. reported a 43% rise in profits on a 35% revenue gain compared with the year-earlier period for its second quarter ended Sept. 30. The mainframe and micro software house earned $3.2 million, or 29 cents per share, compared with $2.2 million, or 21 cents per share, in last year's quarter. Sales grew from $31 million to $42 million.

■

Lexidata Corp. has agreed to be acquired by Adage, Inc., its neighbor in Billerica, Mass., and fellow player in the graphics workstation and terminal market. Adage will issue approximately 2.6 million shares of common stock to finance the buy-out, valued at $20 million. The acquisition will merge Adage's end-user orientation with Lexidata's OEM focus in the computer-aided design and manufacturing market. Together, the companies grossed approximately $70 million in revenue in the last fiscal year.

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From page 123

TI posts losses, plant closings

Separately, computer-aided design and manufacturing pioneer Computervision reported a $20.7 million third-quarter loss on a 23% decline in revenue. The Bedford, Mass.-based firm, which has laid off 1,300 workers this year, said it would announce another round of job cuts later this month.

First closings in 10 years

TI's plant closings will be its first in 10 years and bring to 7,000 the number of employees laid off by TI since the beginning of 1985. In addition, none of the company's remaining 80,000 employees worldwide will receive pay raises in the first half of 1986.

The loss included a one-time charge of $63.8 million from the costs of the layoffs and plant closings. After a tax credit, TI posted an $82.8 million loss for the quarter, obliterating a small profit earned in the first six months of 1985. Third-quarter revenue declined 16% to $1.19 billion from $1.42 billion in the year-earlier period.

For the nine-month period, TI lost $77.6 million, including a loss from continuing operations of $4 million. The firm earned $251.5 million in the like period in 1984.

TI is attempting to cut $70 million a year in costs in its computer-related businesses.

Other operations profitable

A spokesman said the diversified firm's defense electronics, metallurgical and electrical controls operations continued to be profitable, and its geophysical services division, which had been hurt by recent declines in the oil industry, operated at a break-even point.

TI's announcement came shortly after United Technologies Corp. announced the scrapping of its Mostek Corp. semiconductor business, which closed a chip plant in Carrollton, Texas, employing 3,200 [CW, Oct. 28]. United Technologies is currently negotiating with Thomson S.A., a diversified French electronics firm, for the sale of the Mostek unit.

Computervision also announced a major corporate centralization, vesting more power in Vice-Chairman and Chief Operating Officer Robert L. Gable.

Gable will take authority over the firm's research and development, marketing and North American sales, international sales, worldwide services and manufacturing operations.

Focus on core target customers

The company will focus its marketing and strategic efforts on its core target customers in fields such as automobiles and aerospace and on its current installed base.

Computervision's third-quarter loss gave it a nine-month setback of $59 million, or $2.05 per share. Revenue dropped 17% in the period to $323.9 million. Third-quarter sales fell 23% to $105.8 million.

Separately, Honeywell, Inc. announced the layoff of 150 workers at its Electro-Optics Division in the Boston suburbs of Lexington, Marlboro, Sudbury and Wilmington.

Some 30 additional jobs will be trimmed by attrition and other measures.

From page 123

CDLA, IBM: A shaky alliance

the business impact of IBM Credit Corp., the future of the 1956 IBM consent decree and the relationship between the lessors and IBM's service and maintenance arm. While far from agreement on these issues, each side appears to recognize and understand where the other is coming from. For example, IBM isn't making any bones about its efforts to have the consent decree lifted — an effort revealed to the CDLA membership last spring — and the CDLA isn't pretending that it won't mount a tooth-and-nail court fight to prevent the success of that effort.

But in the current atmosphere of relative CDLA-IBM understanding, it was disheartening for both CDLA members and outside observers to hear nothing but party-line puffery in the CDLA meeting's keynote address by Charles Biggar, president of IBM's National Service Division. After an encouraging beginning in which he, too, thanked CDLA members for their business and congratulated them on "the most comprehensive success story in the industry," Biggar launched into a discussion of all the latest technological wizardry that makes IBM's service — in his words — the best in the business.

During a brief question and answer session, Mike Kennedy of Leasing Dynamics Corp. asked Biggar what he had to say about the situation of third-party lessors getting less than full cooperation from IBM field service personnel. Biggar suggested that such incidents were the result of "little people trying to act like executives" and stressed IBM's commitment to timely service response for third-party customers. But in the spirit of Akers opening his door to CDLA representatives, it would have been refreshing for Biggar to address that type of issue head-on in his speech. A standard IBM sales pitch was not the tone that the CDLA members came to hear.

■

How bad is the 1985 computer industry slump? The Association for Computing Machinery (ACM) scheduled its second annual Northeast Regional Conference for last week and mailed out more than 36,000 brochures earlier this year.

The entire thing had to be scrubbed because exactly 25 people signed up to attend. "We were dead stunned," said an ACM spokesman.

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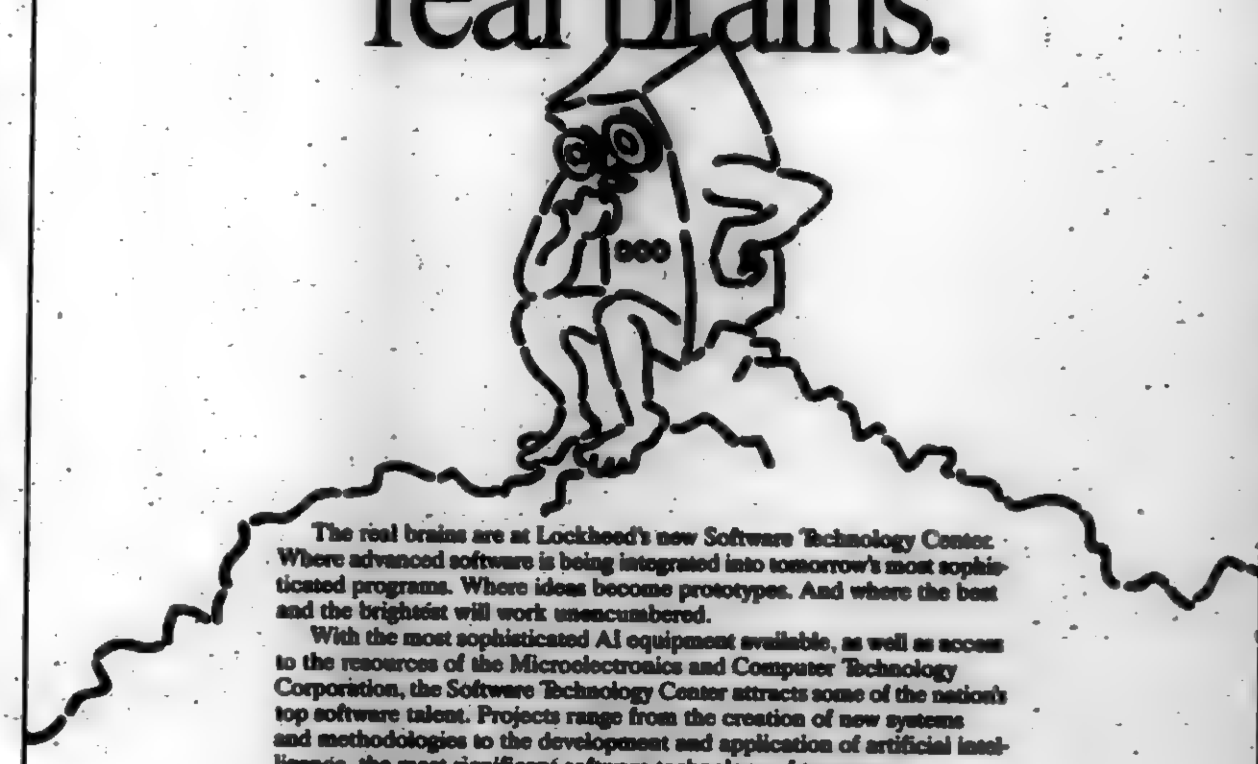

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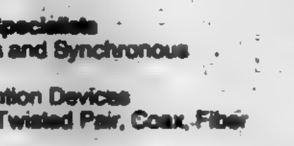

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20 East Fifth Street / Suite 901
Tulsa, OK 74103

SPR CONSULTING... NEVER A DULL MOMENT!

SYSTEMS PROGRAMMER

ElectriCities of North Carolina is a growing organization which provides professional management services to municipal electric utilities.

We recently installed an IBM 4381 with 3380 DASD and a 3725 communications controller in our newly constructed data center and are looking for a systems programmer. This person will be responsible for assisting in installing and maintaining operating system software products as well as assisting in the daily operations of our data center. Our environment includes MVS/SP, JES2, RACF, TSO/ISPF, VTAM and RMF.

The ideal candidate should have two years of experience in a system programming position. This person should also be self-motivated with a desire to learn and expand his or her abilities and grow with us.

ElectriCities offers a competitive salary plan and a full benefits package. For consideration, please send your resume, including salary requirements, to:

ELECTRICITIES
of North Carolina
Personnel Manager
Department CW
P.O. Box 29513
Raleigh, N.C. 27626

An Equal Opportunity Employer M/F

COMPUTER SYSTEMS ANALYST wanted for design and development of computer software for rotating machinery design; manage PRIME & HARRIS Computer Systems; advise ROMAX users; and consult with customers to insure validity of results. Requires M.S. degree in Computer Science; $25,500.00 per year; 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #38985 "Employer Paid Ad"

LIFE-COMM

Rapidly expanding Houston-based financial services client seeks your life insurance experience for their growing state-of-the-art IBM data center. Background in IBM ASSEMBLER and/or life insurance applications required. Experience with LIFE-COMM or any of its predecessor packages a big plus... $Open

(All relocation expenses paid.)

PROQUEST CORPORATION
P.O. Box 690685
Houston, Texas 77269
713-537-2244

DESIGN TEAM MANAGER

Design SNA interface for 1100 series mainframes to communicate with IBM mainframes.

Requires BS or equivalent degree. Requires 5 years experience in data communications including: IBM SNA architected protocols, internals of VTAM and NCP, CCITT X.25, OS1100, DEMAND, TIP and MAPPER. Salary $4400 per month.

Submit resumes to:

Job Service
1234 South Main Street
Salt Lake City, Utah 84147
Job Order #40686

Sr. Engineer

- Product design

- To design & develop new & existing remote teller systems, integrate various modules of varying mechanical & electronic technologies into functioning systems. Test system designs for reliability, security, & cost to customers. Provide & organize product support for existing & past remote teller systems. BS in engineering product design + 2yrs in the job or 2yrs exp as product designer/auto teller & banking systems req'd. Previous exp must include hands-on work w/all aspects of auto teller hardware systems design & manufacture. 40hrs/wk; M-F; $31,000/yr; 8AM-5PM; send resumes to: 7310 Woodward Ave, Room 415, Detroit, Michigan 48202. Ref #38286. Employer Paid Ad.

ASSOCIATE ENGINEER: Write high level language software for network functional verification testing. Write diagnostic programs for advanced communications products to test communication adaptors and LSI functions for Intel processor systems. Will evaluate adequacy and applicability of output or need to reformulate model. Design and test program logic. $28,000.00/yr. 40 hrs/week. 9 a.m. - 5 p.m. Req'd Bachelor's Degree in Electrical Engineering. Send resumes to Job Service of Florida, 1045 S. Congress Avenue, Delray Beach, FL 33444. Job Order #FL 4584985.

Accounting systems expert for software manufacturer in Dayton, Ohio. Designs and installs special accounting systems and related procedures for employers and customers which cannot use standardized accounting methods and systems. Sets up classifications of accounts and organizes accounting procedures to develop appropriate computerized support systems. Job requires Masters Degree in Accountancy. Degree program must include courses in mini and micro computers, financial accounting and financial information systems. Educational background must include training in the PASCAL computer language. 40 hr wk, 9:00 a.m. to 6:00 p.m. Salary $21,280 per year. Qualified applicants only send resume to Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216 Attn: JO #1016621, L. Ellison.

An equal opportunity,
affirmative action employer.

DATA PROCESSING PROFESSIONALS

Illinois Power Company, a progressive, medium-sized midwestern utility, has the following challenging opportunities. BS or BA in Computer Science, Computational Math, Business or a related field is preferred.

APPLICATIONS – PROGRAMMERS AND PROGRAMMER ANALYSTS

Requires 3-8 years experience in analysis or programming. COBOL necessary, with experience in CICS, IMS/DB, IBM's Data Dictionary, TSO/SPF, PANVALET, VSAM, IBM-Assembler, and structured design preferred. Identify needs, recommend software/hardware solutions, design programs and systems, assist in overseeing all phases of system development and implementation.

CICS SYSTEMS PROGRAMMER

Requires 4 years experience in CICS system programming environment, BAL and COBOL, both Macro and Command programming, CICS internals, CICS exits, Debugging and performance tuning. Knowledge in DMS, ACF/VTAM, IMS/DB or TSO/SPF desired.

MVS SYSTEMS PROGRAMMER

Requires 4-6 years experience in an IBM MVS system programming environment, with Assembler, VSAM, COBOL, SYSGEN, SMP and GTF. Knowledge in JES2 and MVS internal, hardware/software problem determination, MVS performance analysis and VM/CMS desired. Knowledge of TMS, CMF, RESOLVE, FDR, SYNCSORT, Look, TSO/SPF, PANVALET helpful.

- ENVIRONMENT -

Our state-of-the-art environment features two large mainframes (3081 and 3090) with MVS/SP, JES2, CICS, ACF/VTAM, TSO/SPF, PANVALET, IMS/DB and SAS, as well as multiple mini and micro computers.

We are located 2 hours from St. Louis and 3 hours from Chicago in Central Illinois. Recreational facilities include parks, lakes, golf courses, health clubs, as well as cultural and educational opportunities. We offer excellent salaries and comprehensive fringe benefits.

For consideration, forward resume, including education, experience, personal and salary history, in confidence, to:

S. R. Chilton

IP ILLINOIS POWER COMPANY
500 South 27th Street
Decatur, Illinois 62525
An Equal Opportunity Employer M/F

SUNBELT LOCATIONS

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CONTACT:

Peggy Allen, DP Specialist

(919) 288-9330

Graham and Associates
Employment Consultants
2100-J West Cornwallis Drive
Greensboro, NC 27408-7085

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While the weather is turning gloomy, the beaches of Ft. Lauderdale are still aglow. Your ticket to paradise is 10 yrs of systems experience including 3-5 yrs of systems tuning with a supervisory background. If you have IMS DB/DC, MVS-XA and Assembler give us a call and you could be there before the first snow. $55-60K

FEE PAID (513) 224-0800

ROBERT HALF
OF DAYTON
P.O. Box 754
Mid City Station
30 North Wilkinson Street
Dayton, OH 45402

SYSTEMS ANALYST

Test and analyze systems developed by others. Debug systems, suggest improvements and modify where necessary. REQUIRES: M.S. degree - Computer Science, 5 day/40 hour week. $30,000 per year. Mail resumes to: NYS Job Service, JO #6023894, 485 Fifth Avenue, New York, NY 10017. DOT Code 012.167.066.

SOFTWARE ENGINEERS

We have immediate needs for individuals with 3-5 years experience and working knowledge in any of the following areas:

- Unix/"C"
- Software development & design
- Switching system requirements & architecture design
- Call processing

These highly challenging and visible positions will have a key role in our continuing success. We provide competitive compensation, complete benefits package and solid career growth opportunities. Foreign nationals are invited to apply. Submit your resume to:

APR
Robert D. Williams
2715 Tuller Parkway Drive
Dublin, OH 43017
An Equal Opportunity Employer M/F/H/V

IBM S/38
ALL FEE PAID

If you are looking to recruit computer professionals your first step should be to advertise in COMPUTERWORLD

Chances are, it will be the step needed!

We're the number ONE trade newspaper for the computer industry. It makes sense, then, that advertising in Computerworld should be the first and most logical step to take when searching for quality computer industry professionals.

With exposure to over half a million readers, there are bound to be plenty of people who are looking for what you have to offer. This means a greater number of responses to your advertisement and a wider selection of candidates from which to choose. And you shouldn't have to look any further.

Telecommunications Systems Programmer

General Mills Restaurant Group has an immediate opening in our Technical Services Department for an experienced Systems Programmer/Telecommunications at our Corporate Office in Orlando, Florida.

Our professional environment and personalized recognition make this an exciting career opportunity for individuals with 3+ years of experience with IBM network software including NCP/PEP and ACF VTAM. Experience with NPDA, NPM or NLDM is desired while SMP-E, MVS/SP or CICS tuning experience will be considered as plus factors.

In addition, you should possess excellent problem solving skills as well as the ability to work independently.

We offer:

- Paid relocation
- Nationally competitive salaries (No state income tax allows your salary to go even further).
- Benefits package including medical/dental insurance, profit sharing and retirement.

If you qualify and are interested in working in a dynamic and professional environment, begin the next step in your career by sending your resume and salary history to: General Mills Restaurant Group, Department TSP/CW, P.O. Box 13330, Orlando, FL 32859.

General Mills, Inc.

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WE GET RESPECT !

From Clients.... .... From Applicants....

Because we are data processing professionals in the placement business. We KNOW the technology and use that knowledge to help our client companies and applicants meet their needs. Our clients throughout the U.S. and Overseas have openings for qualified professionals NOW! The list below is just a sample of HUNDREDS of current needs.

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Many fine opportunities at all position levels in companies throughout the U.S. Our clients are ready to move now if you have life insurance background, especially LIFE/70 or LIFECOMM, your experience has never been more in demand.

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Current needs in the SUNBELT and across the nation. COBOL, ALC or PL/1 on IBM or UNIVAC. CICS, DL/1 or IMS experience especially desired.

Data Base Analysts TO $[illegible]K

IMS, IDMS, ADABAS, TIPS or DMS experience required. Design of physical and logical data bases in an on-line environment is particularly desired.

Systems Programmers $$ OPEN

MVS, DOS, VM, VMS, IMS and VTAM/NCP internals experience are still in great demand. TELL US WHERE YOU'D LIKE TO WORK & THE SALARY YOU'D LIKE TO EARN.

SAUDI ARABIA TO $[illegible]K

Systems Programmer with CICS, OS/VS and VM experience. Must be degreed and a U.S. or Canadian citizen. Two year contract with family living privileges.

SAUDI ARABIA TO $[illegible]K

A degree, U.S. or Canadian Citizenship with IBM, OS, COBOL, CICS, and DL/1 background is required. Two year contract with family living privileges.

Call or send your resume to:

1-800-[illegible]
(outside Texas)

ROBERT SHIELDS & ASSOCIATES
P.O. Box [illegible], Dept. [illegible]
Houston, TX 77[illegible]
713-[illegible]-7981

Campus Computing Services Coordinator

UCLA's Office of Academic Computing (OAC), a leader among university academic computing centers, is seeking a Coordinator to interface closely with OAC management staff, Deans, Department Chairs, and Managers of departmentally owned computing facilities to identify and develop services to meet their computing needs. In this capacity, will also aid in the development of tools to facilitate interactive computing and promote ease of access and use across the UCLA computing network.

Candidate must have a demonstrated working knowledge of both the MVS and VM/CMS operating systems on large mainframes and the use of major application packages typically found in a university academic setting or similar industrial or research environment. Demonstrated supervisory skills, including the ability to direct programming staff on project oriented tasks. Advanced degree preferred. UCLA offers an excellent benefits package.

Please submit resume, with cover letter indicating qualifications for the position, to: Ms. [illegible], University of California, Los Angeles, Office of Academic Computing, ([illegible]), [illegible] Math Sciences Addition, Los Angeles, California 90024. Affirmative Action Employer.

UCLA

THE KEY TO SUCCESS

INNOVATION

Digital Communications Associates, located in Atlanta, GA, has moved into the forefront of the data communications industry through innovative thinking, intelligent planning and strong commitment to research and development. Our continued expansion in the marketplace lead to a growth in sales of over 64% last year. Our ongoing success depends on people who share our vision that excellence in the workplace translates into leadership in the marketplace.

Design/ Development

Hardware Engineers - BSEE and 2 plus years experience in networking products.

Software Engineers - BSEE/BSCS and 2 plus years experience in X.25, ETHERNET, or 8 and 16 bit assembler, UNIX and "C".

Customer Support

Systems Engineers - Pre and post sales support dealing with IRMA or networking products. Two plus years applicable experience.

Customer Engineers - Post sales and hotline support dealing with IRMA or networking products. Installation or user experience desired.

Field Engineers - Field locations for customer troubleshooting and repair of wide area networking products (i.e. modems and multiplexors). AS/BEET and 2 plus years experience are required.

Marketing

Product Managers -Marketing liaison with engineering. BSEE/BSCS plus experience in marketing micro or networking products.

Product Marketing Managers - Marketing liaison with sales. BA in marketing plus experience in marketing micro or networking products.

If you are interested in joining a leader in the data communications industry who can offer competitive salary plus lucrative bonus programs, excellent benefits package, in-house health club and convenient north Atlanta location, respond by sending your resume and salary history to: Digital Communications Associates, Inc., 1000 Alderman Drive, Dept. 250, Alpharetta, GA 30201. Equal Opportunity Employer.

dca
Digital Communications Associates, Inc

IDMS DATABASE CONSULTANTS

A young and growing consulting company needs IDMS DBA's and programmers for several development projects in western states requiring these skills:

DBA for logical & physical database design, maintain IDD & code releases. Must be a good communicator. 3+ yrs IDMS.

PROGRAMMER/ANALYSTS experienced in structured design, coding & debugging of COBOL, PL/I & ADS/O applications for CICS/DC environments. 2+ yrs experience.

We specialize in IDMS projects and offer competitive salaries, flexible hours, sick leave & vacation, education plan, profit sharing and travel expense benefits for our employees. We also contract with subs who have a good track record. 3+ yrs IDMS & 5+ yrs in DP.

Route your resume or call us:
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206-392-[illegible]
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Send your resume to:

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Suite [illegible], [illegible] Plaza One
Charlotte, NC 28[illegible]
(704) [illegible]

SOFTWARE ENGINEERING

We're looking for a few proven professionals to join our software development teams. Qualified candidates will have experience with IBM/MVS/TSO computing environments and developing scientific software applications.

Software Quality Assurance Analyst

This position requires a BS or higher degree in Computer Science or Engineering with at least five years experience in application or system programming; and three years experience in Quality Control and Assurance of large software application systems. Outstanding communication and organizational skills are required.

Software Documentation Analyst

This position requires a BS or higher degree in Computer Science or Engineering with at least three years experience in software documentation, proven technical writing ability (examples will be required), superb interpersonal skills and self motivation.

Our company is one of the largest and foremost scientific research facilities in the world. We offer outstanding benefit and training programs and excellent opportunities for advancement. Send your resume to:

Recruitment & Staffing
Exxon Production Research Company
Dept. CW [illegible]
P.O. Box 2189
Houston, Texas 77252-2189

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EXXON
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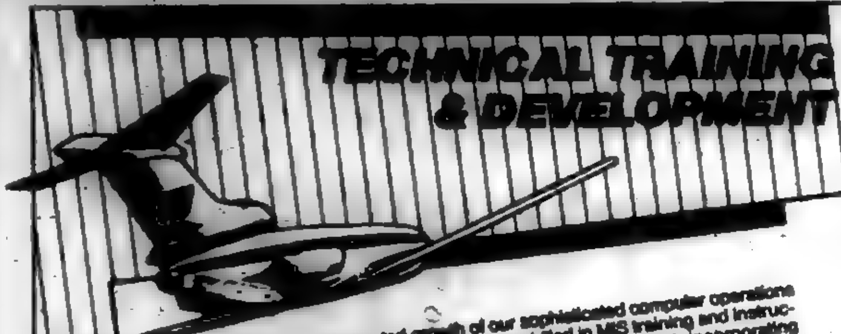

TECHNICAL TRAINING & DEVELOPMENT

The continued, accelerated growth of our sophisticated computer operations has created key openings for individuals skilled in MIS training and instruction. United maintains a genuine leading edge environment: incorporating hardware and software technologies as they impact the marketplace. The individuals we seek will anticipate and incorporate state-of-the-art technologies into our ongoing Training & Development process.

CONSULTANTS

In these visible positions, you will develop long-range MIS human resources plans including technical replacement planning and training needs analyses. Consultants will work closely with strategic and tactical planners, as well as line managers, to assess both current and future skills requirements and to effect quality training and development programs. Other responsibilities will include implementing a skills inventory system and negotiations with vendors on purchases and training specifications. Successful candidates will have had these responsibilities, preferably in a large organization.

COURSE DESIGNERS/TRAINERS

Qualified individuals will be responsible for the development and delivery of technical training programs utilizing a wide range of media. Involves development of student and teaching outlines, course materials, testing and evaluation tools, etc. Applicants preferably will have both hands-on experience in computer operations and a communications network as well as in the design and delivery of training programs for these areas. Degree in Education or Instructional Design preferred. Computer-based training and video production experience a definite plus.

These positions are located at our corporate headquarters complex in suburban Chicago. We provide an outstanding compensation package including relocation assistance. Pass/reduced fare air travel privileges provided. Send your resume with salary history in confidence to: Professional Employment/EXOPX-TTO, United Airlines, P.O. Box 66100, Chicago, IL 60666. Equal Opportunity Employer.

UNITED AIRLINES

NEW ENGLAND

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If you seek supvry. respon. in a growing IMS support team and are willing to start as indiv. contributor, call us. Our client is expanding its IMS-DBDC dept. and seeks leadership potential. Easy to get to Suburban location. $50,000.

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BOSTON
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Leading BOSTON based mfg. conglomerate seeks tech. astute analyst for lead resource role. Previous VAX, DEC-10/20, RAINBOW, DCL & BASIC req. in this challenging environ. Exp. w/PC/mainframe communs. & end user computing pluses. $32,000.

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CT client seeking indiv. w/strong mgmt., tech. & fin'l. appe. skills to manage design/devel. of state-of-the-art fin'l./banking systems. Excellent oppty. to work at sr. level & impact future sys. Outstanding perks, benefits & growth potential. Salary to $85,000.

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The local demand for exp'd. COBOL prog. with mfg., ins., or fin'l. exp. exceeds the supply! Above average increases are being paid for indiv's. w/min. 1½ yrs. exp. Numerous IMS/CICS oriented oppty's exist! Salary $19-$27,000.

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Rapidly expanding co. seeks proj. leader to plan, select, acquire & implement hardware/software for internal sub. Degree & min. 5+ yrs. MIS exp. Sys./38 knowl. pref. Extensive travel. $38,000.

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100 Summer St., Boston, MA 02110
(617) 423-1200
111 Pearl St., Hartford, CT 06103
(203) 278-7170
900 Turks Head Bldg., Providence, RI 02903
(401) 274-8700

Client Companies Assume All Fees.

POSITION AVAILABLE

Admin./faculty; tenure track, Jan. 1986. Eighteen yrs. experience in software design and development. Experience with small and large scale development & implementation. Capable of writing req. definitions, teaching, & supervising Masters of Software Design & Development student teams during the dev. & impl. of a computer system. Exposure to a wide range of applications a necessity. Primary responsibility: search for "real world" software problems in local companies & organizations and to supervise graduate students working on these problems. Secondary responsibilities: assist the Dean of the Masters Program. The College of St. Thomas seeks candidates who are comfortable with and who can contribute to the mission of a Catholic liberal arts college which is committed to the total development of the individual student. Send resume to:

Dr. S. Folz, Dept. of Quant.
Methods/Comp. Sci.
College of St. Thomas
St. Paul, MN 55105.

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Performs self-directed experimentation in airflow diagnostics and reliability of storage devices. Sets up apparatus to measure airflow in terms of velocity, temperature & pressure. Performs reliability research by investigating system performance under contaminated conditions. Dsgs. instrumentation for diagnostic purposes. Reqs: PhD or equivalent in Physics & min. 3 yrs. exp. in research/teaching in field of airflow diagnostics. Strong bkgrd. in laser-based diagnostics, processes & electronics. Must have published in area of airflow diagnostics and must be able to do independent research. (PhD level or equiv.) in Applied Physics or Mech. Eng. Expertise in optics, quantum electronics, spectroscopy & quantum mechanics also required. 40 hrs./wk.; $43K/yr., job interview site: San Jose, CA. Send resume and list of publications to: Job #2242, P.O. Box 9560, Sacramento, CA 95823-0560 not later than November 15, 1985. EOE.

IBM S/38 RPG III LEAD PROGRAMMER

Software consulting firm developing on-line state-of-the-art advertising system for major magazine publisher needs you on the development team. This is a permanent, full-time job. We are a growing, progressive, midtown Manhattan company offering excellent salary and benefits, and all the responsibility you can handle. If you are an experienced, top-notch programmer with an interest in micro-mini communications, graphics, and some background in advertising or accounting systems, we are waiting for your resume.

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(212) 869-0026

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LAI is a growing systems software development and consulting firm that can use your talents in UNIX, C, UTS, and Networking! We have over 100 professionals and have been leaders in UNIX related software development for the past 7 years. We promote the professional growth and fulfillment of our staff by providing a wide range of high quality technical services for our clients.

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Programmers/Analysts/Consultants

IBM System 38

SDA, an international DP consulting firm, is steadily expanding and seeking professionals with experience in IBM System 38 using COBOL or RPG III. We have temporary long-term and permanent positions. We offer competitive compensation and an extensive company-paid benefits package. Relocation negotiable. Please call or send your resume, in confidence, to the office of your choice. (No entry-level positions available)

SDA SOFTWARE DESIGN ASSOCIATES, INC.

8 Knight Avenue
Norwalk, CT 06850
Attn: Linda Shelinsky
(203) 852-1086

1620 Route 22
Union, NJ 07083
Attn: Donna Newsom
(201) 687-5810

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The West Coast's fastest growing computer consulting firm, IG Systems, has openings for experienced analysts and programmers. Full time employee and consultant positions available for sharp, energetic professionals looking for a challenge.

Full benefits, training and bonus programs offered. Opportunities exists in Los Angeles, San Francisco, Seattle, Denver and other project locations in the Western United States.

Send resume to:

IG Systems Headquarters
3600 Wilshire Blvd.
Suite 616
Los Angeles, CA 90010

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2+ YEARS EXPERIENCE

If you have experience in the following areas you may qualify for one of our high paying positions: IBM, COBOL, CMS, TSO, CICS, IMS, TOTAL. Development projects local and national. Independent contractors call for details. (617) 646-7559 or (617) 646-2944.

LENCO
Computer Consulting
661 Massachusetts Ave., Suite 7
Arlington, MA 02174

SENIOR ANALYTICAL SYSTEMS ENGINEER wanted to design and develop software for use on the DEC VAX hardware system for manufacturing and production applications; analyze existing production software systems and recommend modifications to improve efficiency; design program logic to implement processing changes; implement and analyze new software systems in accordance with detail specifications. Requires M.S. degree in Computer Science or Engineering and one year related experience as an Engineering Systems Analyst. $32,000.00 per year, 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit MI 48202 Ref. #39060. "Employer Paid Ad."

PROGRAMMER/ANALYST

SPC, a Charlotte based consulting firm, is currently recruiting experienced Programmer/Analysts for assignments in North Carolina. Employee and subcontractor positions are available. Along with a benefits package for employees, we offer excellent compensation and a challenging career opportunity. If you have experience in any of the following:

● HOGAN ● SDA ● BANKCARD
● CICS ● PL/1 ● IMS DB/DC ● IDMS

Submit resume, including salary requirements to:

Systems & Programming Consultants, Inc.
5701 Westpark Drive, Suite 201
Charlotte, North Carolina 28210
(704) 527-[illegible]

Get your money's worth. Computerworld will lower your cost-per-hire.

When you're looking to fill MIS/DP positions, there's really only one place you need to advertise. Computerworld.

In every major market, Computerworld reaches more data-processing professionals than the local recruitment media. And we reach them for less.

Over 600,000 computer-involved professionals receive Computerworld every week. That's more than any other computer trade journal, business publication, or general-interest magazine.

Computerworld delivers quality readership, too. Fully 41% of our subscribers read Computerworld's recruitment section every week. And 95% of our subscribers read this section regularly.

That's why over 4,000 organizations ran more than 6,500 recruitment ads in Computerworld in 1984. The openings they advertised for cover the whole gamut of MIS/DP positions – including systems analysts, computer science & software engineers, directors of MIS/DP, programmers, sales managers, and systems managers.

As a matter of fact, recruitment advertising has made Computerworld the national leader in classified advertising among specialized business publications (according to *Business Marketing* magazine).

Compare costs and the people reached. You'll find that Computerworld is the number one medium for computer-related recruitment advertising.

[illegible]

Williams International is a world leader in the development and production of small gas turbine engines. Our industry recognized success comes from the contributions of our talented employees — some of the sharpest minds in the industry. Our size and open management policies encourage innovative new ideas.

We have an immediate need for a person with database experience to provide:

- Technical back up to database administrator
- Guidance to applications development staff
- Ability to function as a primary database contact
- Research and analysis of advanced computer software and concepts
- Technical guidance relating to purchased software such as ADS/O, 4GL, info. center and office automation products

Knowledge of relational database design and/or IDMS and related Cullinet products is desirable, plus an appropriate Bachelor's degree.

We want high achievers with a desire to work in a stimulating, high visibility environment. The right people will enjoy the advantages of a progressive company with an open door management policy. Working conditions are excellent and salaries and benefits are highly competitive. U.S. Citizenship is required. For immediate, confidential consideration, please forward your resume to: **Manager, Personnel, WILLIAMS INTERNATIONAL, P.O. Box 200, Walled Lake, MI 48088.** Equal Opportunity Employer.

Williams International

SENIOR ANALYST

Credithrift Financial is a $2 Billion financial services company with over 900 offices in 30 states. Due to the rapid growth of our ordinary life insurance company, we are looking for a senior level analyst to work in our National Headquarter's Data Processing Division.

The Senior Analyst position in our Insurance and General Systems area, is responsible for supervising, instructing, assigning, and directing the work of analysts and programmers. The individual also assists in planning and organizing the activities for which the department is responsible.

Experience as an analyst or project leader in ordinary life insurance applications for at least 3 years is required. Also experience with online systems, proficiency in Cobol and Assembler languages, and good communication skills are required. IBM backgrounds with DOS/VSE, MVS, DMS, and CICS are preferred.

We offer an attractive salary, an excellent benefits package, relocation assistance, and a pleasant corporate working environment. If you have the qualifications and interest, explore our position confidentially by sending your resume with salary history to G. W. Kennedy, Selection and Placement, P. O. Box 59, Evansville, In. 47701. Equal Opportunity Employer

CREDITHRIFT
FINANCIAL INC

MANUFACTURING SYSTEMS ANALYST

For more than 80 years Stromberg-Carlson has built a recognized expertise for the design and manufacture of high quality state-of-the-art telephone equipment and telecommunications systems. As a part of Plessey, an international leader in telecommunications based in the United Kingdom, we are poised for future growth. The following position provides potential growth in terms of scope and responsibility, and will enable you to consolidate previous experience and make a significant contribution to our development efforts.

The successful candidate will have a solid background in systems development, good communication skills, ability to manage projects, and Manufacturing/Materials Systems experience. A BS degree and HP3000 experience are preferred, and experience with Comserv and AMAPS Integrated Manufacturing/Accounting Package would be a definite asset.

This position offers an atmosphere of teamwork and challenge, as well as an excellent package of compensation and benefits. Qualified applicants should submit their resume to: **Stromberg-Carlson, Professional Staffing, Box MSA/CL, 400 Rinehart Road, Lake Mary, FL 32746.**

Stromberg-Carlson
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An Equal Opportunity Employer M/F/H/V

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The General Electric Aircraft Engine Business Group flies on software.

The environment is stimulating

In Lynn, MA, we use the latest computer-assisted techniques in information planning, data modeling, DB design, integrated system development and applications prototyping.

You'll find state-of-the-art technical tools, numerous, highly varied internal and external development programs, direct user interfacing—and project team development—all opportunities to enhance your professional growth at GE.

A look at some of our Hardware and Software

These include IBM mainframes under MVS with TSO/ISPF and CICS, IDMS, DB/DC, ADS/O CULPRIT; LANs for end-user computing; and 4th generation languages; graphics technology; and a variety of computer communications.

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We have openings for a **Manager—Systems Development & Support** requiring at least 6 years' experience. For a **Lead Analyst (Project Leader)** with a minimum of 3 years' experience; and for a **Programmer/Analyst** with at least 1 year's experience, and BS (or equivalent) in an Information Systems-related discipline. Your software will support engine configuration and design change, engine hardware planning & scheduling; and engine assembly and test operation.

Opportunities in Administrative Management Systems applications

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Learn more

For prompt, confidential consideration, for openings that offer competitive salaries, famed GE benefits and fine advancement prospects, please send your resume with salary history to: Mr. Warren Green, Ref. 48L, General Electric AEBG, Building 1-4507, 1000 Western Avenue, Lynn, MA 01910.

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---

data processing

PROGRAMMER/ ANALYST

The Northwest Regional Data Center of Kaiser Aluminum and Chemical Corporation has an immediate career opportunity for a Programmer/Analyst to work with state-of-the-art technologies.

The successful candidate must have a college degree with a minimum of 5 years experience in COBOL and CICS. Assembler, DL/1 and hand-held terminal experience are pluses.

The Data Center is only minutes from 70 lakes and 4 ski areas. You have the natural beauty of the Pacific Northwest area plus the amenities of a community with a population of 350,000.

Send your complete resume to: Systems Programmer, P.O. Box 141208, Spokane, WA 99214.

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Since 1977 Federal Electric Corporation, the worldwide service associate of ITT Corporation, has operated the Mission Control & Computer Centers at the Jet Propulsion Laboratory in Pasadena in support of NASA unmanned space flights. We are currently seeking a Scientific Applications Programmer.

The ideal candidate will possess a BS in Computer Science, Information Systems, Physics, Math or related field, plus 4-6 years' experience in scientific programming. This position requires extensive experience on IBM mainframes, including 303X, 3083, 434X and 438X. You must also have experience in the use, maintenance and debugging of varied software including PL/1, JCL, OSMVS and SP.13.

We offer a unique and challenging work environment and an excellent salary and benefits package including a tax deferred savings and investment (401K) plan.

If you meet the qualifications outlined, please send a resume (including salary history) to: **Mr. James Langel, ITT Federal Electric Corporation, 1820 So. Arroyo Parkway, Pasadena, CA 91105.**

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ITT Federal Electric Corporation

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Currently, opportunities are available for persons to apply **CICS** experience and for persons to apply **MVS/XA** knowledge and/or experience as we move toward XA.

- **Senior Systems Software Analyst—MVS**
  Will plan and implement MVS/XA conversion. Will also provide technical support for MVS/SP including installation, maintenance and problem determination. Could support VM and VSE.
- **System Software Analyst—MVS**
  Will assist in installation, maintenance and problem determination of MVS/SP. Will assist in conversion activity for MVS/XA.
- **Senior System Software Analyst—CICS**
  Will provide primary support for planning and implementing CICS and evaluating system performance. Will direct and monitor the work of others.

Our environment includes Amdahl 470 V8's and 580 with MVS, VM, VSE, JES2, TSO/ISPF, ACF2, MSI, CICS, SMP, DPF and ROSCOE

For immediate consideration, please send your resume and salary requirements to the Employee Relations Department. Principals only.

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Excellent technical, verbal and written communication skills are essential as candidates will be interfacing with key users and all levels of Disney Management.

Prior experience in an entertainment company as a Programmer/Analyst is desirable.

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Professional Staffing
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We are seeking an individual with a successful track record in direct field software sales in the data processing industry. The principle responsibility will be to establish business relationships for clientele in both domestic and international markets.

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We offer an excellent salary and benefit package including relocation assistance. Please submit your resume and salary history to Sally Faddis, Electec, Inc., 225 Baronne Street, Suite 1980, New Orleans, LA 70112

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Hobart Corporation, with its world headquarters located in Troy, Ohio, is seeking a qualified candidate to join our Office Technology Department. This Specialist will be responsible for the support of end-user computing. Duties include one-on-one consulting, group training sessions, and research and implementation of new user computing tools. Candidates for this position should have at least two years of IBM data-processing experience which will include: TSO/ISPF, SAS, JCL, and DYNAPLAN. Prefer a four-year degree in Computer/Information Science, Business or education. Fourth Generation language and microcomputer experience is also a plus.

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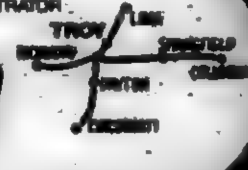

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Responsibilities include: coordination of activities in DASD storage space allocations and performance measurements; acquisition, installation and maintenance of DASD program products; and, backup/restoration of DASD storage.

Should have minimum of 2 years DASD space management experience plus solid experience with TSO, FDR/ABR, DSF, JCL, FAVER, PACMASTER, RMF, and IBM Utilities. Should also have a good working knowlege of computer hardware, environmental facilities, and system performance measurement program products.

Mail resume and salary history to the Employee Relations Department. Principals only please.

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Comdex

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CLIP AND MAIL

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IBM

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4321	0.25	1	*4381-3	[illegible]	8 to 32
4331-1	0.25	0.5 to 1	3083E	4.2	8 to 32
4331-11	0.38	1 to 2	3033N	4.3	4 to 16
4331-2	0.50	1 to 4	3083EX	4.4	8 to 32
4341-9	0.52	1 to 4	3033UP	[illegible]	4 to 24
4361-3	0.70	2 to 4	3083B	[illegible]	8 to 32
4341-10	0.75	2 to 4	3083BX	[illegible]	8 to 32
4341-1	[illegible]	2 to 4	3083J	[illegible]	8 to 32
4341-11	1.1	2 to 8	3033MP	[illegible]	8 to 32
4381-4	1.15	2 to 12	3033AP	[illegible]	4 to 24
3031	1.2	[illegible]	3083JX	[illegible]	8 to 32
4361-5	[illegible]	2 to 12	3081D	[illegible]	16 to 32
4341-2	1.5	2 to 16	3081G	[illegible]	16 to 48
4341-12	[illegible]	2 to 16	3081GX	[illegible]	16 to 64
3031AP	2.0	[illegible]	3081K	14.0	16 to 48
4381-1	2.1	4 to 16	3081KX	15.6	16 to 64
3032	2.5	[illegible]	3084Q	[illegible]	32 to 96
4381-2	2.7	4 to 32	3084QX	[illegible]	32 to 128
3033S	2.9	4 to 16	*3090-200	[illegible]	64 to 192
*3083CX	3.3	8 to 32	†3090-400	52.9	128 to 384

*First installation 1986 †First installation 1987

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5850	[illegible]	16 to 64
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5870	[illegible]	16 to 64
5880	[illegible]	32 to 128

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†AS XL-60	28	32 to 256
†AS XL-80	50	64 to 256

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The above information is intended as a guideline for computer users on relative computer system instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware/software configurations, and system manufacturers continually modify computer models as design improvements in hardware and software arise.

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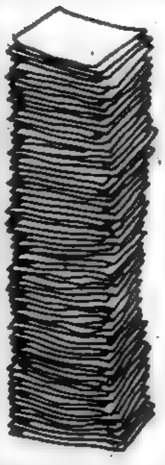

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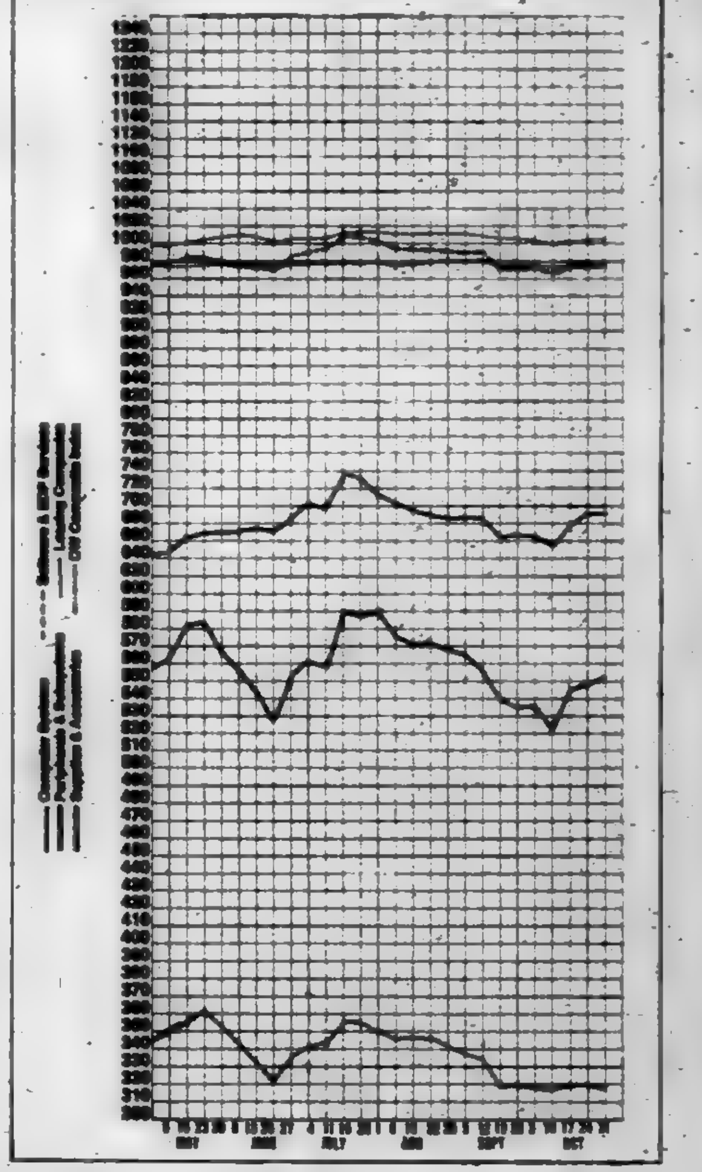

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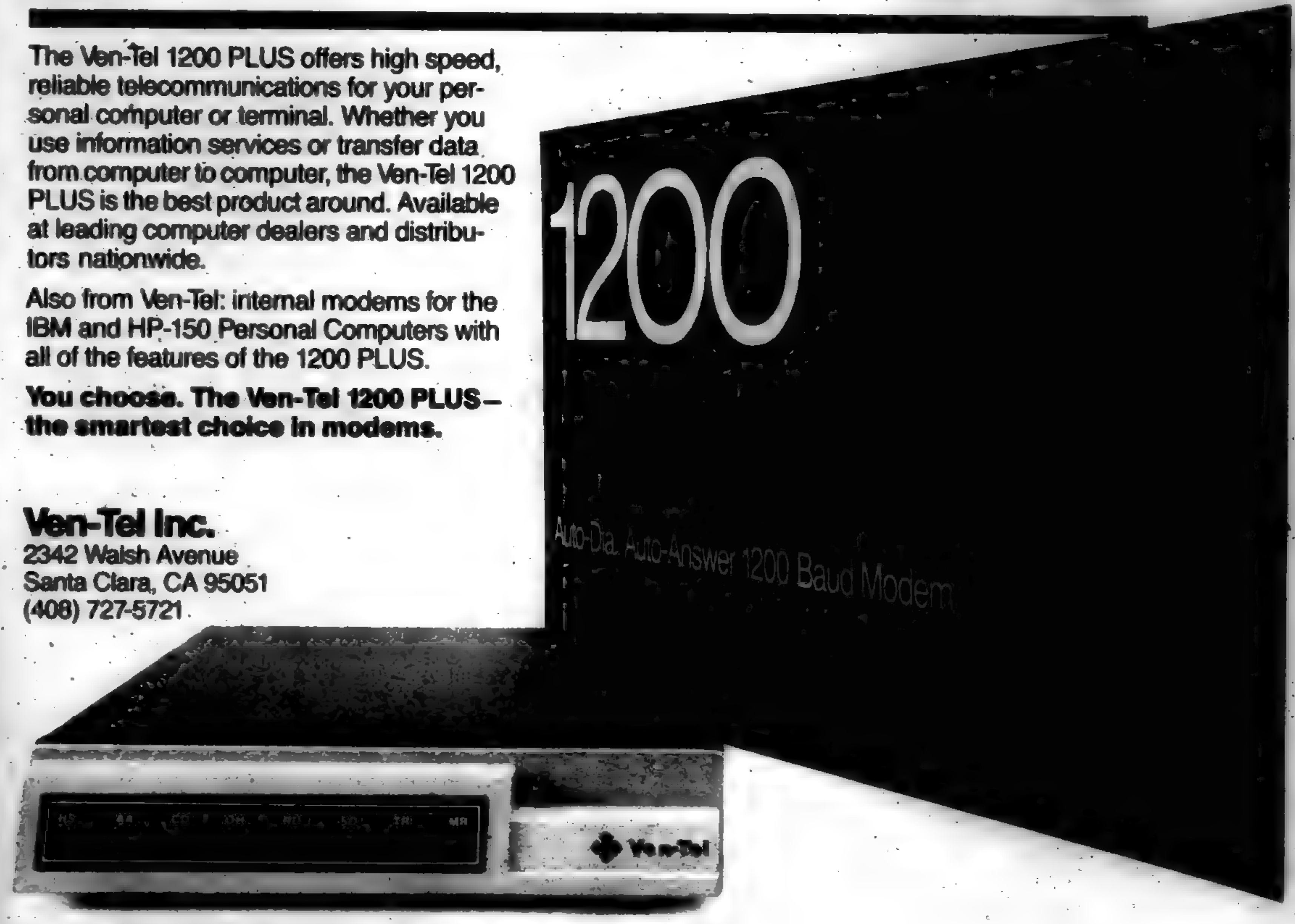

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Hopper, Bank America split

Problems developed over $5 billion conversion effort

By Jeffry Beeler

SAN FRANCISCO — One of the best known and most distinguished executives in the information systems field, Max Hopper, has resigned his position as executive vice-president at California's Bank of America. The resignation comes less than 10 months after Hopper was named executive vice-president in charge of the Bank of America Systems Engineering group, a $5 billion effort to expand and modernize the bank's information systems resources.

Max Hopper

The official reason for the abrupt departure, according to both Hopper, 50, and Bank of America, was that his former employer, American Airlines, made a job offer that he found impossible to resist.

Interviewed last week by telephone, Hopper vigorously denied widespread reports that the resignation was prompted by technical setbacks to one of his major systems projects. The alleged problems "had absolutely nothing whatsoever to do with my decision" to leave the bank and return to American Airlines, he said. Bankamerica Corp. Chief Executive Officer and President Samuel Armacost "has always supported me completely in the directions we've been heading," Hopper said.

According to sources familiar with Bank of America operations, however,

See HOPPER on page 15

TOP OF THE NEWS

The year-long wait for Data General's answer to the DEC VAX 8600 will end Nov. 18 when DG introduces its Eclipse Series MV20000, a high-end product moving in above the current MV10000. The "Microeagle" challenge to DEC's Microvax II reportedly will come in the form of a 2 million to 3 million instructions per second machine, the MV2000DC.

Sources revealed the release of both a single-processor MV20000, formerly rumored as the MV12000, and a dual-processor MV20000. Performance estimates for the MV20000 products range from 4 to 7 MIPS.

■

Look out Lotus. Oracle Corp. unveiled a Lotus 1-2-3 look-alike with greater

Continued on page 12

IBM trims costs to attack slump

By Clinton Wilder

Concurrent with its moves to boost software prices and increase hardware deliveries, IBM's effort to salvage a relatively disappointing 1985 profit picture has included a sharp cost-cutting campaign, top officers said last week.

Speaking to British securities analysts in Scotland, company President and Chief Executive Officer John F. Akers and senior financial executive Allen J. Krowe said the company began cutting expenses during the first quarter of this year. They also reported that in the quarter just ended, IBM had succeeded in cutting costs 15%

See IBM on page 6

GM's MAP steals show at Autofact

By Paul Korzeniowski

DETROIT — The rapidly emerging manufacturing communications standard being promoted by the nation's largest manufacturer, General Motors Corp., moved another step forward last week.

The standard, called the Manufacturing Automation Protocol, held center stage at the eighth annual Autofact '85 Conference and Exposition, which drew its highest ever attendance of 30,000 people and approximately 200 vendor exhibits featuring MAP-compatible products and other automation products.

Despite the fervent MAP-related activity, however, it was apparent that there remain several obstacles to commercial implementation of the standard. "On the show floor, there are plenty of demonstrations but few available products," noted Peter Giulani, a professor of electrical engineering technology at Franklin University in Columbus, Ohio, who addressed a conference session on computer-integrated manufacturing.

Activity began the day before Autofact opened, with 21 manufacturers participating in a MAP demonstration that implemented five complete layers of the seven-layer model. The first four layers were demonstrated at the 1984 National Computer Conference.

During the exposition, the largest and busiest booth was that of GM and Boeing Computer Services Co. Boeing is sponsoring the Technical and Office Protocol, a MAP-like model designed for office applications. GM and Boeing also sponsored the well-attended MAP demonstration.

See GM on page 10

PRODUCT SPOTLIGHT

Language barrier: The fourth generation at work

By John Desmond

Fourth-generation languages are in the midst of an identity crisis.

Vendors of the family of languages that data base theoretician E. F. Codd recently criticized as having "not even an accepted, precise definition" [CW, Oct. 14] are talking less these days about replacing Cobol. Today, fourth-generation language vendors spend more time talking about the need to coexist peacefully with Cobol and even assembler — the oldest language of all — to meet the full range of user needs.

Users are confused about the role of fourth-generation languages in the development of information systems and about whether the advanced languages are an adjunct or replacement for traditional languages.

Horror stories are beginning to surface about fourth-generation language performance. One example is Applied Data Research, Inc.'s Ideal, which was used exclusively by an independent consultant to develop an application for the New Jersey Department of Motor Vehicles and failed to perform adequately [CW, Sept. 30].

Fourth-generation languages have their roots in nonprocedural query languages, which evolved from end-user demands for more sophisticated applications. The market for language products is strong; International Data Corp. predicted total installations of the products will jump 30% in 1985 to 4,100 in IBM 4300, 3030, 3080 and 3090 series shops in the U.S. Many analysts agree with Codd that there is no universally accepted definition of what constitutes a fourth-generation language. But there have been attempts made at a definition.

The "James Martin Report on High-Productivity Languages," published by the Marblehead, Mass.-based Technology Insight, Inc., defines a fourth-generation language as a programming language that provides a 10 to one productivity improvement over Cobol or Fortran. That means a programmer writing in a fourth-generation language should be able to write an application in as little as one-tenth the time it would have taken using Cobol.

Standard attributes of a fourth-generation language include the ability to access one or more data base management systems and features such as a data dictionary, reporting tool and query language. Some experts add that a fourth-generation language should offer all the

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Charges favoritism by SSA officials

By Mitch Betts

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The contract for $6.3 million was the first phase of what was estimated to be a five-year effort costing $17 million; the SSA now estimates the cost will be $32 million.

An investigation by Congress' General Accounting Office (GAO) found that before the contract was awarded in December 1982, Svahn and other top SSA officials permitted Deloitte executives to have offices in the executive suite at the SSA headquarters in Baltimore and gain inside knowledge about the agency's computer operations.

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Svahn testified that he had no involvement in awarding the contract and that he did not know that Electronic Data Systems and Deloitte were bidders.

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Are you involved in an unusual application of DP technology in your company? Know any unsung heroes? Heard any hot news about vendors?

If so, we'd like to hear from you. Call us toll free at (800) 343-6474. Ask for Peter Bartolik, news director.

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DP operations wages in 1986 to increase an average 5.7%

Operations departments seen absorbing divisions

By Rosemary Hamilton

If you are an average worker in a computer operations department, chances are your salary increase will be disappointing next year. And that is a double whammy, since this year's increase was down from 1984 figures. Such are the findings of a recent survey completed by the Association For Computer Operations Managers (AFCOM).

Based on this study, the overall average national increase for employees of computer operations is expected to be 5.7%, the same average increase that was reported this year. The increase is nothing at which to scoff. But it is also 2.1% less than the 7.8% increase in 1984.

These averages, including 1986 projections, were obtained from employees surveyed by AFCOM in September. The association sent a total of 850 questionnaires to computer operations departments and received 300 responses, said Len Eckhaus, president of the Garden Grove, Calif.-based association.

While average salary increases remained static, the computer operations departments experienced a much bigger change. According to the survey, more operations departments were absorbing divisions that have traditionally been non-data processing, namely telecommunications, systems software and maintenance programming. The "new" department should have a positive effect on its members, according to Eckhaus.

As computer operations add these departments, which have been perceived as more professional, its own status will be improved. "Everybody I've talked to, with the exception of one, has thought of this as a good thing. It's a logical placement," Eckhaus said. "It ups their professionalism."

Eckhaus said there was no data on this trend in 1984. However, the 1983 survey did contain a question on telecommunications departments. From that survey, which had approximately 200 responses, 25% said telecommunications was a part of computer operations.

Of the 300 respondents in 1985's survey, 43.2% said telecommunications now reports to computer operations, almost twice the amount in 1983. In addition, 21.4% said system software is now an arm of operations, and 5.1% said maintenance programming is part of this department.

Of the 300 responses this year, more than half (58%) came from departments with annual budgets of $1 million to $5 million. Nearly 26% have annual budgets of more than $5 million, and 15.3% had budgets of less than $1 million.

The survey contained data on 19 job categories, from data processing operations manager to keypunch operator. Participants were categorized by general job descriptions rather than by specific titles.

The 19 job categories fell within three departments: data entry, computer operations and data control. Of the three, data control had the highest average salary increase of 6.6%. Computer operations closely followed with an increase of 6.5%. But data entry dragged down the overall average with its slight increase of 2.7%.

Increases far above national average

Many positions within these departments, however, reported increases far above the national average. The highest increase in 1985 went to data control shift supervisors, whose salaries rose an average of 12.2%. Nationwide, their salaries ranged between $10,890 and $39,280, with an average salary of $19,450 this year.

They were followed by tape librarians, who had an 8.9% average increase in salaries that ranged from $7,040 to $27,000. Data processing operations managers, who earned an average of $35,720, and data entry shift supervisors, who earned an average of $17,340, were next in line with average increases of 8.2% and 7%, respectively.

Keypunch operator was the only job category that reported a decrease this year. The average salary of $11,410 was a 3.6% drop from 1984.

Operator held responsible for on-line crime

By Peggy Watt

PHOENIX — A 28-year-old electronic bulletin board system operator has pleaded no contest to charges of facilitating computer fraud in what police said they believe is the first case of an operator being held responsible for the contents of his system.

A computer even assisted in the investigation. Police were tipped off to the "pirate" bulletin board's existence by a caller to the Maricopa County (Arizona) Sheriff's Office Bulletin Board System, which is an open system that went on-line last year.

Mark D. Brown, a high school industrial arts teacher who also taught computer classes, operated an electronic bulletin board called "The Phunhouse" that offered callers other people's Visa and Mastercard numbers and long-distance access codes from a handful of interexchange carriers, according to Deputy Ken McLeod, also a system operator of the sheriff's office electronic bulletin board.

Protege also arrested

Brown was arrested and his equipment seized in November 1984. At the same time, a 14-year-old bulletin board operator in the same town, who turned out to be Brown's protege, was also arrested.

When the youngster accepted the offer of immunity from prosecution in return for agreeing to testify against Brown, the latter entered his plea, McLeod said. He was fined $137 and sentenced to probation for one year.

The sheriff's office computer bulletin board has helped to uncover several other computer crime cases, including several of telecommunications fraud and one incident in which a teenager posted messages on the board offering to connect cable television services illegally. He did not realize the bulletin board was run by the police.

IBM unwraps PC/VM Bond 2

IBM last week announced PC/VM Bond Release 2, an upgrade to two programs that allow IBM Personal Computer users connected to a mainframe VM system to access disk storage on the larger system.

Available in December, the enhancements improve performance and add support for the Personal Computer AT and AT/370, PC-DOS 3 and 3.1, the Enhanced Graphics Adapter and Display, the Professional Graphics Adapter and Display and VM/System Product Release 4.

VM Bond, the Personal Computer program that supports these functions, costs $250. PC Bond, the host VM server software, carries a one-time charge of $2,000 or a monthly charge of $135.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Dresser puts its telephone switch to data processing work

Meridian DV-1 unit to act as DP processor

By John Dix

BRADFORD, Pa. — Dresser Manufacturing has taken voice and data integration to the logical extreme: Its telephone switch is its computer.

This manufacturer of pipe repair and pipe joining products is the first user of Northern Telecom, Inc.'s Meridian DV-1 data/voice system. Dresser Manufacturing, tucked in the northwest corner of Pennsylvania, is a division of the Dallas-based Dresser Industries, Inc., a company in the petroleum industry also located in Bradford.

The DV-1, introduced in February, is a modular switch built on two separate 20M bit/sec. buses, one a circuit-switched bus for voice communications and the other a packet bus for data. The system can be configured with various DV-1 applications processors to meet different voice, data processing and data communications requirements, explained Dick Deisher, manager of market development for Northern Telecom's Data Systems Division.

Dresser Manufacturing installed a 24-port system in October to be used in its sales department for customer service, according to Wayne Poling, director of information resource management. "We bought a three-cabinet system with an 80M-byte disk and two processors, one processor [emulating an IBM] 3274 and the other processor for applications and call processing," Poling said.

IBM 3270s on-line to host processor

Prior to the DV-1's installation, Dresser handled the financial processing associated with customer accounts with IBM 3270s on-line to its parent company's host processor in Dallas. Besides a few personal computers, most of Dresser's processing is done on the remote host. Voice communications for the DV-1 users was previously supported by the company's AT&T Dimension 2000 private branch exchange (PBX), which is still used for other company employees. "We're looking to move all of our financial processing involved with customer purchasing in-house," Poling said. When it installed the DV-1, Dresser opted to replace its IBM 3270-type terminals with Northern Telecom's Meridian 4020 terminals. These terminals are connected to the DV-1 applications processor, which is software configured to emulate an IBM 3274 controller. The applications processor is, in turn, connected to the remote host. The Meridian M4020 terminals are based on a Motorola, Inc. 68000 microprocessor and "have an integrated telephone, an extremely high-resolution screen and soft keys," Poling said. They can be used to access standard 3270 applications on the remote host through the 3274 applications processor or access office applications — such as word processing, spreadsheets and mail — on the system's other processor.

That processor runs under Dvix, Northern Telecom's version of AT&T's Unix System V. It supports call processing and two programs Dresser purchased: Q-Office, an integrated office automation software package from Quadratron Systems, Inc.; and Informix, a relational data base management system from Relational Data Base Systems, Inc. Poling admits, however, that for now the primary use of the Dvix processor is to learn Unix.

As a PBX, the DV-1 provides "all the station features, such as call forwarding, and functions, like least-cost routing, that a standard switch would," Poling said.

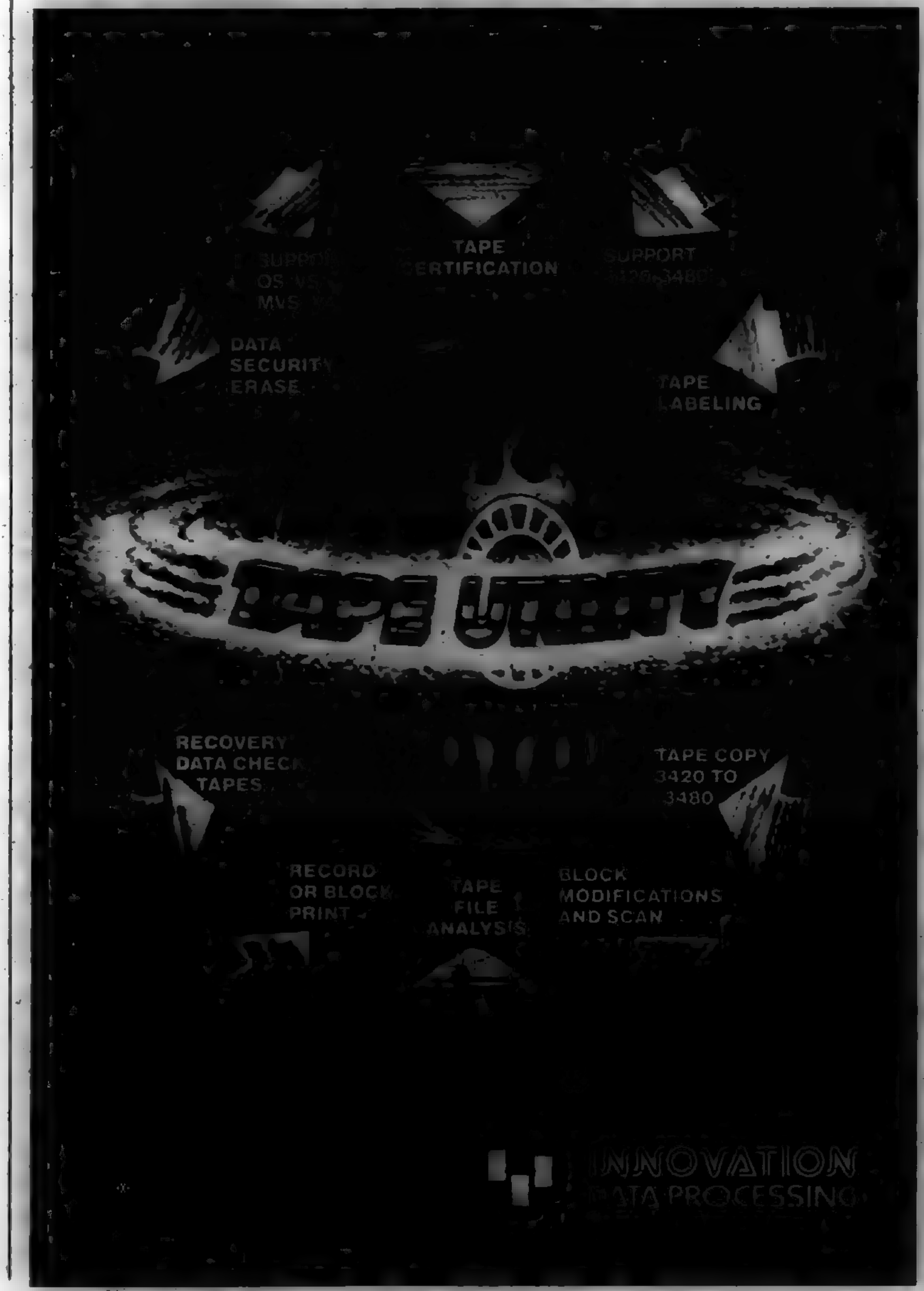
Voices are digitized by the Meridian M4020s and interspersed with terminal data over twisted-pair wire at 2.5M bit/sec., Deisher explained. The line card in the switch splits the voice/data signal, routing the voice to the circuit-switched bus and the data to the packet bus.

Although the DV-1 can support telephone company trunk lines, Dresser routes all outbound voice traffic through its Dimension 2000 PBX, which also provides telephone connections between DV-1 users and the rest of the company.

Poling said that he is very pleased with the DV-1 and is already installing a second unit in one of Dresser's manufacturing facilities in Alliance, Ohio. He estimated the cost of the system to be $5,000 per user, including the price of the terminal and the shared processor resources.

Although all 24 ports on Dresser's DV-1 are used to support Meridian M4020s, the system can also support standard telephones or data devices with RS-232 interfaces, Deisher said. Telephones can be connected through an analog line module — which slides into the system cabinet — that supports 30 cards. Each card can support either two telephone stations or one central office trunk link.

Deisher also pointed out that the Meridian 4000 terminal line can emulate many ASCII terminals, besides 3270 devices. Emulation of Digital Equipment Corp. VT100s and VT220s and IBM 3101s is achieved by down-line loading the appropriate software to the terminal instead of dedicating an applications processor to the task as is required with 3270 emulation.



Mainframe user community braces for year-end sales push

Cost savings possible as price war escalates

By James Connolly

With the end drawing near for a year of weak earnings and major product introductions, anticipation of a bloody computer price war has grown in recent weeks.

But the bargain-basement prices predicted by some analysts apparently have not reached most of the mainframe user community, although some DP managers expect sales representatives from IBM and other mainframe companies to bang on their doors in the next few weeks. The managers expect the year-end sales push because, they said, it happens every year, whether the computer industry is booming or slow, whether customers are in a buy mode or maintenance mode.

"I expect to hear from both sides in November. I get those calls every year, whether I'm buying or not," said an East Coast DP manager who is considering mid-range systems from IBM and Burroughs Corp.

Another manager facing a similar decision commented that mainframe vendors are not offering spectacular deals. "I don't think it's true, at least not yet. The mainframe people aren't really pushing. It's the microcomputer people who have been pushing." Those microcomputer vendors are said to be offering machines in the class of the IBM Personal Computer XT for $1,200.

Unusual discounts selective

Where unusual discounting has occurred, it reportedly has been selective and targeted to volume customers and to those who show signs of buying competing vendors' equipment.

Discounts of 35% off list price are available for some buyers, reported analyst William Easterbrook of Kidder, Peabody & Co. in San Francisco.

"It is quite different from this time last year. IBM is trying to improve its earnings for the year and is being a lot more aggressive. You can get discounts in excess of 35% for some IBM systems, although IBM won't admit it," Easterbrook said.

That high discount is for multiple IBM 3080 series systems, with much lower discounts given to volume buyers of the 3080's replacement, the IBM 3090, Easterbrook said. He said IBM initiated the discounts and that the cuts hurt IBM-compatible manufacturers Amdahl Corp. and National Advanced Systems Corp.

However, other observers said the discounting is far less dramatic than Easterbrook claims and that the fourth quarter of 1985 offers no better buys than previous quarters.

Dale Kutnick, a consultant in Wayland, Mass., said discounting has focused on the 3080 and small systems, such as the IBM System/36. "It depends on the equipment. With the [System/36] there is more than a 25% discount in volume, and, with really big volumes, you get 30% off list," Kutnick said, adding that IBM wants the System/36 installed at any price so it can generate future sales as customers expand the minicomputer and the micro networks it serves.

Kutnick theorized that IBM is discounting now to save its fourth quarter but that discounting in general is a practice IBM has forced on itself by moving away from equipment rentals toward sales.

But Frank Gens, a consultant with International Data Corp. in Framingham, Mass., noted, "We're not aware of any difference in this quarter. The basic discount is still on volume purchases, even if you get four or five CPUs, and some customers in noncompetitive situations don't even get that unless they demand it."

Gens said that official volume-purchase agreement (VPA) discounts range from 5% to 15% — depending on how soon the customer will take delivery — for orders of up to 10 CPUs and about 20% for more than 20 CPUs. Gens said that IBM has cut prices by more in conjunction with large peripherals orders or special maintenance and financing deals. He said one such case would be where IBM delivers a machine four months before it starts charging the customer, saving the user up to 8% on its total cost.

Standing as it does in competition with IBM, a mainframe leasing company such as Comdisco, Inc. monitors IBM's discounting practice closely. "If they are deeply discounting their mainframes, it's very selective. Their big discounting tool is the VPA, and we've seen some 5% VPAs, but it's not like they are discounting 15% to 20%," said Bob Vardagy, vice-president for marketing at Comdisco.

Vardagy said the discounting has focused on volume peripherals orders, 3090s and smaller systems. He noted that IBM cut list prices on its 3380 Model E disk drives and 4381 Group 3 mainframes to spur sales only months after introducing those products. He said that with the high-end 3090, demand has been such that little discounting is available and that many customers who want November deliveries of 3090s cannot get their machines until after Jan. 1.

IBM trims costs to attack slump

From page 1

from the year-earlier level.

In light of three consecutive quarters of lowered profits, IBM's stated goal of ramping up operations for a fourth-quarter turnaround has been demonstrated in speeded-up delivery schedules for high-end hardware products, widespread hikes in mainframe software prices (CW, Oct. 21) and, last week, a hike in the costs of 139 personal computer software packages.

Although the company affirmed earlier statements that the fourth quarter will offset the previous nine months and should result in fiscal year 1985 profits exceeding last year's level, Krowe appeared to hedge that bet for the first time.

"The degree to which we generate significantly higher revenues during this fourth quarter, compared with the record-breaking fourth quarter of a year ago, will determine whether we will reflect earnings growth for the full year," Krowe said.

Akers said IBM will keep its cost-cutting program in place through 1986 in anticipation of a continued U.S. computer slump and in accordance with a sluggish overall domestic economy.

"We do not at this point see much in the way of improvement over 1985," Akers said. "We are positioning ourselves for whatever happens."

Expecting slower 1986 growth

Frank Gens, an IBM analyst with International Data Corp. in Framingham, Mass., said the cost-reduction program indicates that IBM expects 1986 growth to be slower than that of the years prior to 1985.

"This is about the closest thing to a hiring freeze that IBM has had," he said. "The consolidation of their regional offices and the recent reorganization of their telecommunications products unit have all been geared toward reducing their costs" (see story page 155).

Although Krowe noted that IBM's U.S. employment level declined in October, an IBM spokeswoman said the company will show a year-to-year work force increase, and she reaffirmed IBM's no-layoff policy. She said the October decline resulted from "normal attrition, retirements and limited hiring in some parts of the business."

Akers and Krowe emphasized that IBM expects to post strong growth in the fourth quarter, fueled by volume shipments of the 3090 Model 200 mainframes and higher software prices. "Program products tend to have higher gross margins than many hardware products," Krowe said. "This has been a helpful upward pressure on gross profit margins."

■

In the latest indication that software pricing is one area where IBM can pump up revenue at will, the company last week bucked an industrywide trend toward decreasing micro software charges with an extensive round of hikes. Effective immediately, the changes cover 139 of the more than 475 programs that IBM offers for its Personal Computer family with most increases between 8% and 10%.

Among the pricing changes, PC-DOS Versions 2.1, 3 and 3.1 now cost $85 each, up from $65. Among other programs affected are Basic 2, up to $539 from $495; Batch SNA Communications, to $385 from $350; Cobol, to $379 from $345; Displaywrite 2 Version 1.1, to $385 from $299; PC Network, to $95 from $75; PC Xenix, to $429 from $395; SNA 3270 Emulation, to $769 from $700; and Topview, to $159 from $149.

CW Senior Editor Eric Bender contributed to this report

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AT&T takes home-grown approach to MRPS with BURPS

As vice-president in the network services division at AT&T, Eugene J. Eckel oversees manufacturing at factories in Columbus, Ohio; Oklahoma City; North Andover, Mass.; and Winston-Salem, N.C. The factories produce transmission equipment for central telephone offices as well as the company's 3B line of minicomputers. Also, he supervises a network software development center in Naperville, Ill.; a technical center in Piscataway, N.J.; and factories in South Korea and Taiwan. Approximately 40,000 AT&T employees report to him, with 10,000 North Andover plant employees representing the largest portion. Computerworld *Senior Writer Paul Korzeniowski interviewed Eckel after he had addressed the Boston chapter of the American Society for Quality Control.*

INTERVIEW

There has been a lot of talk about General Motors Corp.'s Manufacturing Automation Protocol (MAP). Is AT&T working with MAP in its factories?

We are not. Primarily, we work with a methodology called BURPS [Business Resource Planning System]. It is our own methodology and represents an enhanced version of MRPS [Manufacturing Resource Planning System], for it includes business resource planning capabilities. MRPS is a disciplined manufacturing resource planning system that helps to plan the manufacturing process from marketing to customer delivery. BURPS is integrated, so we can track an item from material to manufacturing resource planning to business resource planning. It is a comprehensive business system that integrates many business functions. . . .

In addition to quantifying our quality objectives, we are putting in automated methods at high levels that tie into BURPS. At any time we know where a product is in the shop, what our inventory is, what our quality efficiency is, what our cost is. It is all part of one integrated system.

At what stage of development is the system?

At Oklahoma City, it is [in] a very advanced state of development. We use that factory as our laboratory. The AT&T engineering research center near Princeton, [N.J.], has been working with our Oklahoma City personnel to develop the system. The research center works on future manufacturing tools, methods and processes and develops generic products that anticipate technical evolution. A system such as the one at Oklahoma City presents a number of advantages with the most obvious being lower cost and better quality. The system also helps us to reduce manufacturing intervals, so we can cut it from three weeks to one week and . . . reduce our inventory.

> ”
>
> *I don't think that [the last reorganization] has taken place nor has AT&T said that it has.*

When will you move these systems out of test phase and into production?

We are very close to full production in Oklahoma City and have transferred its technology to our other plants. However, the job will never be finished — not even in Oklahoma City — and we've been at it there for a few years. There will always be new technologies and new skills that have to be introduced.

How do you introduce these advances without threatening your workers?

First, you have to be able to convince them that it is not a threat. We were able to do that in Oklahoma City. We made the union part of our team so it would understand what was at stake and what its role was. We had to persuade the union that automation would protect jobs and expand employment. There was fear at first that our overseas products would become the determinant of our domestic factory. We persuaded the union that foreign ventures were not exporting jobs. At first, we began to ship complete systems to our foreign partners. Gradually, the partner builds off of our expertise and takes over more of the production cycle. But the partner never takes over full production, and we continue to ship that product to our partner.

You stated that production of AT&T's 5ESS switch has increased thirteenfold from 180,000 lines in 1983 to 2.4 million lines in 1984 to 6 million this year. Who is buying the product?

The chief purchasers are the [seven regional holding companies] and their subsidiaries, for example, [New England Telephone & Telegraph Co.], a subsidiary of Nynex Corp. We are also selling large quantities to the independent telephone companies. The international numbers are relatively small but are increasing rapidly. We are producing the switch in [the Netherlands] and shortly will add facilities in Korea and Taiwan. The federal government has purchased a number of switches, and lately, major corporations are buying them and installing their own switching systems for corporate networks.

How many large companies have purchased the 5ESS, and who are they?

We have commitments from half a dozen companies. [Wang Laboratories, Inc.] is the only company I can talk about. I think this market will be growing although it is hard for me to quantify it. A number of customers are enthused about owning their own switch.

Has production of AT&T's 3B line risen as sharply as that of the 5ESS?

To an extent, ramp up for the 3B20 has been parallel because it is used as the 5ESS' central processor. Production for the other models has not risen as sharply. Our sales have not risen as quickly as we had hoped, but we are making good progress.

Since divestiture, how has your job changed?

Manufacturing has always been a bedrock of the AT&T system: a strength of the old Bell system was [Western Electric Co.]. A strength of new AT&T is our new manufacturing organization. But our organization has not changed much and is almost a mirror image of the old Western Electric.

Has the last reorganization taken place?

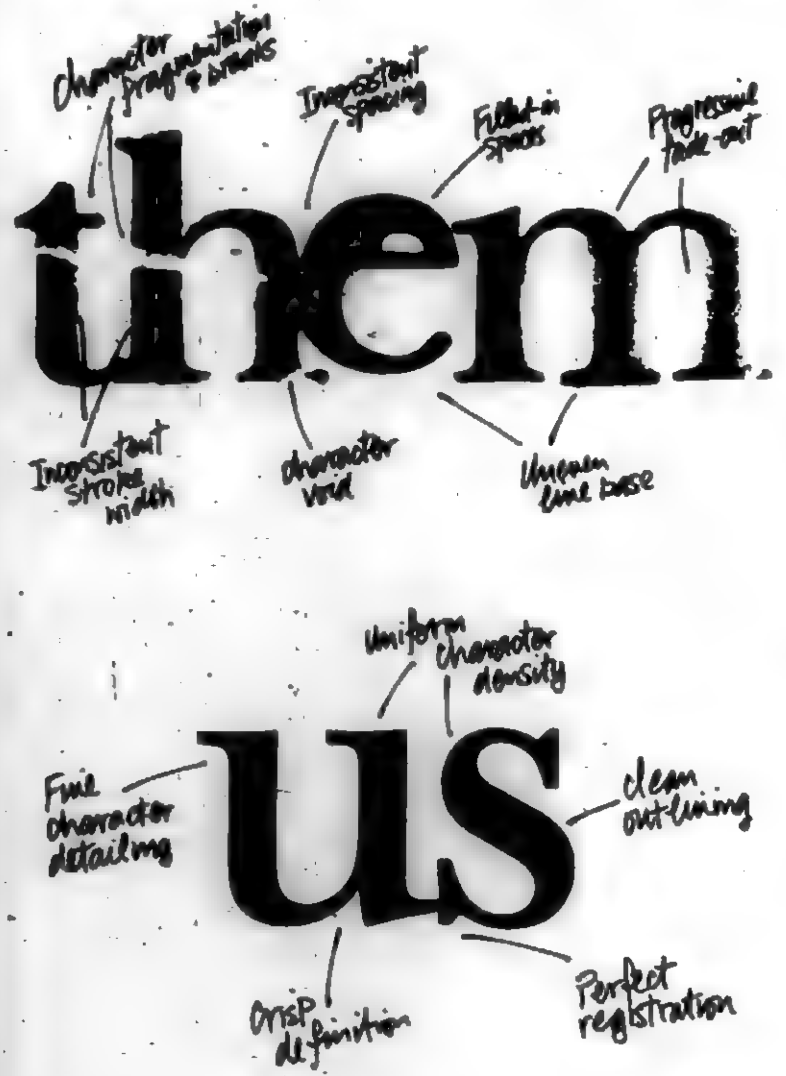
I don't think that it has taken place nor has AT&T said that it has. I hope other reorganizations would be less traumatic than the previous ones, but we have to evolve as we see our needs change.

Has the reorganization changed the way that the company operates or sees itself?

The principal change is the realization that we serve a very demanding customer who is now an arm's length away from us. Our new customer is anxious and willing to seek out competitors and buy products elsewhere. We are faced with some capable international competitors, not just in Japan but also in Europe and Canada.

Who are these competitors?

In domestic switching, our major competitor is [Northern Telecom, Inc.]. They had been ahead of us, but I feel that we have caught up to them and are ahead of them in many areas. But we can't hesitate for a minute. Internationally, [L. M. Ericsson, Siemens Communication System, ITT Telecom Products, Inc.] and the Japanese communications firms are all well run.



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ARKANSAS						
Little Rock	1-23-86	●	●	●	●	●
CONNECTICUT						
Hartford	11-19-85	●	●	●	●	●
DISTRICT OF COLUMBIA						
Washington, D.C.	11-26-85	●	●	●	●	●
Washington, D.C.	1-22-86	●	●	●	●	●
FLORIDA						
Jacksonville	11-20-85	●				
Tallahassee	12-5-85	●				
GEORGIA						
Atlanta	12-11-85	●	●	●	●	●
HAWAII						
Honolulu	11-26-85	●				
ILLINOIS						
Chicago	12-4-85	●	●	●	●	●
Chicago	1-17-86	●	●	●	●	●
INDIANA						
Indianapolis	12-11-85	●	●	●	●	●
South Bend	12-3-85	●	●	●	●	●
LOUISIANA						
New Orleans	1-16-86	●	●	●	●	●
MASSACHUSETTS						
Boston	12-12-85	●	●	●	●	
MICHIGAN						
Detroit	1-16-86	●	●	●	●	●
MINNESOTA						
Minneapolis	12-12-85	●	●	●		
MISSOURI						
Kansas City	12-13-85	●	●			
St. Louis	1-7-86	●	●	●	●	●
NEBRASKA						
Omaha	12-9-85	●	●	●	●	●
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Fairfield	1-14-86	●	●	●	●	●
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NEW YORK						
Long Island	1-10-86	●	●			
New York	1-8-86	●	●			
Syracuse	12-12-85	●				
NORTH CAROLINA						
Charlotte	12-10-85	●	●	●	●	●
Raleigh	1-7-86	●	●	●	●	●
OHIO						
Cincinnati	1-8-86	●	●	●	●	●
Cleveland	1-14-86	●	●	●	●	●
Columbus	12-12-85	●	●	●	●	●
OKLAHOMA						
Oklahoma City	12-3-85	●	●	●	●	●
PENNSYLVANIA						
Philadelphia	11-21-85	●	●	●	●	●
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Lynchburg	12-17-85	●				
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WISCONSIN						
Milwaukee	1-15-86	●	●	●	●	●

CULLINET SEMINARS/CANADA FALL/WINTER 1985

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Edmonton	1-15-86	●	●	●	●	
BRITISH COLUMBIA						
Vancouver	1-13-86	●			●	
Victoria	1-14-86	●				
MANITOBA						
Winnipeg	11-26-85	●	●	●	●	
ONTARIO						
Ottawa*	12-12-85	●				
Toronto	11-19-85	●	●	●	●	
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GM's MAP steals show at Autofact

From page 1

A MAP users forum was forced to move to the largest room in Cobo Hall, the site of Autofact, due to an unexpectedly large turnout. Paul Borawski, a spokesman for the conference's sponsoring organization, the Computer and Automated Systems Association of the Society of Manufacturing Engineers (SME), noted that SME's MAP users group had grown from 60 members in June 1984 to its present 1,600 members.

Reasons for the intense interest in MAP are not hard to identify, Borawski said. "Today, only 15% of the devices in a factory talk to another device."

Enabling those devices to communicate will cut costs and boost productivity, many managers seem to believe. "Once we implement MAP, we will cut our five-year product development cycle by one to two years," claimed Autofact attendee Robert J. Maton, vice-president of GM's advanced engineering staff.

It is this need that has driven GM to attempt to forge a standard methodology for integrating factory automation devices by means of its seven-layer MAP, based on the International Standards Organization's Open Systems Interconnect model. Theoretically, MAP will dictate how factory devices such as robots, vision systems, engineering workstations and computers will be linked together into a cohesive system, regardless of location or type.

Vendors participating in the show demonstrated for the first time products that conform to the fifth, or so-called session, layer of the MAP architecture.

Coordinates interaction

The session layer is used to coordinate interaction between applications on different machines. The demonstration also showcased MAP applications at the uppermost layer of the model, including electronic messaging and a standard for file transfer.

Despite the vendor and user interest in MAP evidenced at Autofact, full realization of MAP's potential is still two years in the future, industry sources said.

One major obstacle is that not all seven MAP layers have been agreed upon. While some work has been completed on the seventh layer, none of the sixth has been finalized. The seventh, or application layer, is intended to overcome incompatibilities between network elements such as machine operating systems and file structures. According to some vendors, the presentation layer is the toughest nut to crack.

Another obstacle is the time required by vendors to tailor their products to MAP.

Also, until MAP is fully specified, products may be incompatible. A spokesman for Concord Data Systems, Inc. of Waltham, Mass., noted that two terminal servers that met MAP specifications could not talk to one another until the vendors cooperatively adjusted their MAP software. Standards are like blueprints to vendors; although many products conform to the Ethernet standards, few are interchangeable.

Even if MAP objectives are met, there are limitations to the current specifications. "MAP doesn't include security features," noted Thomas Harris, a manager at Rexnord, Inc. in Milwaukee. Network management capabilities are also lacking.

Meanwhile, GM is moving ahead with plans to implement pieces of MAP in three of its plants next spring. Full implementation is expected to be completed in 1988.

■

Application tools lead Autofact '85

Among the products introduced at the annual Autofact '85 Conference and Exposition last week were the following:

■ Digital Equipment Corp.'s VAX Engineering Data Control System (EDCS), a hardware and software package designed to manage applications from a variety of vendors. The hardware includes CPUs ranging from the Microvax II to the VAX 8600, while the software includes DEC's VMS operating system and integrated data management and office automation products that are said to allow engineers to track and manage data files in established computer-aided design and manufacturing operations. VAX EDCS prices range from $105,000 to $650,000 and from $12,000 to $30,000 for a software-only purchase.

■ Two IBM programs for the IBM Series/1 with support for General Motors Corp. Manufacturing Automation Protocol (MAP). The IBM Series/1 Event Driven Executive — MAP Applications Server and the IBM Series/1 Realtime Programming System — Automation Protocol Communications Server were designed to support integration of computers, robotic systems and programmable controllers from different manufacturers. The applications server supports applications that require message transfer between MAP-supported applications and floor devices and file transfer applications that allow transfer and modification of files between two MAP systems. The communications server acts as a directory server for the network and as an interface to IBM 370 hosts. The applications server costs $4,500 and the communications server, $9,500.

■ Hewlett-Packard Co.'s HP Designcenter, a family of hardware and software products. Designcenter tools are intended to speed product development processes for electrical and mechanical design engineers. Applications include electronic computer-aided engineering (CAE) for front-end product development with links to physical design systems, and mechanical CAE for two- and three-dimensional modeling, solids modeling and structural analyses.

N.J. officials may invoke liquidated damages clause

By Charles Babcock

TRENTON, N.J. — The New Jersey attorney general's office will wait to see how long it takes Price Waterhouse & Co. to redo the state's Department of Motor Vehicles computer systems before deciding on whether to invoke a liquidated damages clause.

The clause provides for late fees of $10,000 to $50,000 a month if the new system was not operational by June 30; with the project already behind schedule, Price Waterhouse officials said in August it would take six months to a year for the systems to be redone, said Michael R. Cole, first assistant attorney general.

Price Waterhouse developed the system on time, using Applied Data Research, Inc.'s Ideal fourth-generation language and Datacom/DB relational data base management system. As more and more parts of it went on-line, however, response times plummeted, and the Department of Motor Vehicles began suffering a massive updating backlog [CW, Sept. 30]. Police throughout New Jersey have stopped citing drivers for operating unregistered vehicles because 1.4 million registrations were waiting to be recorded in the system.

The state has withheld $2 million of the $6.5 million payment for the new systems, and the liquidated damages clause provides for penalties of $10,000 a month for the system being late in July and August, $30,000 in September and $50,000 for each succeeding month.

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Fujitsu expands

SAN JOSE, Calif. — Fujitsu America, Inc. took steps to increase its direct presence in the crowded U.S. low-end peripherals market last week by forming a new business unit to market floppy disk drives domestically.

The Flexible Disk Products Group will market 3½-in. and 5¼-in. drives and 3½-in. diskettes to OEMs and industrial distributors in the U.S. The new unit makes Fujitsu "truly a single-source vendor" for storage peripherals, a spokesman said.

In addition to its IBM plug-compatible mainframes sold in the U.S. through Amdahl Corp., Fujitsu currently markets Winchester hard disk drives, streaming tape drives and cartridge tape drives domestically.

— Clinton Wilder

Intel unveils second-generation Expanded Memory Spec board

By Eric Bender

HILLSBORO, Ore. — A second-generation multifunction board for the IBM Personal Computer offering up to 1.5M bytes of conventional and expanded memory capabilities is expected to debut today from Intel Corp.'s Personal Computer Enhancement Operation.

"The conventional multifunction card is obsolete," claimed Jim Johnson, comanager of the Intel group. "In the long run, just about every [Personal Computer] that's purchased will have expanded memory."

This will hold true even for users running only one application such as word processing, he maintained. "Look at pop-up utilities and spelling checkers — those programs are taking up more and more memory, and you can put all that in expanded memory."

Intel's Above Board PS was designed to the Lotus Development Corp./Intel/Microsoft Corp. Expanded Memory Specification (EMS).

Johnson described the EMS not as a temporary fix for Personal Computer memory limitations but as a cornerstone for future enhancements, even far beyond Intel 8088-based systems.

EMS 'accepted standard'

In a joint statement, Intel and Microsoft said that the EMS, which gives Personal Computers access to up to 8M bytes of additional internal memory, "is quickly becoming the accepted standard for taking [Personal Computers] beyond the 640K-byte limit" that Microsoft MS-DOS now places on direct address memory.

"Intel and Microsoft are committed to evolving the operating environment to a multitasking environment in a way that's consistent with the operating system," Johnson said. "Controlling the allocation and management of memory is something that the operating system has to do."

The two firms today will announce a limited introductory offer that will provide a free copy of Microsoft Windows — when that multitasking operating environment software finally ships — along with any Above Board purchased from Nov. 15 to Jan. 15.

Both companies extolled the virtues of opening up Windows with expanded memory capabilities.

"Above Board provides enough additional memory to allow Windows to function at maximum performance and lets the user work with more applications than can fit in the 640K-byte limits," said Steve Ballmer, vice-president of Microsoft's System Software Division.

With numerous manufacturers providing EMS-compatible boards, several other suppliers also promised that their products will work with Windows.

"We'll be as compatible with Windows as Intel," said Tony Paradiso, senior product manager at AST Research, Inc. in Irvine, Calif.

Designed for new system buyers of the IBM Personal Computer, Personal Computer XT and compatibles, Intel's Above Board PS features a serial port, parallel port, a clock/calendar with battery backup, a random-access memory disk and print-buffer utilities.

Two models will be offered in December, one with 64K bytes priced at $445 and another with 256K bytes costing $545.

The new board conforms to EMS Revision 3.2, shipped earlier this fall, which provides improved support for multitasking environments.

Among independent software vendors that have endorsed EMS are Ashton-Tate, Borland International, Computer Associates International, Inc., Innovative Software, Inc., Javelin Software Corp., Living Videotext, Inc., Lotus and Microsoft.

In the past year, the Personal Computer Enhancement Operation has increased its number of U.S. outlets from zero to more than 1,500, according to Johnson.

XEROX

Xerox is about to move xerography light years ahead.

TOP OF THE NEWS

Continued from page 1

storage capacity and a set of SQL commands identical to the SQL commands in IBM's SQL/DS and DB2 relational data base management system products.

"This product is designed for Lotus users who run out of gas and need more capability but don't want to learn a new interface," Oracle President Larry Ellison said last week. "We're providing basically an upgrade to Lotus."

SQL Calc is integrated with the Oracle relational DBMS, which runs on IBM mainframes in MVS and VM environments, in many AT&T Unix environments and on a variety of minicomputers. SQL Calc is being bundled with PC Oracle for a price of $995.

The data storage limit of SQL Calc is determined by available disk space, Ellison said. The product is available now for the IBM Personal Computer XT and AT with 512K bytes of main memory.

■

Apple Computer, Inc.'s engineers are said to be busily readying products for the traditional unveiling at the firm's January shareholders meeting. Sources point to a Turbo Mac, which is reputed to be the Macintosh XL that Lisa never was, along with a Mac with 1M byte of memory, a larger (14-in.) screen and even higher resolution.

But the intriguing item in the works is Apple's "true" portable (not an Apple IIc), which may not be ready in January but is certainly getting a big internal push.

■

Sources close to AT&T said the company is scheduled to release today a terminal cluster controller compatible with IBM's 3274 workhorse, along with a line of terminals. The Multifunction Communications System 6500 controller will have 32 ports like the 3274 but up to three synchronous and 16 asynchronous host links. AT&T will also unveil an interface card for its PC 6300 personal computers that will link the microcomputer to the controller.

■

Zilog, Inc. tomorrow will introduce a 32-bit supermicro that runs on AT&T's WE32100 32-bit microprocessor. It is the first time the AT&T chip has been used for non-AT&T products and the first time that Zilog opted not to use its own chips in its product line.

WORLD DIGEST

CW International News Network

HANNOVER, West Germany — The question of who will guide Europe on the path to a technological renaissance is one of the most important issues that faces the representatives of 18 European governments as they meet this week to discuss the future of Eureka, Europe's nascent program for cooperation in technological development.

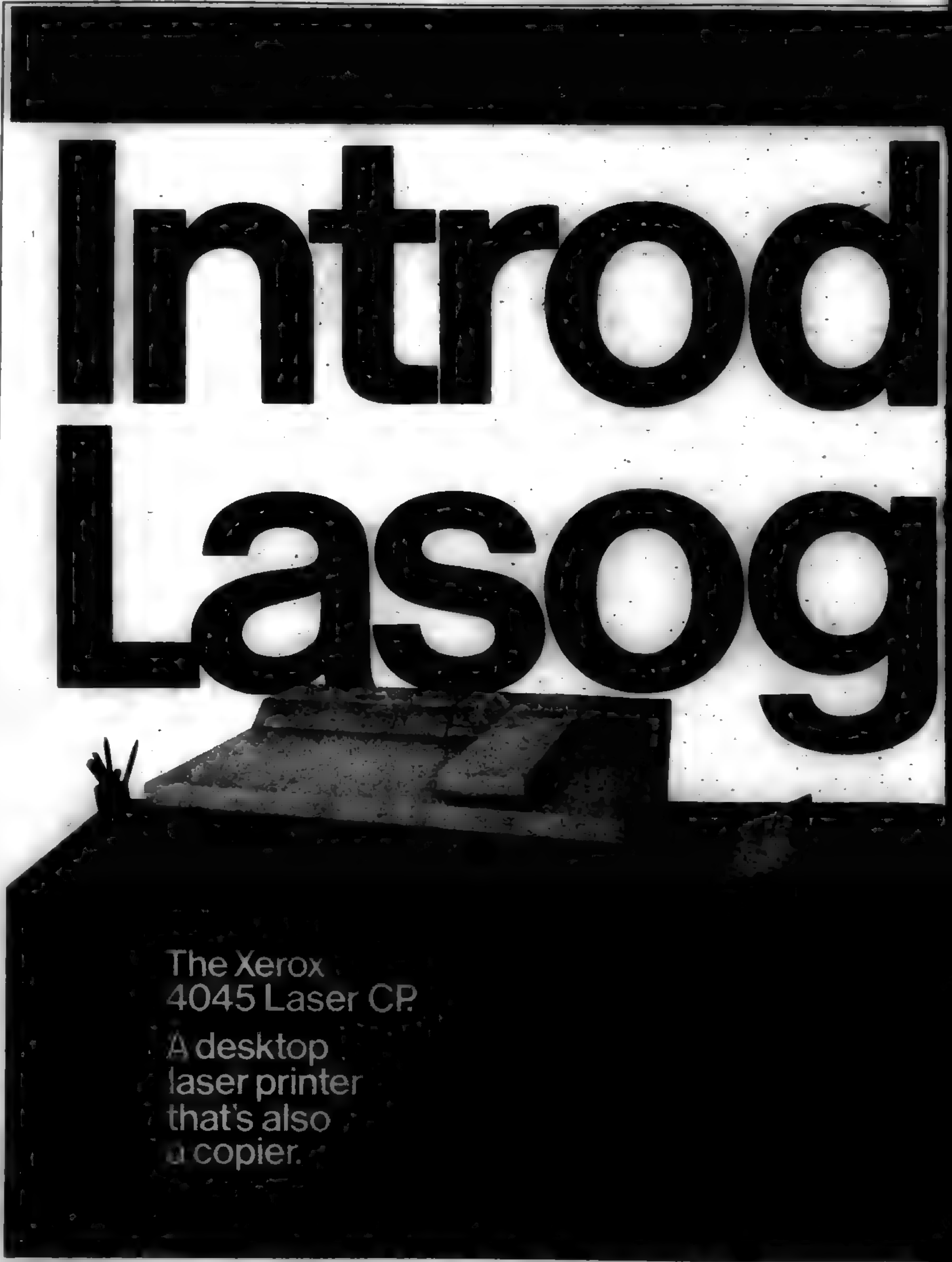
Eureka's proponents claim that it must have a flexible bureaucracy in order to respond rapidly to changing conditions in the marketplace.

However, until a few months ago, the most vocal candidate to run Eureka was the European Community's Commission, an organization, some have said, that moves as quickly as a snail.

MAASTRICHT, Netherlands — In the future, artificial intelligence technology will mainly be used for speech generation, factory automation and financial applications, according to artificial intelligence expert Edward Feigenbaum in his keynote address to a seminar held recently in order to celebrate the inauguration of the Netherlands' national research institute for knowledge systems.

Artificial intelligence technology, Feigenbaum said, holds the promise to make computers easier to use.

"Computer systems are the most complex artifacts that have been created in the history of mankind, but they are so friendly that human beings long for them to be sympathetic," Feigenbaum observed.



Accell joins application development tools in unified system

By John Desmond

Unify Corp. of Sacramento, Calif., announced today an application development system that includes a fourth-generation language, an application generator, the company's Unify data base management system for AT&T Unix environments and a windowing facility.

The product, Accell, is targeted at professional application developers using departmental computers, a spokesman said.

An International Data Corp. analyst, Edward Acly, said, "The message of the product is, 'Don't rely on a fourth-generation language or application generator alone.' Accell lets you use whatever of a number of tools is appropriate."

In addition, Accell may help blunt the oft-mentioned criticism that few applications are available for Unix, the industry-standard portable operating system. Acly said, "This will help to generate those applications."

A beta test site user of Accell at Kenny Technologies, Inc. of New York said that Accell applications provide a more sophisticated interface to end users via the windowing and function keys.

Accell will initially be available on the AT&T 3B2 supermicrocomputer; Sun Microsystems, Inc. workstations; and the Pyramid Technology Corp. 98XE reduced instruction set computer. Unify said a version for Microsoft Corp. MS-DOS environments is scheduled for release in 1986.

Developers can use Accell to write batch, menu-driven or interactive windowing applications. The product can call previously written C routines. The Accell fourth-generation language incorporates a subset of IBM's SQL. Instead of calling up an SQL interpreter from the fourth-generation language, Accell executes compiled data base access routines, a spokesman said.

Applications are 90% table driven in Accell, speeding up the interpretive overhead of application generators. Developers can program by exception with Accell's application generator component.

Early 1986 delivery

Accell is scheduled for early 1986 delivery and costs $7,500 for the 3B2 and $58,000 for the Pyramid 98XE. Sun will set the price for its version.

Unify President Nicolas Nierenberg said Accell is appropriate for writing transaction processing applications in areas such as accounting, order processing, inventory and claims processing.

The product gives companies the option of running highly interactive applications that capitalize on personal computer capabilities on departmental processors rather than on central mainframes, IDC's Acly observed.

User Steven Stamps, director of development at Kenny Technologies, said the application now being developed with Accell is intended to replace a manual process in which information is collected from different sources to help maintain a municipal securities data base.

Kenny Technologies, a subsidiary of securities broker J. J. Kenny Co., is running Accell on a 3B2 Model 400 with fewer than 20 users. Stamps said the company plans to install the final version early in 1986. Accell provides alternatives for completing tasks, and "it's up to the developer to decide which tool should be used, based on efficiency, development time and what interface is required for the end user," he said.

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Micropro aims Wordstar 2000 Release 2 at corporate sphere

Direct access to Lotus, IBM DCA

By Peggy Watt

SAN RAFAEL, Calif. — Micropro International Corp. is hoping its oft-misunderstood Wordstar 2000 will get a second chance, especially in the corporate world, with the announcement of Release 2 last week.

The product got off to a slow start after its release in October 1984, largely due to misunderstandings about its name, acknowledged Lewis C. Levin, senior product manager. Diehard Wordstar users were somewhat puzzled to find that the new word processing program was unlike its predecessor, though Micropro said the new product was aimed at a different audience and carried the Wordstar name only for recognition.

In the new version, both Wordstar 2000 and its enhanced cousin, Wordstar 2000-Plus, offer direct access to files written under Lotus Development Corp. 1-2-3 and Symphony, conversion to and from IBM's Document Content Architecture, more format choices and a new document history feature that lists each document's date of creation and modification and the number of characters in each document.

The new version also supports the IBM PC Network, Ethernet and Novell, Inc. Netware local-area networks.

A program can have more than one printer installed on it, change fonts in mid-line and be customized to take advantage of unique printer features.

Pages can be designed with as many as three newspaper-style columns, and footnotes can be inserted at the bottom of each page or at the end of the document.

Micropro hopes enthusiastic comments from analysts who got a first look will prompt users to glance again.

"We want a fresh look from the people out there," Levin said. Analysts from Infocorp, Wohl Associates and International Data Corp. have already welcomed the revisions as having wide appeal.

Levin characterized the user of the Wordstar 2000 line as the corporate member of Micropro's word processing line, which also includes Easy, a low-end word processing program released earlier this year.

"We always intended this for the business setting," Levin said, adding that the Release 2 enhancements were intended to make the program more attractive to that market. Notably, Release 2 users can read Lotus files by named ranges without having to copy files and convert them to Wordstar 2000 format.

'Lotus is often standard'

"Lotus is often standard computer equipment in a corporation. We want to adapt to that environment," he added. Wordstar 2000 should be compared not with its sibling products but with other major word processing programs, Levin said.

The company also announced a corporate site licensing program in September as another foray into the business market. Network licenses and technical support are available for the new versions.

New versions of Wordstar 2000 will sell for $495, like the current product, and a hard disk is still recommended.

Upgrades to Release 2 will be available free of charge to those who bought the old Wordstar programs after Nov. 1; for other users, the cost is $60. Neither is copy protected. Though Wordstar 2000 was originally copy protected, that feature was removed last February.

Wordstar 2000-Plus, which sells for $595, offers telemerge capabilities for telecommunications, Star Index for alphabetizing contents and listing section numbers and a mailing list function. The same upgrade prices apply.

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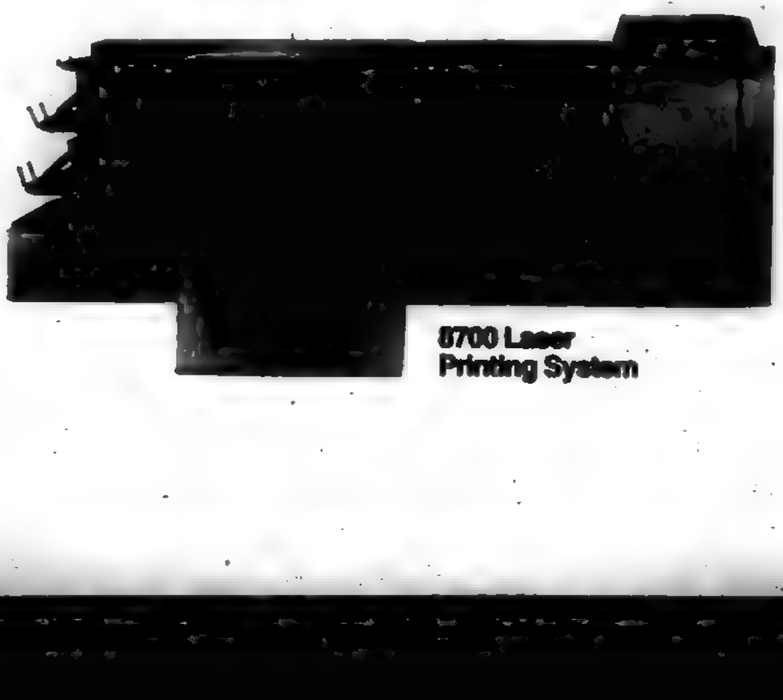

8700 Laser Printing System

Hopper, Bank America split

From page 1

Hopper's personal work style "ran counter to the bank's corporate culture." This fact, these sources contend, led to a strained relationship with Armacost and was instrumental in Hopper's sudden departure.

Before coming to Bank of America in 1982, Hopper had served as head of a joint development team at American Airlines that, during the 1970s, pioneered the forerunner of today's automated airline reservation systems. Hopper's pronounced capacity for taking calculated risks in extending the state of technology was rewarded at American Airlines, an information systems pacesetter that reportedly rewards inventiveness and overlooks missteps on the way to system improvement.

But the same entrepreneurial instincts that made Hopper an industry legend during his 10 years at American Airlines apparently worked to his disadvantage at the nation's second largest financial institution. Hopper joined the bank as director of retail information and processing services, and in January was promoted to executive vice-president for the Bank of America Systems Engineering group. In this position, Hopper oversaw an innovative restructuring of the bank's information processing organization that was widely reported [CW, Feb. 4] as a model of its kind and that elevated Hopper's stature as a prototype of the corporate chief information officer.

The reputed turning point in Hopper's association with the bank apparently came when, at his own personal insistence, the organization began migrating its domestic banking applications from IBM's MVS to IBM's ACP/Transaction Processing Facilities (TPF).

Technicians had doubts about migration

"A lot of the bank's technical people had doubts [about the migration project]," according to a recently departed Bank of America technician who requested anonymity. "But when the order comes from someone at that level, you can't really fight them."

By all accounts, the migration effort has already yielded at least a modest payback. "TPF has been implemented within the bank and is working in conjunction with [IBM's] IMS to control its [automatic teller machines]," according to a second well placed source who also preferred not to be identified. As a result of the implementation, "Bank of America is now able to run an additional 150 ATMs with no degradation in systems performance," the source said.

But in return for the increased ATM support, Bank of America was forced to foot a software development bill said to total $100 million to $200 million. Much of the expense resulted from the migration effort's heavy reliance on contract programmers, especially TPF experts, whose high hourly rates reflect their extreme scarcity.

TPF conversion fell short of goal

To make matters worse, the conversion to TPF reportedly fell far short of the bank's expectations. One of the project's original aims was to interface TPF to many of the domestic banking operation's key applications like general ledger. But thus far that goal has remained beyond reach, a source said.

In July or August, when the extent of the migration effort's shortcomings had finally become clear, rumors of Hopper's imminent departure began to circulate among members of the bank's systems staff, the former employee explained. Within three months, the rumors became fact when Hopper and Armacost decided, apparently by mutual agreement, to part company.

On Oct. 30, bank officials issued an internal statement announcing Hopper's resignation and the appointment of a successor — Lou Mertes, operations chief at the institution's Seafirst Corp. subsidiary.

Hopper provided a different account of the TPF migration effort. Initially, he said, the bank had intended to implement a point-of-sale (POS) system in TPF but later postponed its plans when the projected market demand for POS failed to materialize.

The deferral was also prompted by the bank's subsequent decision "to move forward with a total integrated data network" that will eventually use TPF as its hub, he said.

In short, Hopper explained, any snags that Bank of America has encountered in its TPF migration project resulted from unavoidable "resource conflicts" and fundamental changes in its business needs. "You probably won't find this kind of perspective if you talk to people down in the bowels of the organization."

One alternative theory about why the TPF migration effort has caused the bank so many headaches is that the system lacks adequate data recovery and integrity features. In applications like airline reservations or credit card authorization, where systems breakdowns are usually regarded as serious but not disastrous, the shortage of built-in data recovery capabilities is seldom a serious constraint on TPF's effectiveness.

But in financial applications, in which data bases are continually updated and where loss of customer information is intolerable, TPF is intrinsically less suitable than IMS, which does contain extensive safety precautions. To compensate for the thinness of TPF's data recovery and integrity features, Bank of America was forced to create the necessary safeguards itself, one of the sources said.

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VIEWPOINT

EDITORIAL

When users drive standards

"Revolutionary" is a word to be used cautiously, so we will be cautious in describing what happened in Detroit last week. The bare fact is that 30,000 people and more than 200 manufacturers turned out for the eight annual Autofact '85 Conference and Exposition largely because five years ago a group of DP professionals asserted their power over plant floor equipment vendors and demanded an automation protocol that placed users' interests over those of vendors.

Based on the evidence we saw at last week's Autofact (see story page 1), the struggle has been successful. The protocol is now universally acknowledged as the de facto standard for factory automation. The users have won. Vendors have capitulated. Revolutionary? You bet.

Although the standard, commonly known as the Manufacturing Automation Protocol, or MAP, applies only to the manufacturing industry, its genesis and implications pertain to all computer professionals. In fact, coexhibiting at Autofact with chief MAP proponent General Motors was Boeing Computer Services, which is advocating a Technical Office Protocol (TOP) standard among computerized office equipment manufacturers.

How will the seven-layer MAP work once the technical obstacles are overcome? Consider the analogy of a telephone call between a party in Chicago and one in Tokyo.

MAP layers one through five make it possible for Chicago to dial Tokyo and to establish and maintain a working connection. MAP Layer 6 provides an interpreter function, making it possible for the two parties to understand each other. MAP Layer 7, an applications layer, makes it possible for the two parties to work together actively.

Today, however, there is no presentation Layer 6, no interpreter function. MAP gets around that for now by specifying that vendors conform to a few specified formats and a few applications. For example, the U.S. and Japanese parties could communicate if they somehow agreed beforehand to work on a specific project using a small set of code words familiar to both.

Although MAP, when it is completed, may not be the last word in standardization, the fact that it was generated by users is critical. Vendors have traditionally adopted standards when they stood to benefit, as when IBM Systems Network Architecture compatibility would increase sales. In this case, a large user company told its automated equipment suppliers that their devices had to be compatible with MAP. This drove the standard much farther, much faster than would have occurred otherwise. MAP has probably encouraged more vendor activity in the last two or three years than any such comprehensive standard in history.

The model has been established. Can the MAP experience be adopted by other computer professionals? Specifically, can Boeing's proposed TOP succeed in the general OA field? Certainly there are crucial differences, given the plethora of office network and communications standards already in place.

Users should not be deterred. The success of businesses over the next decades will be determined in large part by how effectively information management decisions are made. These decisions should not be dictated by vendor caprice.

As MAP has shown, users must act first.

I DON'T KNOW, FIRST WOZ LEAVES, THEN STEVEN TAKES A HIKE, AND NOW MY BLUE JEANS ARE SPROUTIN' PINSTRIPES.

LETTERS TO THE EDITOR

CW editorial cartoon rates regular spot on company's bulletin board

You'll be happy to hear that your editorial cartoons are now making their way onto our bulletin board on a regular basis. And that's no easy task, considering all the in-house news we have to post.

Congratulations to *Computerworld* — and Rich Tennant, in particular — for taking CW humor out of the Stone Age and into the fun age.

Steve Millmore
McCormack & Dodge Corp.
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Patent rights offer greater protection than copyrights, trade secret laws

The article "Patenting software possible but tough to accomplish," [CW, Oct. 14], incorrectly leaves the impression that the patenting of computer software is not favored by the U.S. Patent and Trademark Office (PTO).

I conduct business regularly before the PTO and obtain patent protection for a wide variety of computer software. The ability of computer programs to be patented is not in dispute as long as the program interacts with a piece of hardware and obtains definable results. Additionally, the software must be novel, unobvious and adequately disclosed in the patent application.

As correctly pointed out in the article, the services of a patent agent or attorney are recommended — hence the higher cost — and the application process does take about two to three years. However, the rights granted by a patent are significantly greater than the rights granted by copyright or protected by trade secret law.

For example, given a valid patent, a court can stop any infringer from making, using or selling the patented program simply by determining that the infringer uses steps A, B, C and D even if the infringer's program has significant steps A, B, C, D, E, F, G and H. This feature of patent protection does not have a counterpart in copyright and trade secret law.

Also, the patent is viewed as encompassing all equivalents of steps A, B, C and D. If step Z is equivalent to step C, then a program with A, B, Z and D infringes the patent. Copyright protection of the program would not necessarily encompass the equivalent step Z. Like many things in business, you get what you pay for; patent protection does cost more, but you get more protection for your money.

Finally, I recommend patent protection for those programs that have a long, useful business life, a product life of at least five years or those programs that are recognizable as generating a large amount of revenue.

Robert C. Kain Jr.
Washington, D.C.

Responsibility for system security rests on data processing professionals

I was troubled by the recent column, "Computer literacy: rehabilitation or risk?" [CW, Oct. 28]. I disagree on the entire range of philosophical, social and political implications in the column. Such is the nature of democracy, and these issues would be better discussed in publications other than *Computerworld*.

I would suggest, however, that system security and data privacy are the responsibilities of system designers, operators and computer professionals and not the responsibility of the juvenile justice system.

Steven B. Jackson
St. Louis Park, Minn.

'Secondary meaning' cannot convert truly generic terms into trademarks

I am writing to correct an error that appears in the article "Trademark law protects product names and logos" [CW, Oct. 21]. In the article, it states "an otherwise generic or descriptive mark still may receive the act's protection if it acquires 'secondary meaning,' as defined under trademark law, or if the mark is modified so as to make it distinctive."

Although secondary meaning may convert an otherwise descriptive term into a trademark that is able to be protected, no amount of secondary meaning can do the same to a mark that is truly generic.

Howard G. Zaharoff
Brown, Rudnick, Freed & Gesmer
Boston

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VIEWPOINT

Invasion of the end users: sharing the MIS monopoly

READER'S PLATFORM

By Naomi Karten

The poor maligned spreadsheet — what a love-hate relationship it has provoked.

No one seems particularly concerned about the dangers of data management software or project management software or desk management software in the hands of fledgling users. But the idea of users cavorting with a spreadsheet in the name of better and faster business decisions sends shivers up and down the spines of MIS managers.

Users could enter a calculation incorrectly, thinks MIS. Or misplace a decimal point. Or lose track of which numbers are related to which other numbers. And the whole company could go down the tubes as a result.

MIS managers are justifiably concerned about users' lack of applications know-how, particularly given the extent to which spreadsheets can contain — and conceal — errors in business logic. But sometimes it appears as if MIS wants not only to retain control of the computer but also wants to retain a monopoly on errors.

First of all, it's not really fair to hold users responsible for not being tuned into the importance of system controls and data management. It hasn't been their job to know these things.

Programmers, certainly, are not born knowing about data edits, internal balancing and reconciliation to other systems. They learn through training and by looking over the shoulder of more experienced programmers. If users are to make effective use of personal computing, they need opportunities for similar kinds of training and over-the-shoulder watching.

Furthermore, it's not as if the technical and organizational checks and balances in MIS' production methodology emerged full-blown on day one. They evolved over a long period of time — 15 years, at least. Yet, amid all this computer sophistication, even MIS blows it occasionally with systems that crash, malfunction and generally go haywire, spewing out bits and bytes all over the place.

While bemoaning the invasion of the end users, MIS conveniently forgets some of its own colossal screwups — the generation of duplicate payments, the "pay up or else" notices to paid-up customers, the 30-hour-per-day daily system. An objective person could easily conclude these are reasons enough to scrap computers altogether.

The problem here is not the users of the technology — whether MIS or end users — but the technology itself in its current incarnation. MIS people are not immune to circular errors, lost files and spreadsheets that do not compute. Programmers using personal computers lack the protections of the production world just as users do. Yet, spreadsheet snafus tend to be viewed as a user problem.

Fortunately, vendors are beginning to appreciate that although these number-crunching wonders have become near and dear to all of us, they are untrustworthy from a business perspective.

What to do? You could lock up all the personal computers for a year, but in most cases this would be neither feasible nor wise because users far outnumber MIS managers.

More reasonable strategies would revolve around continuing education and broadened management responsibility. Information centers can advance user education by going beyond training in keyboard acrobatics. Most training directed at users focuses on products rather than on business objectives.

Of those courses that do address business problems, some stick to business analysis and application design — a weighty effort in and of itself. But a few go further, training users to investigate assumptions, validate calculations and incorporate reconciliation and control techniques.

Users need more opportunities for the latter kind of training. Information centers may be able to develop a user orientation to system controls. The big "but," of course, is that it's time-consuming, and it's one more thing for already cluttered things-to-do lists. Yet, conveying the dangers of inadequate controls is easy: simply demonstrate the impact of a variety of spreadsheet errors within the decision-making context of your business environment.

Unlike education, the broadening of management responsibility must come from the top. Executive management must make it the responsibility of every manager to incorporate checks and balances into every personal computer application that will feed into a departmental or corporate decision. The following examples are steps the information center can take to help determine the form of these checks and balances:

■ All printed output must be accompanied by documentation sheets listing objectives and assumptions, and documenting calculations.

■ All printed output must list the run date, time and originating department in a designated location.

■ The validity of every application must be verified by an objective second party.

This approach is far from foolproof, but by holding all managers responsible for the numbers that leave their departments, the probability of error drops.

If disasters caused by shaky application logic are the fault of the software, they are also the fault of managers who trusted the numbers without a second thought. The sooner we start to take concrete action, the sooner this bankruptcy gremlin can be put to rest.

Karten is president of Karten Associates in Randolph, Mass., a consultancy that specializes in strategies for information centers.

Diagnosing realistic requests with a simple dose of 'why?'

How to find solutions by analyzing demands

MANAGEMENT MATRIX

By Walter F. Cuirle

If you are like most managers in this business, you spend much of your time either juggling your department's schedule to handle new requests, reviewing the status of the projects already on the books or changing the newest schedule to handle the slippage uncovered in the most recent status report. Did you ever stop to consider that there might be people in upper management who look at the end product of one of those projects and ask, "Why on earth did they send me this?"

MIS is supposed to offer solutions, not just provide services. As a manager in MIS, you have a responsibility to ask why, even though that may not always be apparent or easy to do. A request that says, "put this over here and that down there, and give me the report every Friday" sounds like an order that can't be refused, but it is really someone's attempt to find a solution.

Think of yourself as a doctor: A patient marches into your office and says, "Give me a prescription for a week's worth of tetracycline." Your response should be, "Where does it hurt?" not, "What dosage would you like?"

If you meet user demands as requested, but the problem doesn't get solved, whose fault is it? You have both the responsibility and the right to investigate. Let's look at some of the common demands that sometimes overbearing users make and what they might really mean. Diagnosis in every case is the early and repeated application of "why?"

The hidden agenda project

First, there is the hidden agenda project, in which things are not what they appear to be. Milder forms start out with, "Let's download this file from Seattle and that file from Boston and merge them over here in Orlando." They often fall apart on the first "why?" because the answer is generally, "so Houston sales can get the net on Tuesday afternoon instead of Wednesday morning." It all sounds a little crazy because it is.

You can dampen it with a direct cost-benefit comparison or cure it by getting the Houston sales staff to move its Wednesday court time to Fridays and getting the tennis scores off the system in Seattle and Boston.

Then, there is the "because it's there" project. In this one, the requester plays Sir Edmund Hillary and you and your department members are the mountain guides. These projects often begin with, "Say, do you have anything about bisync that I could borrow?"

A month or two later, you get an odd request from the same person for a project involving productivity enhancement through telecommuting. This sounds great except that, buried near the bottom, is a requirement for you to develop 3270 emulation on a VIC-20. Apply "why?" a few times and listen for answers like, "I was just reading about . . ." and "I thought it would be neat if . . ." You can sometimes effect a complete cure by diverting the requester's attention to travel and leisure magazines.

Projects that invoke accuracy by way of justification are common and insidious. Some of their hallmarks: They tend to increase paperwork for the staff; they require the invention of new identifying codes; they promise increased accuracy and better tracking with no mention of overhead, timeliness or need.

Apply "why?" often enough to determine if the requester is really talking about accuracy or just about significant figures. If it is the former, it is a sign of health. If the latter, you may have a problem.

This sort of request is currently most common among the time trackers — today's self-made efficiency experts. Generally, the requester isn't personally interested in the results of the proposed system. Those proposed 10th-of-an-hour time expenditure reports are wanted under the mistaken impression that they are needed by somebody up high. You can induce a cure by pointing out what management really wants.

For a proposed project on a corporate scale, management is interested in how much the firm will make vs. how much the project will cost. For existing projects, management is interested in how much the company can still make if the project is continued vs. how much the company can save if the project is terminated. A new system that tracks to plus or minus $10 vs. an old system that tracks to plus or minus $100 is pointless if the project is estimated in six figures.

Finally, there is the "I need more information" project. This is quite distinct from the "I need more information about X so that I can decide about Y." The latter is a request for help, and you can sit down with that person and work out a solution. The former may be legitimate but can also turn out to be an exercise in collecting information for information's sake. It is common, closely akin to the accuracy disease and can be cured in a similar manner.

Ask a few questions, and then rephrase the answers with "the company" in place of "I." It gives everybody a certain pespective on the whole thing. If the answers no longer sound reasonable, kill that proposal without mercy. It's dangerous.

Some people object that MIS would come up with the right answers if management asked the right questions. But that makes MIS no different than the computers it uses. That's just data processing. It's time to put the emphasis on the "M" in MIS.

Cuirle is a senior associate with Nicholas DeMaio Associates in Bryn Mawr, Pa.

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VIEWPOINT

TURNAROUND TIME

Larry Long

Q *I started work as a data center manager Jan. 1. I was hired after four long interviews with the MIS director and the senior vice-president that he reports to. The major reason that I was brought in was to turn the data center around. The turnaround was the focus of our discussions during the interviews.*

For 6½ months I worked nonstop to do exactly that. During this period, I completed many tasks that provided a firm base for the data center to move forward.

Among these were the installation of a 34-location nationwide network; negotiations of cost-saving contracts; preparation of the 1985 and 1986 budgets; justification of an operating system upgrade; technical evaluation of computer-aided design and manufacturing systems; many procedural improvements; computer, front-end and DASD upgrades; a capacity study; and a plan for reorganization.

My six-month performance review was outstanding; yet only five weeks later, on a Tuesday afternoon, I received a memo telling me that I had to complete a number of tasks by 8 a.m. the following Monday or else.

I completed all 10 tasks by the Monday deadline, including a major benefit/cost analysis. This, however, did not stop my boss from terminating me on Friday morning of that same week.

I had been praised by the senior vice-president just a few weeks earlier.

To top it off, after convincing me to leave a good position and move to another state, my boss wanted to give me a total of two weeks' severance pay. After much discussion, I still received only one month's pay.

I never received a good reason for my termination. I think he simply did what he had planned from the beginning — bring in someone to turn the data center around and to provide technical direction, then let the person go.

A second possibility is that perhaps I did too good a job and had become a threat to the MIS director. He was extremely unsure of himself and certainly lacked the technical competence required for his position.

I am now looking for another position in this area, as we cannot afford another move.

I would appreciate your opinion, and I also appreciate the chance to get this off my chest.

It is unlikely that your boss hired you with intent of releasing you after the turnaround was complete. A well-ordered data center without continued good management will surely deteriorate.

I believe that your presence posed an immediate and real threat to the MIS director's job security. This type of threat is common in business, but most managers prefer the traditional approach. That is, managers make life increasingly miserable for their upstart subordinates while secretly and subtly sabotaging their integrity among top management.

Your manager's approach was a blatant deviation from tradition — he simply fired you without just cause. Even a good evaluation merits another six months, and your outstanding evaluation was a lot better than good.

> ”
>
> *If a candidate's credentials imply a certain level of technical expertise and this expertise does not surface during questioning, then productivity may be a problem.*

Q *I am responsible for administering the standards and procedures program for our data processing department. We believe that by putting our standards and procedures on-line they will be easier to access and update and, therefore, will be much more effective.*

Do you know of any companies that have effectively automated their standards and procedures or of any software products available for providing this capability?

What you propose is a good idea. Standards and procedures are adhered to if, and only if, they are accessible and always up to date.

I am unaware of any software products developed specifically for this purpose, however, many companies use word processing and idea processor software to document and make revisions to their standards and procedures.

To carry this automation one step further, it is a relatively simple matter to write a routine that presents users with a menu of available standards and procedures, then load the requested word-processor-generated or idea-processor-generated text files. In the routine, provide the user with the capability to page throughout the text file.

Here is an even simpler approach. Create the text files, specify the on-line versions to be read only, then distribute a list of file names for the various on-line standards and procedures. To view a particular standard or procedure, users simply use their word processing software to call up the desired text file.

Q *I heartily agree with your five "Ps" of programming; that is, a good programmer is perceptive, patient, persistent, picky and productive [CW, Aug. 12].*

One of my duties is to find good programming candidates. Would you share some of your experiences on how to identify people who have the five "Ps"?

This topic has dissertation potential. Ultimately, it boils down to an individual and some kind of subjective if-then-else analysis. Perhaps I can offer a few suggestions.

A good way to test whether a potential candidate is perceptive and picky is for the interviewer to skim purposely over a very important topic, such as in-house training or promotion opportunities.

If the candidate continually requests clarification and shows genuine concern about prospects for the future, then continue the interview. If the candidate listens passively, then stop taking notes; begin discussing topics of more interest to the candidate — such as television or sports.

Look for a history of self-improvement in any area, from music to computers. If the candidate periodically takes a course or learns something extra just in case, then place a check in the "persistent" box, or else recommend the candidate to a competing firm.

When a candidate has a college degree or experience, interviewers tend to assume that the candidate has the prerequisite technical knowledge. Orchestrate the interview such that several people ask technically revealing questions.

If a candidate's credentials imply a certain level of technical expertise and this expertise does not surface during questioning, then productivity may be a problem. Play *Trivial Pursuit* with the candidate.

Patience is a tough personality trait to ferret out during an interview, but there seems to be some correlation between patience and an unwavering belief that something is best.

If the candidate steadfastly pronounces a particular language to be the only real language, then avoid discussion of your push to fifth-generation languages; wish the now former candidate good luck and call a taxi.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

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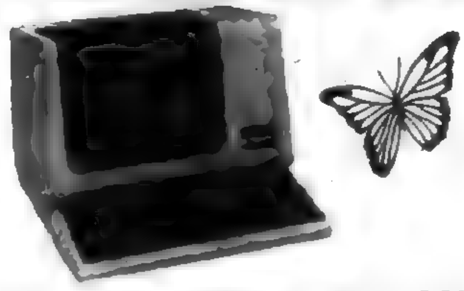

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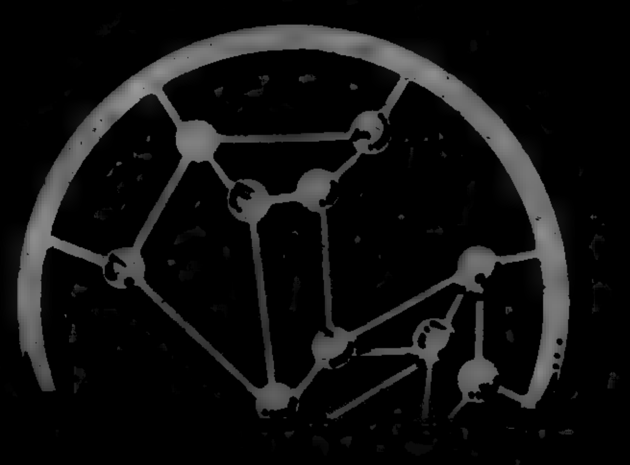

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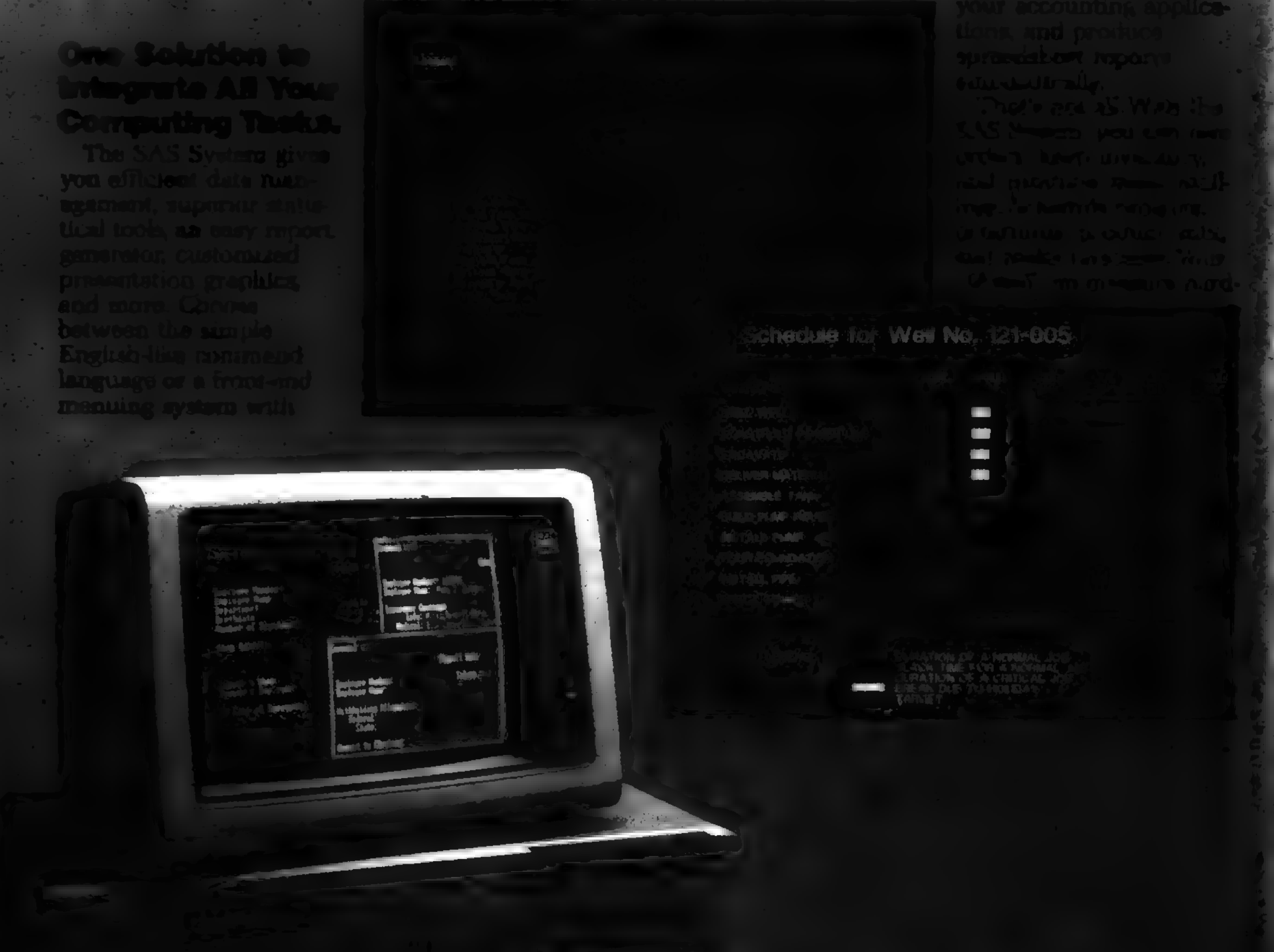

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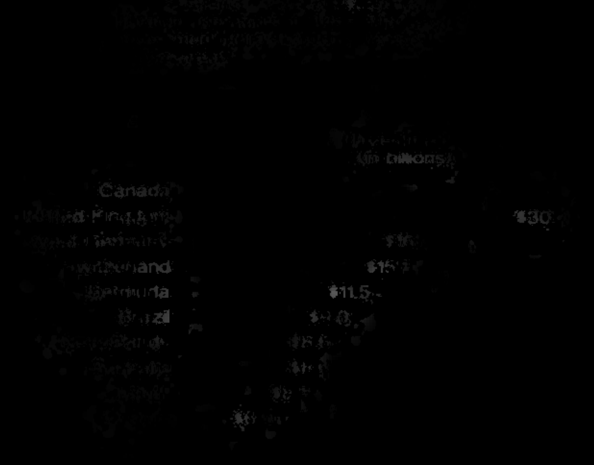

Jacore joins AT&T value-added resellers offering 3B minis

NEW YORK — When AT&T Computer Systems convened a meeting of its value-added resellers council recently, it included Jacore Systems of Marietta, Ga. Jacore, like 111 other AT&T value-added resellers, wants to offer its customers the 3B line of minicomputers.

Jacore's presence was notable, however, since in the past it had been a value-added reseller associated exclusively with IBM. It was among the 10 companies IBM named in 1982 as its first value-added resellers, and with $60 million in revenue this year, it is IBM's largest value-added reseller.

Jacore will continue to sell the IBM System/36, which constitutes the bulk of its business. But James L. Jacobson, Jacore chairman, says the firm's small and medium-size business customers want the hardware migration path provided by the 3B. The 3B line will allow them to take their software with them as they move up to bigger models, a progression that IBM can't match with its incompatible mid-range lines, he said.

— **Charles Babcock**

REGIONAL UPDATE

SAN JOSE, Calif. — Former Convergent Technology, Inc. chief technical officer and cofounder Ben Weigbreit admitted his recent decision to leave Convergent along with chairman Allen Michels and two other Convergent executives to form a yet unnamed venture is certainly a bold one.

"It's very bold, and I'm terrified," Weigbreit told *Computerworld* recently. Little else about the group's plans is clear. "We have no product plans, no funding plans and no business plans," he said. Right now the foursome is operating out of two rooms in Weigbreit's Palo Alto, Calif., home and is in the process of looking for office space.

Weigbreit and Michels first discussed leaving Convergent a week before their departure was announced, he said. "Each of us had been thinking about doing something else. I could sense that Allen was thinking of looking elsewhere."

The former Convergent executive dismissed suggestions about a possible legal battle with Convergent as a result of the group's departure and reiterated statements that the new company would not compete for Convergent's business.

— **Maura McEnaney**

■

WASHINGTON, D.C. — The U.S. Department of the Army is studying the feasibility of converting the official Army personnel file, more than two million records now on microfiche, to digital optical-disk technology, according to Lt. Col. Michael R. McGuire, the project coordinator.

The Army is planning pilot operations at the Enlisted Records and Evaluation Center at Ft. Benjamin in Harrison, Ind., and at the Military Personnel Center in Alexandria, Va. If the evaluation is positive, full-scale conversion to optical disks could begin in fiscal year 1988.

McGuire said conversion was recommended in a 1984 study by Austin Associates, a consulting firm in Englewood, Colo.

— **Mitch Betts**

■

WASHINGTON, D.C. — The government market for Department of Defense Tempest computer equipment, which is shielded to prevent unwanted electronic emissions at national security installations, will be cut by about 10%, according to the local office of International Data Corp. (IDC), a market research firm.

IDC's prediction is based on the fact that the DOD has ordered national security agencies to restrict their purchases of Tempest hardware to offices where there are "clear and compelling requirements," not just any office where workers have security clearances.

But IDC said the good news is that there still remains a multibillion dollar market for Tempest hardware in the government. The recent series of widely publicized spy cases is creating a heightened security awareness, which vendors can exploit to sell their Tempest wares, IDC said.

— **Mitch Betts**

■

SACRAMENTO, Calif. — Two night watchmen working for a private security contractor were arrested recently for allegedly stealing microcomputer word processing programs and user manuals belonging to the California Lottery Commission.

Armed with a search warrant, police raided a private residence on Oct. 27 and seized floppy diskettes on which roommates Oh Kwon and Ki Young Sung had purportedly copied the commission's Microsoft Corp. Wordstar software. Authorities also confiscated some Wordstar documentation and charged the pair with grand theft, conspiracy and possession of stolen property.

Kwon, 23, and Sung, 24, apparently wanted the packages for their own private use and planned to bootleg their stolen diskettes on the black market, according to Rick Blim, deputy chief of the state lottery's security division.

— **Jeffry Beeler**

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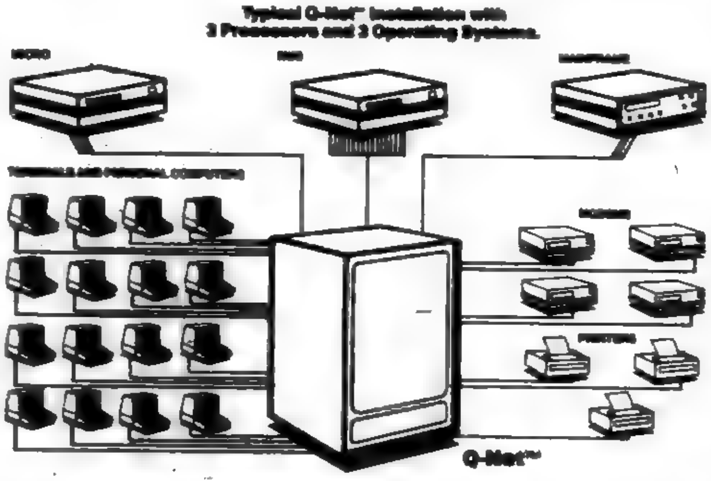
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SMALL TALK
Rick LePage

Mac's Excel: A class act

Microsoft Corp. has finally started shipping Excel, its much anticipated integrated software product for Apple Computer, Inc.'s Macintosh, and the program conceivably could create a new standard for integrated performance in the business world.

Microsoft has quite a lot at stake with Excel, as the program treads upon Lotus Development Corp.'s turf, both in Microsoft's MS-DOS environment — Microsoft has indicated that Excel will be available for MS-DOS machines sometime in 1986 — and in the Mac environment. While Excel has not affected sales of Lotus' 1-2-3 or Symphony at present, public anticipation of the product seems to have cooled sales of Jazz, Lotus' integrated product for the Mac.

Priced at $395, Excel contains three major modules — spreadsheet, graphics and data base — as well as a complete macro facility for automating repetitive tasks.

An Excel work sheet has 256 columns and 16,384 rows — over 4.1 million cells. While a Mac with 512K bytes of random-access memory (RAM) could not use an entire work sheet, it is more than enough memory for most high-powered business uses. Macintoshes enhanced with third-party boards with up to 2M bytes of RAM can approach using all of the available cells.

Microsoft has structured Excel with a feature called dynamic recalculation, which departs from previous spread-

See **MAC** on page 28

LePage is editor of "Macintouch," a monthly newsletter for Macintosh users and developers published by Ford-LePage, Inc. in Framingham, Mass.

A critical eye for micros

Chris Christiansen's ideas on the state of the mart

INTERVIEW

Chris Christiansen, microcomputer analyst

A self-described "information junkie," Chris Christiansen began experimenting with microcomputers in 1979. After studying biology and science communication, he ended up at the Yankee Group in spring 1982, just as the personal computer wave began rolling through corporate America. "I got on board at the right time," he commented. "I'm not big on planning; I've always gotten to do a lot of amazing things by being flexible."

Christiansen, 33, last month left his role as the consulting firm's personal computer guru for other opportunities. *Computerworld* Senior Editor Eric Bender interviewed him during his final days at his Boston office.

How do you wade through the flood of micro products?

I keep changing the way I look at hardware and software. I hate product demos because I don't trust them, first of all. Second, they never show me what I want to see, and third, I usually fall asleep at some point. I get really antsy if I can't touch the keyboard after 10 or 15 minutes.

One trick I learned from Aaron Goldberg at [International Data Corp.]. You simply ask the software vendors to start the program. You can take that even further by asking them to install it on your system. Not only do you get the package to keep, but oftentimes, the installation procedures are so arcane that they will pretty much disqualify the program right then and there.

I used to take the package and play with it until I either blew it up a couple times or I came to a point where I thought it was decent or where I had to read the documentation. Now I look for at least 10 or 15 minutes at the demo disks and the tutorials.

Also I look at the documentation before I ever load the program. How do I get information out of other files, out of spreadsheet files, out of a data base file or a text file? I don't want to rekey anything. I want

See **CHRISTIANSEN** on page 26

High-contrast screen debuts

By Eric Bender

BEAVERTON, Ore. — The first electroluminescent flat-panel display optimized for portable computers running Microsoft Corp.'s MS-DOS has debuted from Planar Systems.

In the coming year, three major computer vendors will introduce portable systems incorporating the display, said Planar Marketing Vice-President Steven Hix.

Planar's new EL8358M screen gives many features previously offered only in high-resolution CRT terminals in a package that weighs 16 ounces and measures about half an inch thick, Hix said. Unlike the case with LCDs, the electroluminescent display offers high contrast and a wide viewing range, and it can be viewed in all ambient light conditions, he emphasized.

The electroluminescent screen offers high contrast and a wide viewing range.

The display provides 640- by 200-pixel resolution and full utilization of virtually all MS-DOS text, graphics and utility pack-

See **HIGH-CONTRAST** on page 25

INSIDE

Alpha Software enhances its Electric Desk integrated package/**24**

Hewlett-Packard shows an eight-pen plotter for personal computers/**24**

NEW THIS WEEK

- NCR introduces an IBM-compatible personal computer
- Intersol announces an on-line customer service and support management system
- For more on these and other new products, see pp. 111-149.

INSTANT ANALYSIS

"The Lotus/Intel/Microsoft Expanded Memory Specification is a permanent, architectural extension to the Personal Computer, and with multi-tasking, it will be even more important."

— **Jim Johnson**
Intel

Treasury and controller offices count on micros, survey shows

Cash management, analysis typical uses

By Charles Babcock

NEW YORK — Accountants, controllers, financial staffs and treasury offices are the most intensive corporate users of microcomputers, according to a survey of treasurers and MIS managers at 323 large corporations.

Released last week, the survey was conducted by Bank Earnings International, an Atlanta consulting firm for banks and financial service organizations. It was sponsored by Manufacturers Hanover Trust Co. of New York, one of the top four banks selling microcomputer treasury workstations to corporations, according to the survey.

The survey showed that virtually all treasury offices and 90% of controllers across a broad range of companies from manufacturing to financial services use microcomputers, said Janice Sprague, vice-president for treasury consulting at Manufacturers Hanover.

Treasury staff members use micros for cash management, evaluation of the cost of borrowing, pension fund portfolio management, capital structure analysis and other functions. The controller's department, including accounting, uses micros for financial analysis of accounts receivable, payroll, profit planning and financial forecasts, Sprague said.

The typical corporate microcomputer is an IBM Personal Computer or Personal Computer XT, with some of the largest firms turning to the Personal Computer AT as a standard. Of the 93% of the companies that standardized on a particular brand, 88% of them chose IBM. The AT is especially popular at companies with more than $3 billion in sales, the survey said.

Almost all the companies have formal acquisition controls over micros, and 70% rely on the MIS department or other central group to enforce standards, the survey said.

Somewhat surprisingly, the survey also concluded that "the vast majority of companies do not use microcomputers outside of the financial area." It claimed that only 8% of the respondents use micros in administrative functions such as the law department or personnel; 4% use them in production and 2% in marketing. Sprague acknowledged that the survey did not ask about research and development, an emerging bastion of microcomputing.

Once the microcomputers are in place, corporate users often turn to the information center for support. Of the companies contacted, 36% have information centers, with the bulk of them concentrated in companies with the highest revenues. Eighty-eight percent of the information centers provide internal consulting, and 70% provide hardware acquisition/support and training. But less than half provide software development and maintenance, the sur-

See **OFFICES** on page 29

ADR micro tool provides Roscoe access

Applied Data Research, Inc. (ADR) of Princeton, N.J., has announced ADR PC/PTE, personal computer software that gives application programmers access to Roscoe, ADR's mainframe on-line programming system for OS/MVS environments.

PC/PTE, running under IBM's PC-DOS, can also access the master files, system sequential and partitioned files of the Librarian, ADR's source program management system, according to a company spokesman. Personal computer facilities are available for data manipulation, code editing and file transfer.

From the personal computer, data can be moved to the mainframe and stored in Roscoe's Active Work Space, Roscoe's library, the Librarian master files or system files.

Using a transparent data transfer facility, PC/PTE automatically converts EBCDIC data to ASCII format for use by a local interactive editor. Binary data transfer for backup purposes also is supported. Once downloaded, the program can be manipulated with personal computer editing facilities.

All mainframe security and controls established through Roscoe are automatically enforced within the PC/PTE environment. All source management facilities of the Librarian also are supported. Security cannot be overridden at the personal computer level.

PC/PTE directly supports IBM PC-DOS environmental commands and executes external PC-DOS commands. PC/PTE runs on the IBM Personal Computer, Personal Computer AT anti XT and 3270 Personal Computer. PC/PTE carries a one-time site license charge of $9,500 plus a charge of $195 per copy.

HP unwraps micro plotter

Hewlett-Packard Co. has unwrapped an eight-pen plotter for personal computers that produces A-size — 8½- by 11-in. — overhead transparency film and paper plots.

The Colorpro plotter was designed for business professionals and comes with a choice of RS-232C or the IEEE 488 bus interface for connection to personal computers. It is supported at introduction by software packages including Lotus Development Corp.'s 1-2-3 and Symphony packages, Decision Resources, Inc. Chart-Master and Sign-Master and HP's Graphics Gallery and Textcharts, the vendor said.

For reports and presentations, the Colorpro produces multicolor pie, bar and line graphs and text charts. The eight fiber-tip pens draw at a rate of 15.7 in./sec.

The plotter weighs 12 lb and measures 18.1 by 12.1 by 4.9 in. It costs $1,295 and is being sold through local HP sales offices.

Alpha Software upgrades automated desk

Lifts copy protection; gives PC-DOS access

Alpha Software Corp. of Burlington, Mass., has enhanced its Electric Desk package and eliminated the product's copy protection scheme.

With copy protection removed, users are able to make as many copies of the integrated package as they need and to store the entire program on a hard disk drive.

Electric Desk, which runs on the IBM Personal Computer line, supplies spreadsheet, data base management, communications and word processing functions.

Electric Desk sells for $345, and current users can upgrade to the new version for $59.

The latest version features an IBM PC-DOS access service that enables users to perform operating system functions without exiting from Electric Desk.

For example, users can format diskettes, back up files, check disk directories or run one other program.

The product's data base service has been enhanced with a global search and replace capability, a global search and delete facility and expanded index commands for multilevel sorting.

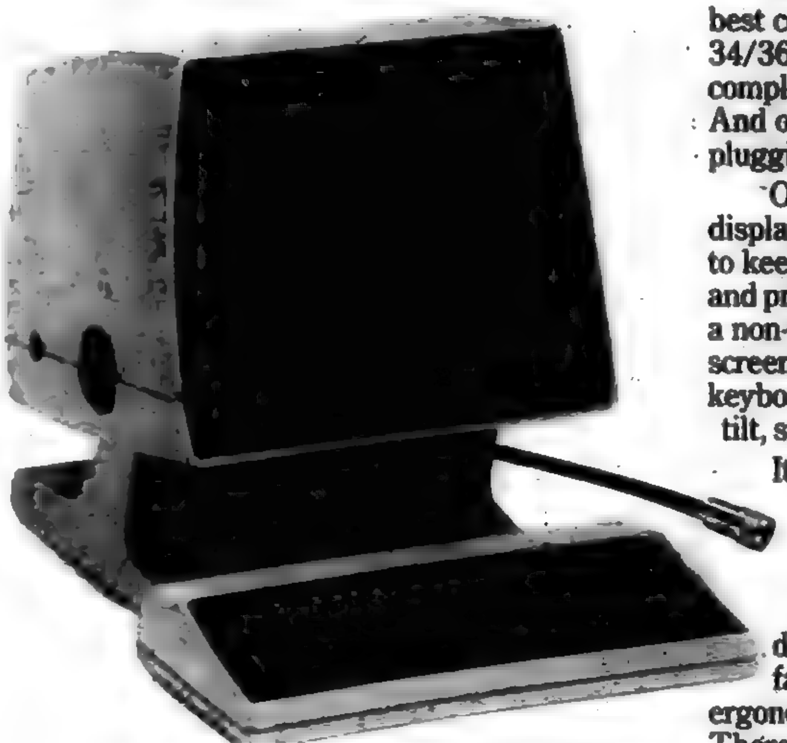
The spreadsheet supports 2,048 rows by 255 col., compared with 255 rows by 255 col. in the first release. With a Sort command, a user can sort by three columns in ascending or descending order.

Other changes include the ability to save a portion or an entire work sheet and store data in IBM's Data Interchange Format.

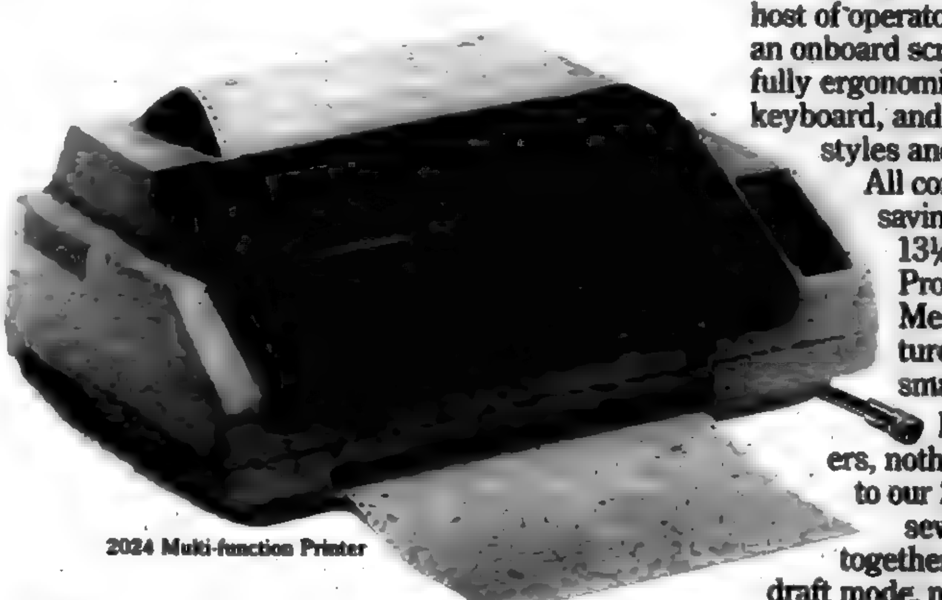
An export command enables a user to create ASCII word processing files from an Electric Desk data file. Two keystrokes are needed to delete and copy words, lines, sentences and paragraphs.

Visible page breaks, an embedded command to change line spacing and a Hide command to suppress displays of nontext characters have also been added.

Four great plugs for



2051-11 Monochrome Display



2024 Multi-function Printer

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You're looking at four of the best connections in the System 34/36/38 world. All offer complete plug-compatibility. And other advantages worth plugging into:

Our 2051-11 monochrome display, for example, is designed to keep operators comfortable and productive, with features like a non-glare green or amber screen, a choice of ergonomic keyboards, and a monitor that can tilt, swivel, or even sit on a shelf.

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Hook up with our 2191 display, and you're face-to-face with the latest in ergonomic, compact design. There's a full tilt-and-swivel screen in green or amber, plus a host of operator conveniences—an onboard screen printer port, a fully ergonomic adjustable-tilt keyboard, and a choice of cursor styles and screen formats. All contained in a space-saving footprint of only 13¼ by 14 inches. Proving that with Memorex, great features can come in small packages.

In dot matrix printers, nothing comes close to our 2024 for joining several functions together—high-speed draft mode, near-letter-quality

Innovative Software unveils spelling check program

Innovative Software, Inc. of Overland Park, Kan., has introduced a spelling check program that reportedly checks 80,000 words and works with the vendor's The Smart Word Processor module.

The $139 Smart Spellchecker features single-keystroke access to its dictionary from The Smart Word Processor's command list.

The 30,000 most commonly misspelled words are stored in memory together with The Smart Word Processor for greater checking speed, according to the vendor.

Users may instruct the program to check single lines or paragraphs as well as entire documents. The software also is said to locate incorrect usages of prefixes, suffixes, capital letters, punctuation and abbreviation.

The Smart Spellchecker runs on the IBM Personal Computer and requires 64K bytes of memory. The word processing and spelling check programs together require 320K bytes of memory.

The software is based on Merriam-Webster, Inc.'s *Ninth New Collegiate Dictionary*, and users can create up to five custom dictionaries.

AT&T offers digitized graphics transmission package for 6300

AT&T Information Systems recently unveiled a $695 software program for its Personal Computer 6300 and compatibles that reportedly allows transmission of digitized graphics for teleconferencing at speeds up to 9.6K bit/sec.

AT&T Truevision Still-Frame Teleconferencing Software (STS) works with AT&T's Truevision Image Capture Board and with the Truevision Video Display Adapter or Video Display Adapter with digital enhancement.

The software allows simultaneous display at remote locations of functions performed locally, including cursor pointing and text, graphics or number annotation.

With the Image Capture Board, STS can capture an image from a video source at one location and transmit it to another.

STS offers three methods of picture transmission, according to Morristown, N.J.-based AT&T. The methods offer three choices of parameters affecting the quality of the transmitted image, and the program can be switched between the three while a teleconference is in progress, the vendor said.

System 34/36/38.

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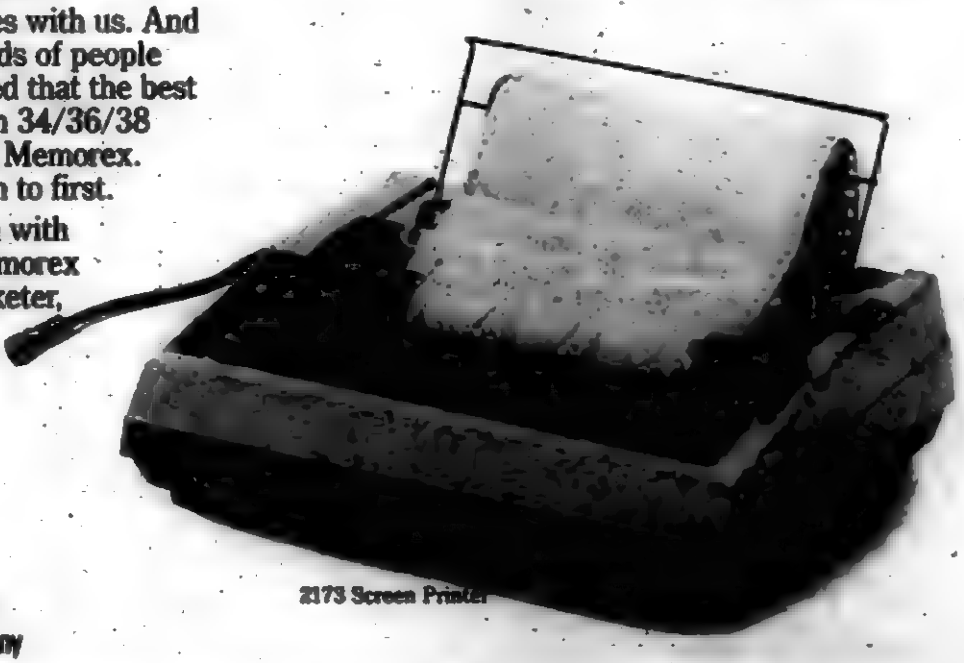
2191 Compact Display



2173 Screen Printer

Memorex
A Burroughs Company

IBM unwraps micro printer

IBM last month introduced the Wheelprinter E, a $699 printer that uses a cartridge print wheel to produce letter-quality text on correspondence and multipart forms.

Designed for use with IBM Personal Computers and compatible systems, the Wheelprinter E prints at up to 16 char./sec. It has a 13.2-in. writing line and prints forms with up to three parts.

Features include manual insertion of paper 3 to 15 in. wide; drop-in ribbon cassette; cartridge print wheels; automatic sensing and setting of the printer to the pitch of the cartridge print wheel in the machine; and emphasized and double-strike printing modes.

High-contrast screen debuts

From page 23

ages, Hix said. "It gives a true 2:1 pixel aspect ratio, so you can get circles," rather than the ellipses typically shown on LCD screens, he pointed out.

Planar's display draws 12W to 14W, which is considerably more than most LCDs and creates potential limitations on the use of a portable, but Hix predicted that development will drop power consumption down to 5W by mid-1986. The current OEM price also is high, at $775 each in quantities of 1,000, but he forecast that this should drop below $300 in the next two years.

The solid-state device, which can withstand shocks of 100 Gs and operate in temperatures from zero degrees Celsius to 55 degrees Celsius, should be suitably rugged for portable applications, Hix said. The display has worked in tests for more than 25,000 hours without failure.

A Tektronix, Inc. spin-off founded in 1983, Planar claims to be the only electroluminescent display manufacturer in the U.S. Its major competitor is Japan-based Sharp Electronics Corp., Hix said. Planar has built an automated, in-line assembly system for electroluminescent displays.

Christiansen's eye for micros

From page 23

to be able to find that [procedure] fairly easily in the documentation right off.

After getting the program loaded, being able to load data into it is the second most important thing. Then I will go play with it, usually following menus out to the outermost branch. I'm a bad typist, which blows away 20% or 30% of the programs anyway.

How do you evaluate hardware?

You look at the specs, and you get them to send you the machine.

You take apart the machine, and you look at it. You just look at how it looks inside, to see if the parts are loose, if the case fits back onto the machine nicely. Then there's the old standard kick test.

Then you plug it in and hook it up. Running the software is most important. You run your [Lotus Development Corp.] 1-2-3, your [Lotus] Symphony. It is really interesting to take [Headlands Press, Inc.] PC-Talk and run that on a lot of machines. PC-Talk won't run right on machines that have aberrations like a different clock speed. PC-Talk wouldn't run on the [Wang Laboratories, Inc.] Professional or the [ITT Information Systems] Xtra.

Why don't the manufacturers recognize these problems?

Sometimes I wonder about what the vendors do with these boxes before they send them out to the real world. It doesn't seem like they let somebody play with them who doesn't have a real loyalty to the company.

Some of the stuff that comes out just doesn't work; they claim it is compatible when it's not. It just strikes me that a fairly high level of stupidity is involved somewhere along the line.

It's interesting that people don't blame the product [when it doesn't work]. New users often blame themselves rather than the hardware or software. They think they must being doing something wrong or they think that they are stupid: "I just can't handle this." But a lot of times the problem is just that the documentation and the instructions for assembly are really bad.

On the hardware side, some vendors such as AT&T and Wang are now offering ways to upgrade their basic microcomputers to an Intel Corp. 80286-based system. How important is that?

Everyone would like that as an insurance policy, but I doubt you will see large numbers of those systems go out.

Sometimes it's desirable but not necessarily wise to upgrade a machine. When you upgrade a machine you still have the old mechanical components, and that is what fails on a machine — the keyboards or the disk drives. Your total commitment is getting very close to the price of an [IBM Personal Computer AT], and you are going to have service problems in a year.

You can only drip so much coffee and spill so many doughnut crumbs on a keyboard before it starts to stick. The disk drives are going to get cranky. The screen eventually will burn in. You may not get your investment out of the machine before you start to replace those mechanical components.

It's like Volkswagen Bugs. People used to keep swapping engines out of them but then eventually things would get bad mechanically, the clutch would go, the transmission would go, the body would rust out, the electrical system would start malfunctioning. Eventually you just say, "Enough." The bad thing with Bugs, and I think this will happen with personal computers, is that people get some kind of emotional attachment to their machines.

The [Internal Revenue Service] allows you to depreciate office equipment on a minimum of three years. Most companies appear to be depreciating somewhere between four and five years. I figure the lifespan of a keyboard, depending on usage, is about 2½ years. The same goes for disk drives.

Are these maintenance issues moving large corporations toward next-generation machines?

They are very concerned about maintenance and service problems. But right now none of them really wants to go out on a limb and commit to large numbers of ATs, especially if there is a relatively high cost involved.

What they want, and what a lot of them are looking at, is the new version of 1-2-3 that supports the [Intel] 8087 and supports the Expanded Memory Specification. That allows their users to run their models faster. With memory costs coming down at a horrendous pace, they can upgrade their systems and address probably 90% of their users' needs. We are only talking about 20% to 30% of the users in any one corporation here.

By moving them up to hard disks, or swapping out their IBM or [Compaq Computer Corp. machines], they have a way of upgrading their installed base machines.

Micro managers, like everyone else, want to protect themselves. They don't want to go out and commit to large numbers of ATs and find out that IBM introduces a cheaper version next year or that there are more hidden problems with the AT hard disks. Or that after they had just signed off on a whole lot of ATs with 20M-byte disks, the new 30M-byte drive comes out for $200 more, and it is manufactured internally by IBM. Who in his right mind is going to buy the 20M-byte version?

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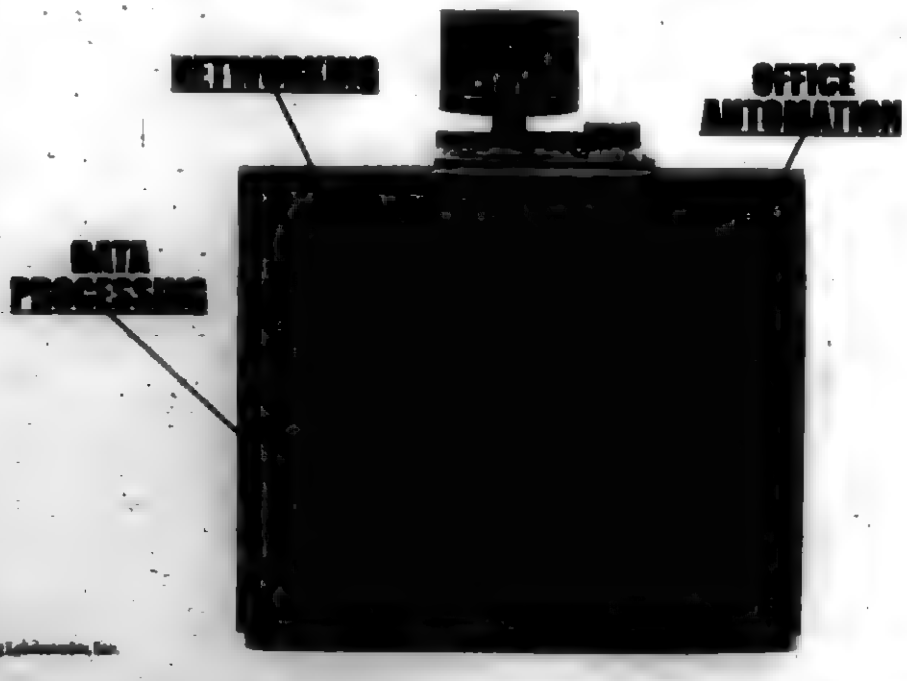

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What else do they want to know?

Is anything going to supplant Lotus 1-2-3?

On one hand, 1-2-3 is heavily entrenched. On the other hand, micro managers are getting tired of having Lotus repeatedly promise them network solutions and site licenses and then offer very tentative changes in their current licensing policy. Lotus has been saying for over a year now that they would finally come out with a networking policy.

Micro managers are concerned with what will happen next. They are concerned with what operating system is going to be part of their life. People still doubt that IBM will continue to maintain a completely open operating system at the [personal computer] level.

One of the major concerns is what to do about all this nonsense about departmental-level processing. Managers are really concerned about the amount of information that is being processed and stored at the workstation level. They want to centralize that information because they want to ensure that there is some degree of compatibility, so that Joe can share his data base information with Barb. Connectivity, moving that information around, using and controlling that information all are very important.

A lot of companies have simply run pilot tests for networks, [telling vendors that] "all you have to do to qualify for a pilot at our company is come in and show us the transfer of a [IBM] PC-DOS file from one machine to another across your network." The vendors bring in their equipment, and large numbers fail this simple test.

People are selling systems that are incomplete. They are not even capable of installing them.

And users often never find out what's available on existing equipment.

This is something that is very surprising about technology in general. People often leave or they discard the technology before they have even come close to fully exploring the capabilities. This Wang system [at Yankee Group] has a glossary function, which is essentially like macros. You can build whole applications inside it or run batch files.

I can set it up so that it will reformat a whole document exactly the way I want it, by writing this big glossary. It's a matter of simply documenting your keystrokes and also having enough imagination to string the whole thing together with a little bit of intelligence to organize it properly. The point is that most of the people in the Yankee Group don't realize that that function is available; they don't realize that this has other neat little tricks.

And all this has been reinvented for personal computer word processing?

Yes, I think this has been here since 1978.

We're starting to see more and more claims of natural language interfaces for micros, from people such as Javelin Software Corp. Do any of these offerings seem genuinely useful?

The problem with a natural language is that you only use it for a very short period of time.

The thing with Javelin that surprised me is that I had seen all that stuff before. Javelin just added a real nice interface onto a decision support system. IBM's Personal Decision Series has a product which is called Plan which is allegedly their spreadsheet. It's quite similar to Javelin without the fancy graphics.

> ”
>
> *Some of the stuff that comes out just doesn't work; [vendors] claim it is compatible when it's not. It just strikes me that a fairly high level of stupidity is involved somewhere along the line.*

How has the industry changed in the past three years?

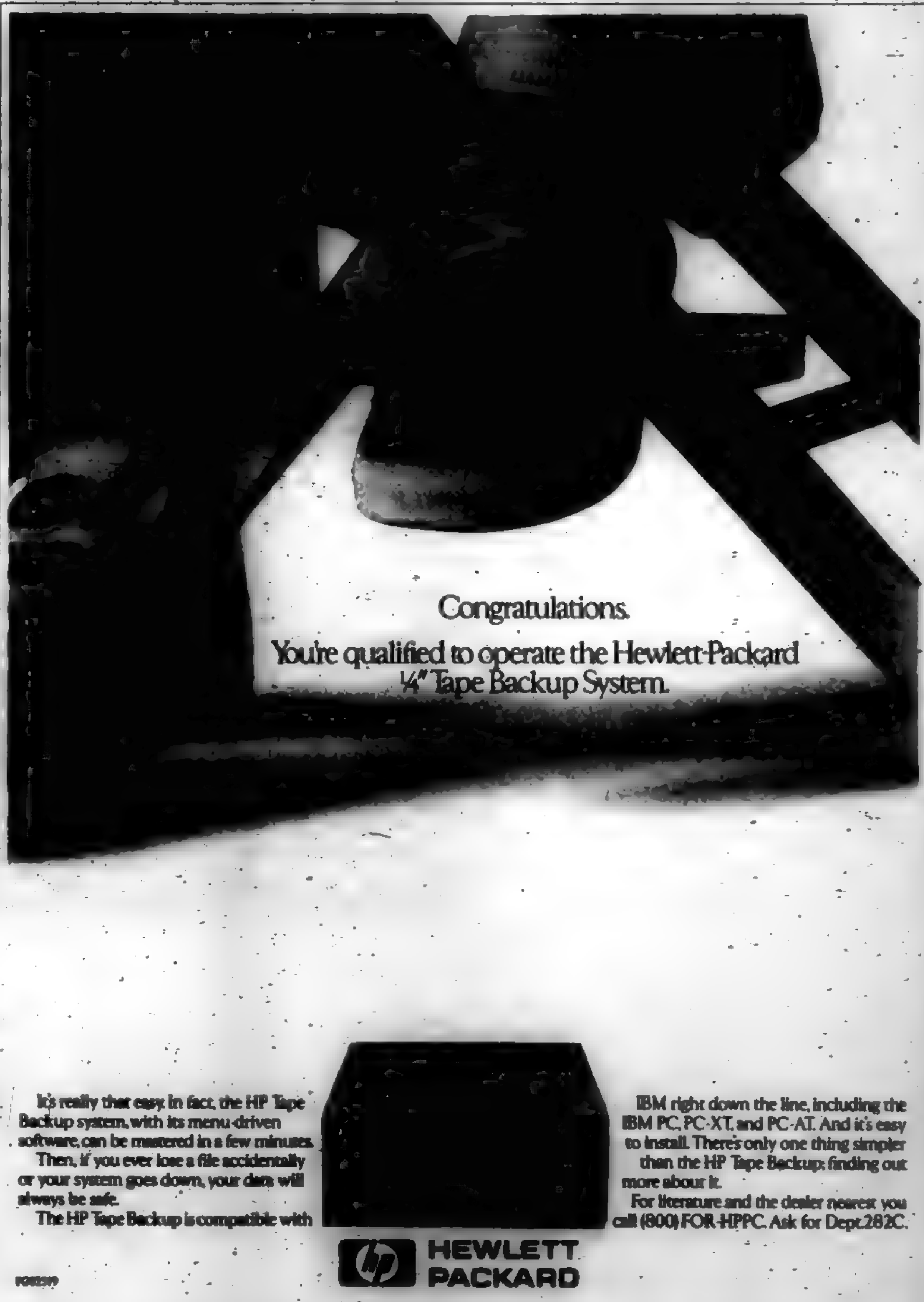
The worst thing about the way the whole [personal computer] area has changed is that everyone wears suits. Another thing is that the engineers and the techies get hidden away in the back rooms. They rarely get out of their little offices, but those are the guys to talk to. Watching a marketing type in his three-piece Brooks Brothers suit do a canned demo is just disgusting.

The weird thing is that oftentimes people that sign off on major purchases don't use this stuff. They have never used it and will never use it so a canned demo done by a slick marketing type is fine.

To see Ben Rosen use [Ansa Software's] Paradox and talk about it and really get excited did wonders for me. I have always been a big fan of his, because he is one of the few people I know who has become extremely rich and powerful in this industry without getting a corresponding increase in his ego. He is always entertaining. (Rosen, a well-known venture capitalist, is chairman of Ansa Software.)

OK, so how did you like Paradox?

Paradox isn't radically revolutionary. You could see how nicely it matched the 1-2-3 interface. It just struck me as a nicely tailored package that was half a step better than the market.



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HEWLETT PACKARD

FO8209

Mac's Excel: A class act

From page 28

sheets. Older programs, when recalculating a cell's value, would scan the entire work sheet and recalculate every cell. This process is time consuming, especially when working with a large spreadsheet.

With dynamic recalculation, when a formula is entered into a cell and calculated, only that cell and any other linked cells are recalculated, a process that is nearly instantaneous.

A work sheet can be used either for spreadsheet or data base purposes. In either mode, Excel is very quick, even with large files. A spreadsheet that comprises 1,500 cells, each consisting of a complex formula based on the cell above it, can recalculate in under a minute. Sorting a 1,000-record data base is also that fast.

Formulas are entered into a formula bar at the top of the screen. References to other cells can be entered by typing the cell reference in the formula bar or by clicking the mouse on that cell.

In addition, Excel has over 150 built-in mathematical, statistical, financial and other functions, with the added ability of being able to store a large number of user-defined functions for retrieval at any time.

Labeling cells with a name

Excel allows a cell or group of cells to be labeled with a name, which makes it easy to create formulas. For example, cell A15 might contain profit information; labeling that cell "profits" will cause every instance of that name in a formula to use that cell's contents, which is easier than searching for the appropriate row and column reference.

Excel also features the ability to split a work sheet's window, allowing the user to view and work with two different portions of a work sheet simultaneously. Different windows of the same spreadsheet can also be opened and resized, enabling a user to view more than one section of a work sheet and alternate between them.

Additionally, formulas can be linked easily to data in other work sheets, an extremely powerful tool for financial analysis. Excel also offers extensive table and array functions, which make it easy to create what-if analyses and multiple-cell calculations.

In a tip of the hat to Lotus, Microsoft included the ability to import 1-2-3 WKS-standard files into Excel, as well as the ability to save Excel files in 1-2-3's form. (Jazz lacks the latter feature.) In addition, Data Interchange Format, SYLK and normal text files can be imported and exported from Excel without having to run a conversion utility on any data files.

The chart feature in Excel is both powerful and easy to use. One need only define the group of cells to be charted and open up a new chart document. The chart will be drawn using that user's preferred chart format.

Charts can be easily redrawn in any format — line, bar, column, pie, area, scatter or combination — and can be added to and manipulated in any number of ways. Pie charts offer exploded wedges in many forms, with the user choosing the wedge to explode. Patterns can be changed at will. Borders, legends, titles, other text and axes can be added, subtracted or manipulated.

Additionally, charts can be frozen or set up to be updated as a work sheet is updated, and the ability to have multiple charts on the screen at one time is another plus. Users can also create overlay charts containing information from different spreadsheets.

Excel's data base function is better than is found in most integrated packages and good enough for most medium-size applications, but any large-scale data base should be used with a dedicated program.

Data is entered in the row and column format — no special forms can be created — and manipulated in a manner similar to the spreadsheet. Sorting, selecting and reporting are handled well, and a large number of specialized functions are available for further data manipulation.

There are no specialized features such as type checking, complex report or forms generation and data entry aids that are found in data base programs like Provue Development Corp.'s Overvue or Ashton-Tate's Dbase III.

Many people have faulted Jazz for the lack of a macro facility, and Lotus officials said that their research found that users were not looking for macros.

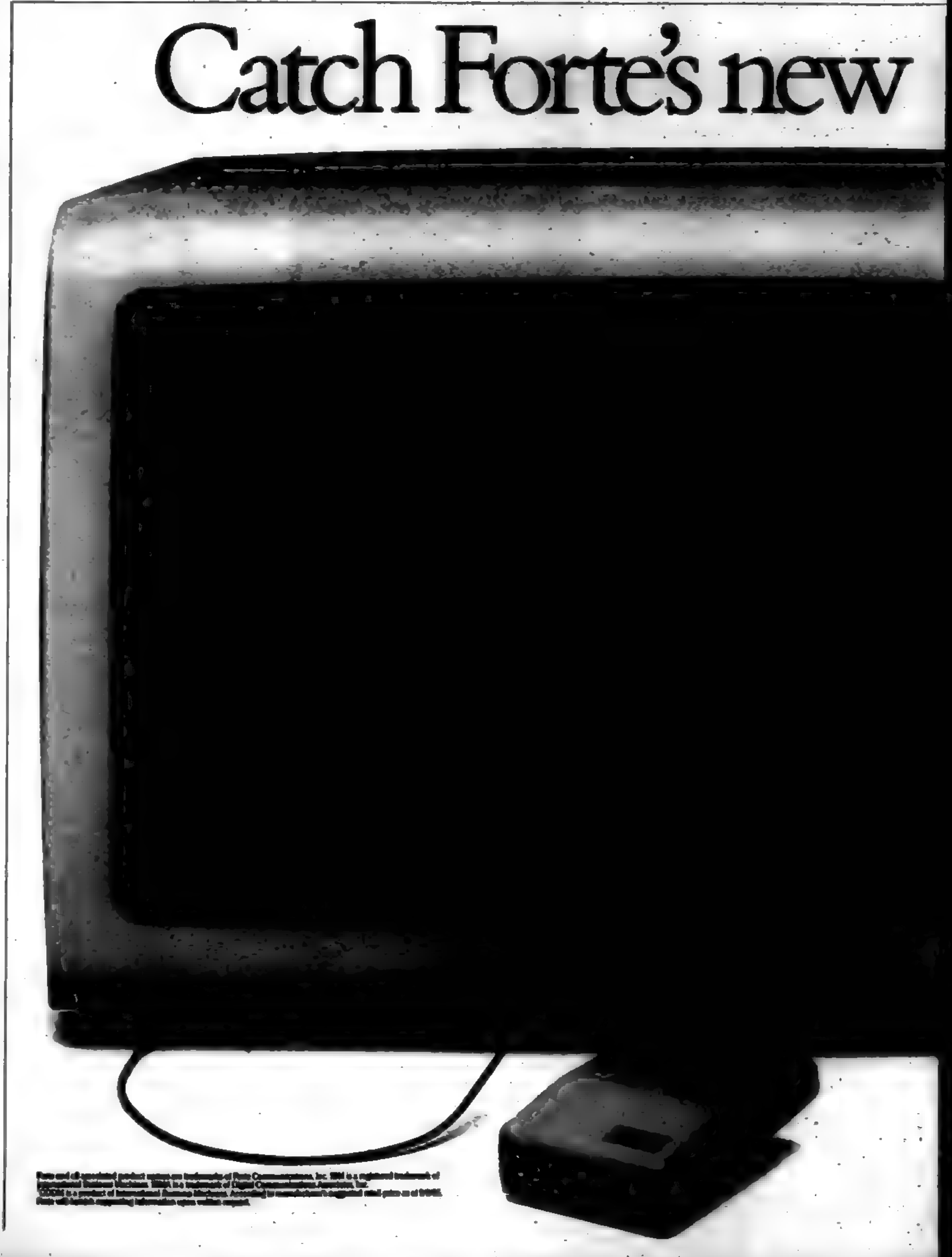
Microsoft obviously took its cue from different research. Excel offers a complex, complete and simple macro feature.

Macros are created in real time, using a special macro sheet to record formulas, the creation and opening of documents (including charts, data bases and spreadsheets), the formatting of cells and almost any operation that can be performed manually.

To create a macro, first a macro sheet is opened and named. The user then opens up either a new work sheet or an existing one, turns on the macro recorder function and performs the tasks to be associated with the macro.

When the macro has been completed, the recorder is turned off and the macro saved with an appropriate command-key sequence. Macros can also be input directly into a macro sheet and can be edited or changed at any time.

Macros can be interactive — pausing for input from the user — and can even create special dialogue boxes for input, warning messages or



other information. Over 200 commands are available to the user, including instruction branching, document and cell formatting, function calls and so on. A special section of one Excel manual extensively details the use of macros.

Unlike Jazz, Excel does not include a word processing or telecommunications module. Instead, an Apple utility called Switcher is included. Switcher partitions a Mac's RAM, allowing the user to load more than one program simultaneously into memory and alternate between those applications, with simple data transfer between them. While not multitasking, Switcher does alleviate the need for completely integrated software, which historically has consisted of underpowered modules.

Microsoft obviously spent a lot of time evaluating present spreadsheets and integrated programs — sorting out limitations and strengths — in order to create an entirely new type of integrated program. Excel performs all of its tasks efficiently and quickly, and its power is real, even within the confines of current machine architecture. But its strongest feature is overwhelming ease of use.

Overcoming historical difficulty

Spreadsheets have historically been difficult to master — witness all the training programs, seminars and books on learning how to use 1-2-3 — but Excel is extremely simple to use. The manuals are clear, instructive and filled with numerous examples. The actual integration of the different modules is almost transparent. Going back and forth among different document types is straightforward and easy.

What does Excel do that other programs do not, though?

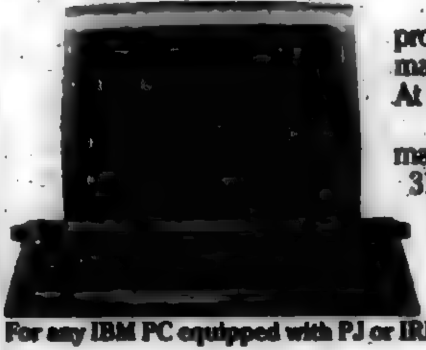
Jazz offers a powerful spreadsheet, good graphics and capable data base, combined with telecommunications and word processing. The problem with Jazz is that the separate modules tend to get in each other's way, slowing down the program considerably. Each module in Excel is joined together almost flawlessly, a result due in part to its management of memory. A hard disk is a necessity with Jazz, but Excel performs excellently on a floppy disk system.

Comparing Excel with 1-2-3 is a bit harder, because the Mac and the IBM Personal Computer environments are so dissimilar, but the facts do point to Excel as the more complete spreadsheet. Excel can do everything 1-2-3 can do and more — multiple windows, user-defined functions, dynamic recalculation and so forth — without the speed loss so evident in integrated programs.

In terms of MS-DOS integrated packages, while Symphony and Ashton-Tate's Framework might offer more functionality, their modules are also difficult to master, and the integration among them is nowhere near as smooth as Excel's. In addition, increasing RAM with expanded memory boards above the 640K-byte limit might speed up those programs to a point where they rival Excel, but those are costly additions.

Most staunch IBM supporters will not notice Excel until it is available for their machines. But other micro users should take a serious look at this package, as it should finally legitimize the Macintosh in the business environment.

micro to mainframe graphics lineup.



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Offices count on micros

From page 23

vey said. Individual departments frequently develop their own software, it added.

In another area, the survey revealed that 80% of the companies have links between microcomputers and mainframes, and another 17% plan to establish such links.

In companies with $1 billion or less in sales, an average of seven micros are connected to a mainframe; in companies with over $3 billion in sales, an average of 85 micros are connected to a mainframe, the survey said.

Interest in the micro-to-mainframe connection is by no means waning. While the majority of micros still operate as stand-alone units, "future plans indicate that another 25 microcomputers will be connected to the mainframe in the average company," the survey said.

An IBM Personal Computer is being linked to an IBM mainframe in most cases. In DP shops where the mainframe is not an IBM model, the connection is still being made 72% of the time to an IBM micro, according to the survey.

All but 6% of the companies surveyed permitted data to be downloaded from mainframes to microcomputers; 22% permitted it without restriction.

The most common restriction is limiting the data bases available for downloading information, while a secondary restriction is requiring a formal request before accessing data.

Surprisingly, the survey showed that the degree of restriction decreases as the size of the company increases. In companies with over $3 billion in sales, 40% have no formal restrictions on accessing resident data. When questioned about their plans, many of these companies said they felt compelled to impose stronger restrictions. "Controls for these linkages are likely to increase in the future," the survey said.

The survey drew responses from 323 treasury offices and 174 MIS managers after telephone contact with 960 members of the Fortune 1,000 companies.

"It was a very indicative sample for the large corporate user," Sprague said.

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But the U.S. Government isn't the only customer with tough networking problems that BBN has helped to solve. Numerous major corporations, among them Wang, Weyerhaeuser, and MasterCard, not to mention European giants like England's National Westminster Bank and Italy's largest corporation, ENI, have also found the answers they were looking for from us. Each came to BBN with a unique networking problem—from integrated voice/data transmission to electronic mail to credit authorization—and each came away with a unique networking solution.

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SECOND IN A THREE-PART SERIES

The divestiture of AT&T has required communications managers to shoulder more responsibilities and broaden their knowledge of things like the national communications system and new technologies. But the burden is often too much for any one individual. More and better trained people are necessary to run the communications system of a Fortune 500 company in a cost-effective way.

How does the communications manager or director find and retain the best possible talent for the job? Some experience-tested methods are listed below.

Motivation is given high prominence in many management courses as a way to retain and increase productivity levels.

Experience shows that individuals are either self-motivated or not and that there is only so much or so little that can be done to change that. Behavior modification may work in an environment where employees stay with a firm for a long time but may not in an industry where the average employment cycle is two years.

Because of this, communications managers should spend their time searching for people who are already self-motivated and have a focused view of where they want to be rather than

See GOOD on page 38

Minoli is a member of the Bell Communications Research (Bellcore) network architecture planning group. Opinions in this column are strictly the author's and do not represent the view of Bellcore.

GM gears up Saginaw plant

By Bob Wallace
Special to CW

General Motors Corp.'s Factory of the Future program, an ambitious project launched three years ago, will reach fruition when the automaker's Saginaw, Mich., Steering Gear Plant begins initial operations in January.

The 60,000-sq-ft plant will showcase a totally integrated engineering and manufacturing system for the design and production of front-wheel-drive axles.

The Saginaw plant's basic manufacturing system will consist of 24 manufacturing cells. Specific manufacturing functions are performed in each cell. Some of the cells will be used to produce parts of the steering gear assembly. These pieces, along with others purchased outside the plant, will be assembled into completed front-wheel-drive axles in an assembly system that consists of 12 assembly stations.

The backbone network used to interconnect the manufacturing cells is a broadband, coaxial cable local-area network that conforms to the IEEE 802.4 standard

See GM on page 37

MAP changes spark product updates

By Paul Korzeniowski

DETROIT — Vendors of factory automation products are busy updating their products to conform with architectural changes in the Manufacturing Automation Protocol (MAP), a factory automation standard promulgated by General Motors Corp.

One difference network vendors are moving to accommodate in Release 2.1 of MAP is the introduction of carrier-band networks. Carrier-band nets are a recent development in the evolution of MAP. Much of MAP's early standardization efforts have centered around the idea of using a single factorywide broadband network, actually an IEEE 802.4-compatible token-passing bus network.

MAP Release 2.1 calls for use of a 10M bit/sec. IEEE 802.4-compatible network as a factorywide backbone net supplemented by carrier-band tributary subnetworks used to transfer data among small work groups called cells.

The carrier-band networks also con-

See MAP on page 37

FCC clarifies $25 surcharge ruling

WASHINGTON, D.C. — The Federal Communications Commission decided recently that local-exchange telephone companies must repay customers the $25 monthly line surcharge on private lines terminating in telephone switches that cannot reroute this traffic into a local exchange.

Private branch exchange systems that prevent private lines from "leaking" long-distance calls into the local exchange as local telephone calls — thereby avoiding an access charge — are exempt from the $25-per-line monthly fee under FCC rules. However, some carriers have levied these charges anyway.

To recover the surcharge, customers will be required to show that an exemption request was filed with the local telephone company..

The FCC issued its clarification of the $25 monthly surcharge in response to petitions from users. They charged that local telephone companies had collected unreasonable amounts from them to recover lost access-charge revenue when the FCC had expressly exempted PBX systems blocking private lines from connecting to local lines from the surcharge.

— **Bryan Wilkins**

INSIDE

Fibertrak has accumulated enough orders to justify the construction of a nationwide fiber-optic network, but it is unclear if its founding companies will go ahead with the build/34

NEW THIS WEEK

- A hand-held terminal and communciations system bows from Motorola and Pathway Design
- Contel Networks and Systems expands its Mind Pricer on-line circuit pricing system
- For more on these and other new products, see pp. 111-149.

INSTANT ANALYSIS

"The design documentation for a 747 weighs as much as the plane itself."

— **Laura Conigliaro of Prudential Bache, at Autofact '85**

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS

Firm's search for a network leads to distributed data switch

Links tools, users from three sites

By Bill Bindewald
Special to CW

Intel Corp. learned some interesting lessons when it set out to procure a network for its engineering group in Santa Clara, Calif. Chief among these lessons was the following: Define your network requirements and then find a solution — instead of trying to fit your requirements to a given network. Bill Bindewald, Intel senior engineer, data automation group supervisor, relates the experience.

Being in charge of a networking project can be an overwhelming task unless critical parameters are quickly defined. Our assignment was to come up with a cost-effective network that could provide access to multiple computers and link other shared resources to users in three buildings.

Although the engineering group had two Digital Equipment Corp. VAX computers in two different buildings, CPU-to-CPU communications was not a major design objective since it was already provided through DEC's Decnet. Users wanted access to computers and shared peripherals such as laser printers.

One of the first options assessed was a statistical multiplexer network. At approximately $400 per port, the cost would have been well within budget, but connection costs — as well as a lack of flexibility for additions and changes — would have substantially added to the total.

An Ethernet solution, on the other hand, presented a degree of complexity and cost that extended beyond our needs and resources.

Distance limitations

Our search eventually led us to a data-switched network. An investigation of available products showed that, although a data switch was a viable alternative, the distance limitations of most equipment cable rendered them impractical. Terminal cables, for example, would have to run all the way back to a centralized switch.

This led to the decision to go with a new distributed data switch approach pioneered by Metapath, Inc. of Foster City, Calif.

The system that was eventually implemented at Intel's facility consisted of four networks bridged together with 9.6K bit/sec. leased lines.

A data switch with 80 ports, capable of connecting 64 serial devices operating at 9.6K bit/sec. and 16 parallel interface devices running at 45K bit/sec., was installed at a central location.

It was linked to other central data switches and other distributed data switches, each of which had five to 20 ports.

Up to 1,125 ports can be incorporated in a single network over a distance of one mile, and by bridging networks, we were able to extend the network to cover three buildings. Cables from the terminals or other peripherals had to reach only as far as the nearest distributed data switch.

We connected approximately 70 devices to the networks, including a mix of terminals, personal computers, printers and the two VAX-11/780 systems.

Data is transmitted at 2M bit/sec., and, due to the nonblocking architecture of the system, each port can be simultaneously active at maximum transmission rates.

Once we fully installed the network, we implemented a network management system. This system runs on a personal computer under Microsoft Corp.'s MS-DOS and is used to configure ports in the network, a task which was previously performed manually at each station. The software also acts as a network monitor, yielding usage statistics and defining security access.

We were able to perform a substantial part of the installation work as the network grew. The relative ease of installation enables us to implement changes as users are added or site requirements change.

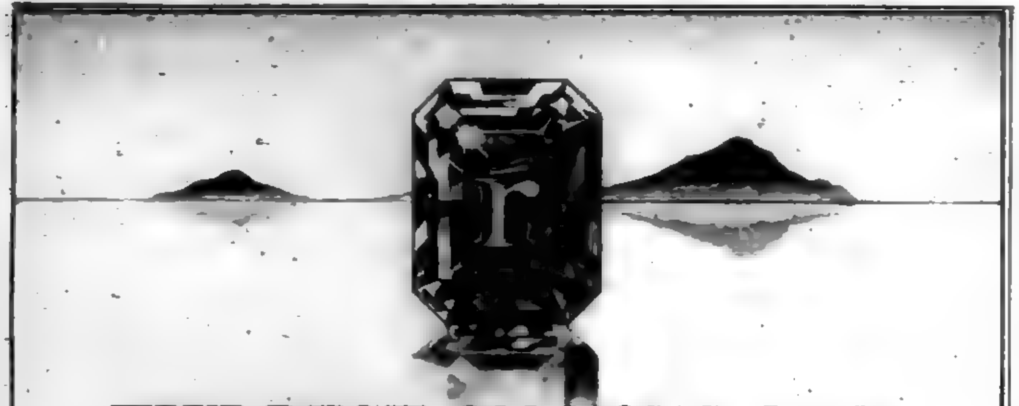
No data degradation

User acceptance and satisfaction have been high due to the ease of operation and fast response, with virtually no data degradation. Since each data switch is controlled by the microprocessor, bus operation is not affected by the failure of any individual switch, and failed connections can be rerouted to a predesignated alternate device.

Earlier this year, the engineering group moved to Intel's new facility in Folsom, Calif. Armed with the experience gained in implementing the Santa Clara networks, new networks were installed within a period of about eight weeks.

It may be argued that in spite of all the connectivity achieved in this application, a data-switched network is not a network in the conventional sense of the word. However, being constrained by convention in an area that is still evolving ignores the real objective: solving operational requirements.

Users connected to our data-switched networks in Folsom may now access any one of three computers, share expensive laser printers and modems and communicate with each other. In essense, this level of functionality is all that is required.



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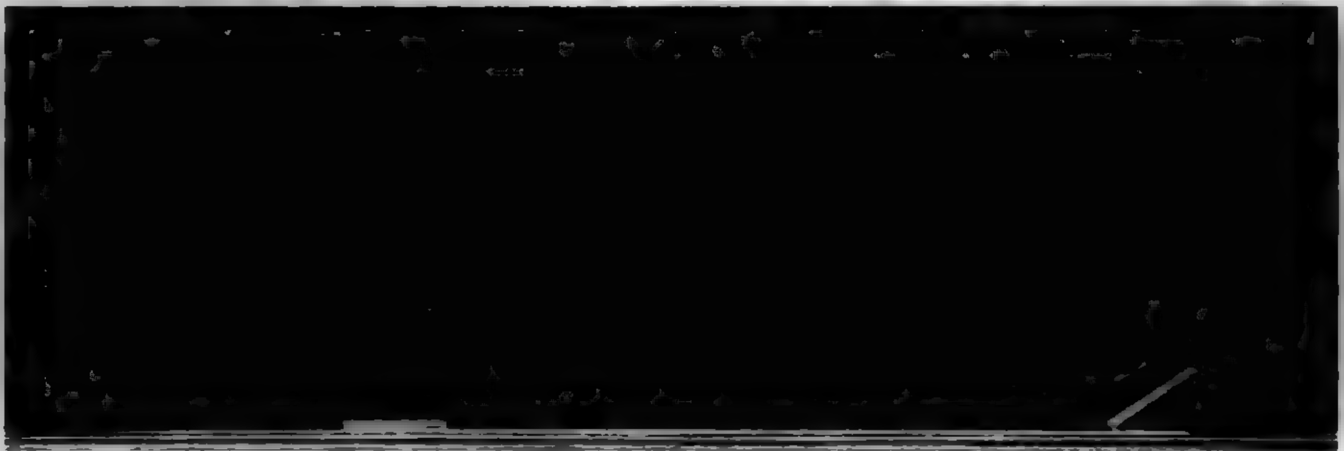

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But let no one doubt our resolve.

CONTROL DATA

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Railroad companies' fiber-optic net venture on the right track

By John Dix

After repeated delays, Fibertrak, located in Reston, Va., has reportedly accumulated enough orders to justify the construction of a nationwide fiber-optic network. The decision to build is now before the two railroad companies that founded the joint venture in 1984.

Fibertrak was formed by Norfolk Southern Corp. and Santa Fe Southern Pacific Corp. to plan the construction of a national fiber-optic network along the track beds of affiliated railroads. Unlike most of the other planned fiber-optic nets [CW, Oct. 28], Fibertrak intends to lease its capacity strictly to other carriers, making it a so-called carrier's carrier.

To ensure that the plan was viable, Fibertrak set out to "obtain a backlog of orders that would give us sufficient encouragement to build a system," according to company President Gus Grant. The critical mass of that back order — $2 billion worth of 10-year carrier contracts — was recently achieved.

The planned network will extend 7,500 miles and be within reach of roughly 80% of the population, Grant said. Each route will have 11 active single-mode fibers and 11 spares. The all-digital system will operate at 565M bit/sec. and be segmented into 45M bit/sec. increments, each providing capacity for 672 voice circuits.

Construction of Fibertrak was originally slated to begin in January 1985, with nearly 3,000 miles completed by this month. The entire network was scheduled to be completed in roughly 36 months, or by the end of 1987.

Norfolk Southern and Santa Fe Southern Pacific — which each own 50% of Fibertrak — are still deliberating over whether to proceed to build the net. Grant, however, is confident, saying he believes the green light will come and construction will begin within three months.

A number of things differentiate Fibertrak from competitors such as Lightnet, the joint venture of Southern New England Telephone Co. in Connecticut, and CSX Corp., a railroad company headquartered in Richmond, Va. For one, some Fibertrak competitors lease only dark fiber; they do not provide the lasers and electronics needed to put the signal on the cable.

Besides providing all of the electronics required, Grant says Fibertrak will have a sophisticated control system for network management and control. Grant also claimed Fibertrak will have the only network shielded against electromagnetic pulse, a safeguard that would ensure continued transmission even in the most hazardous operating conditions.

Fibertrak's main carrier attraction may be, however, its low price. Grant claimed his company has the lowest costs in the industry and hence, the lowest rates. These rates are based on actual proposed construction contracts, Grant said.

While Fibertrak has no intention of leasing capacity to end users, they will be the ultimate beneficiaries of carriers that use fiber optics. Many carriers that lease facilities from the so-called carrier's carriers turn around and make that capacity available to users. Grant would not divulge which carriers have agreed to lease Fibertrak capacity.

Tymstar satellite service launched

By Paul Korzeniowski

SAN JOSE, Calif. — Tymnet/McDonnell Douglas Network Systems Co. plans to supplement its packet-switched network services with a satellite service that will use small-dish antennas.

The company has scheduled a spring 1986 announcement for Tymstar, making Tymnet the newest player in the small-dish antenna satellite transmission game, an emerging market that includes competitors such as M/A Comm, Inc. and Equatorial Communications Co.

Tymstar will differ from these established carriers because it will supply protocol conversion capabilities that the other systems lack, according to Hal Kroeger, national representative at Tymnet. The initial announcement should support asynchronous, IBM Binary Synchronous Communications, IBM System Network Architecture and Sperry Corp.'s UTS 4000 host protocols. Terminal protocols will include all of the above plus IBM RJE protocol.

"The current satellite vendors have concentrated on transmission," Kroeger noted. "Since we come from a networking background, we will focus on networking issues."

The service will consist of a master hub facility and small earth stations constructed by a McDonnell Douglas subsidiary. The company will use GTE Satellite Corp.'s G Star satellite.

Skystar will be offered in conjunction with or as a replacement of Tymnet packet services. "Tymnet tends to support lower transmission speeds such as 19.2K bit/sec.," Kroeger stated. "Tymstar will work with transmission at speeds up to [1.54M bit/sec.] T1 speeds."

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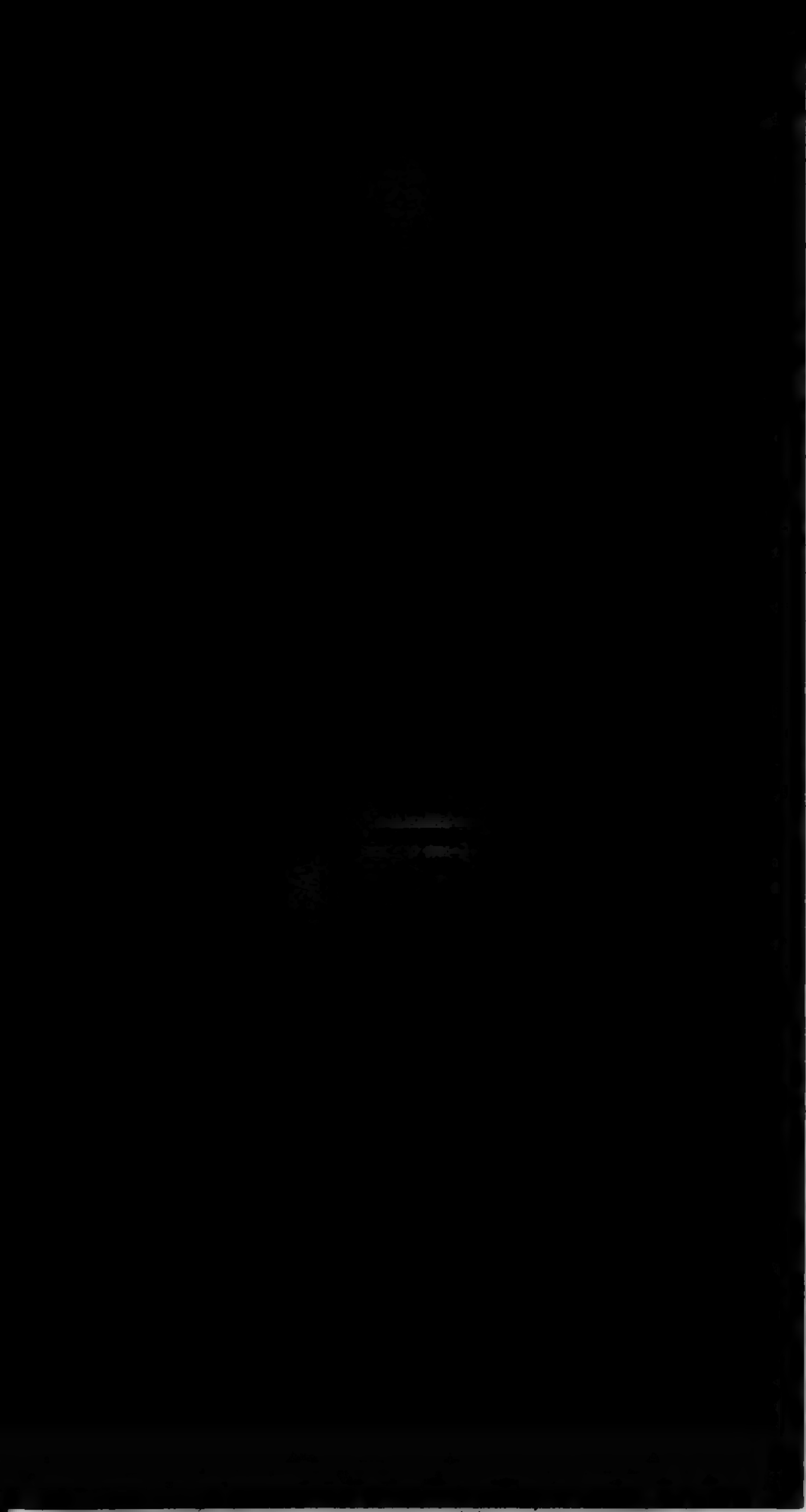

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Ungermann-Bass unveils repeater for Ethernet-compatible nets

Tool permits various transmission media to be interconnected

Ungermann-Bass, Inc. rounded out its line of internetwork products recently with the introduction of a network repeater for Ethernet-compatible local networks that use various higher level protocols and different types of transmission media.

The Santa Clara, Calif., company's Buffered Repeater can be used to interconnect up to 16 independent 2,800-meter Ethernet network segments to construct an end-to-end network reaching 27 miles.

The repeater can extend the geographical reach of Ethernet-compatible networks supporting any of the following higher level protocols: Digital Equipment Corp.'s Decnet; the Department of Defense's TCP/IP; Xerox Corp.'s Xerox Network Systems protocol; and comparable layers of the International Standard Organization's seven-layer network architecture model.

Media can differ

While the type of higher level protocols supported cannot vary from one net segment to the next, the media used in each segment can differ. The Buffered Repeater enables baseband, thin coaxial cable, optical-fiber and broadband systems to be interconnected.

To minimize packet collisions — which increase as Ethernet-type networks are extended and more devices are added — the Buffered Repeater filters out invalid or fragmented packets between net segments. This limits the need to retransmit packets and helps network performance, the company reported.

The Buffered Repeater is available in two versions: the baseband-to-baseband version is $3,000; the baseband-to-broadband version, including internal modem, is $3,800. Both units are available now.

Ungermann-Bass has also announced a Network Transceiver that is streamlined and 30% less expensive than previous transceivers.

Transceivers tap Ethernet

Transceivers provide the actual tap to the Ethernet cable, putting signals from intelligent Net/One Network Interface Units up on the network.

The Network Transceiver, which costs $275, is said to be slim enough to fit in restricted 4-in. cable trays and conduits. The product is switch selectable for operation with Version 2 of Ethernet or the IEEE 802.3 standard. It is available 30 days after receipt of order.

— John Dix

Spartacus tool out for MVS

LOWELL, Mass. — Spartacus Computers, Inc. has announced a version of its Knet software and K200 Ethernet Control Unit for IBM MVS-based hosts, enabling these CPUs to communicate over Ethernet with other types of machines that support the Department of Defense's TCP/IP.

TCP/IP was developed for the DOD and documented as a standard for federal communications networks in 1980. It specifies how connections between devices are established and provides for the accurate delivery of data between devices.

Knet MVS extends the 4-year-old company's Knet and K-Link product lines, which include similar offerings for the IBM VM operating system.

Like Knet VM, Knet MVS is a software applications package that supports the TCP/IP protocol and works in conjunction with the K200 Ethernet Control Unit, a device that attaches to a block multiplexed channel of an IBM host and provides a connection to Ethernet.

"We've chosen to implement the TCP/IP protocol because it is offered by over 60 vendors, including [Amdahl Corp.], [Apollo Computer, Inc.] Digital Equipment Corp., [Sun Microsystems, Inc.], Masscomp, NCR Corp. and a host of others," said company President James Atkins.

While adherence to TCP/IP takes care of lower level communications incompatibilities between these types of processors, end users must use TCP/IP applications to make use of the protocol. Such applications include the TCP/IP file transfer protocol, trivial file transfer protocol, telnet virtual terminal protocol and simple mail transfer protocol.

Scheduled for first-quarter 1986 availability, Knet/K200 prices for MVS systems start at $40,500.

Spartacus also announced the K310 T1/Ethernet system, a device that enables an IBM mainframe to link to a remote Ethernet network via a T1 1.54M bit/sec. digital communications facility.

The K310 is slated for availability in the first quarter of 1986 for use with both the Knet MVS and Knet VM systems, supporting TCP/IP and similar protocols from Xerox Corp.

— John Dix

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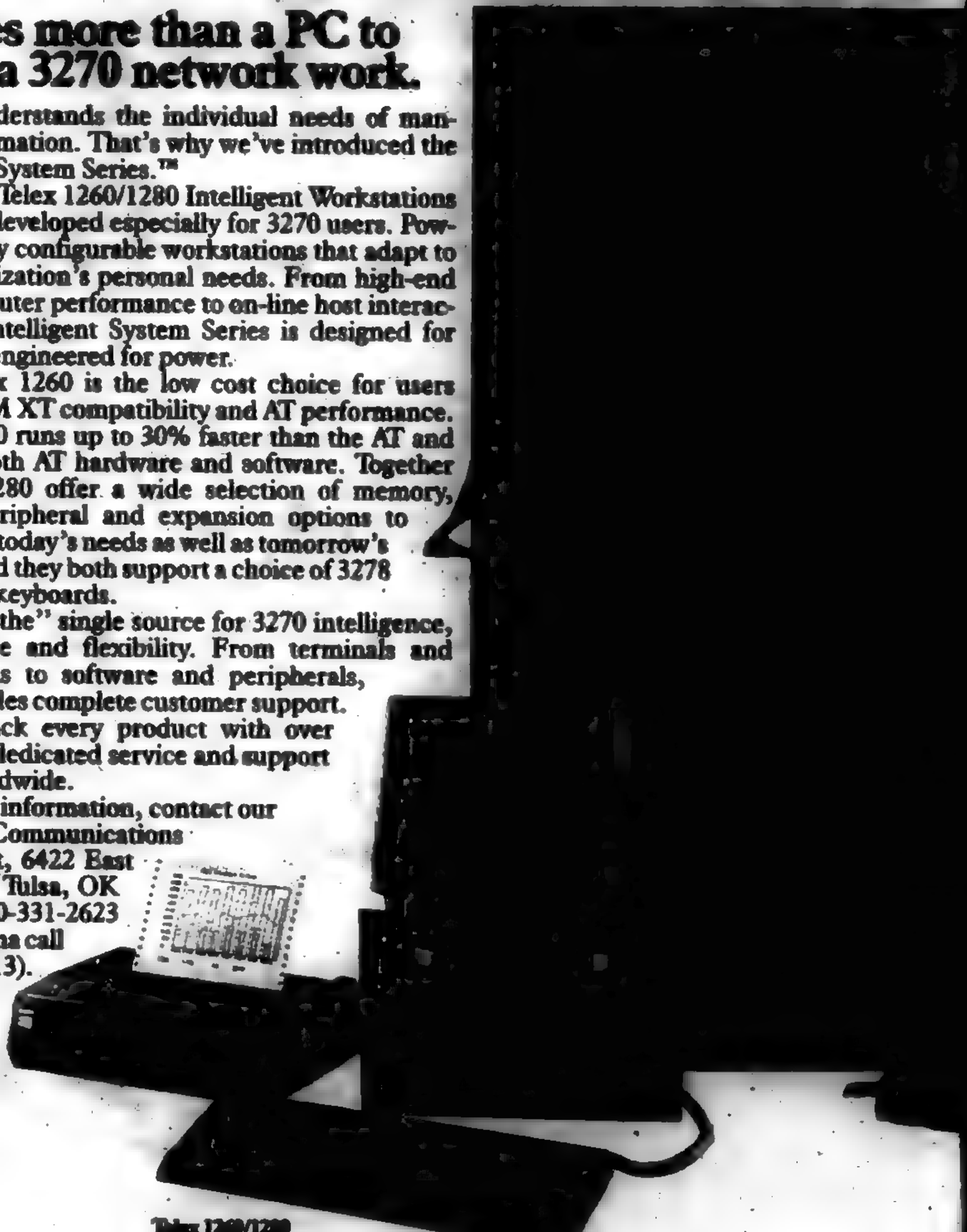

Telex 1260/1280
Intelligent Workstations

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GM gears up Saginaw plant

From page 31

for 5M bit/sec. token bus networks.

Bob Mowers, program manager with the Factory of the Future project and a member of GM's advanced engineering staff, said the factory net systems consist of four levels.

■ Device controller level. The device controller comprises the lowest level of control in the plant's hierarchical networking scheme. A device controller is attached to each piece of equipment involved in the manufacturing process, whether it is a machine tool, robot, guided vehicle or simple gauge. Each vendor provides its own device controllers.

■ Cell controller level. These devices control manufacturing devices within a cell. One cell controller, for example, may command a series of welding robots. A cell controller is a combination of a programmable controller and a processing unit. Maxitron Corp. of Corte Madera, Calif., provides the cell controllers for the Saginaw plant. The base Maxitron cell controller features four microprocessors: one Intel Corp. 8086, one Intel 8031 and a pair of proprietary processing units.

■ Factory control system level. This system acts as the heart of the plant network as it oversees the operation of each of the 24 manufacturing cells, the plant's automated guided vehicle system, the storage and retrieval system and the assembly system. It assigns work to all of the manufacturing cells and assembly stations. The system also keeps track of parts inventory levels at all phases of the operation.

"The factory control system monitors the work status of all equipment on the plant system and schedules maintenance where necessary," Mowers explained.

According to Mowers, the factory control system consists of processing equipment provided by Stratus Computer, Inc., located in Marlboro, Mass. Spokeswoman Anne Pheasant said that Stratus supplied two XA600 processors and an FT200, a smaller applications development processing unit, to the Saginaw facility. This level of plant control is connected to several divisional networks that deal with materials management, accounting, ordering and sales.

Mowers said the factory control system will serve as the repository of all individual device programs. "Whenever the factory is changed over from the production of one part to another, [the factory control system] is responsible for downloading the device programs to the individual cells." The processors' other duties include generating financial data and information on production level and quality performance.

■ Divisional systems level. This highest level of control is connected to the factory control system. Mowers said the factory control system was hard-wired to divisional networks where necessary.

Concord Data Systems, Inc., of Waltham, Mass., provided the terminal interface modules. These devices enable color graphics terminals to connect to the broadband network.

"There are what are called man-machine interfaces, which are color graphics CRTs that allow people to interface with the factory control system and the cell control system," Mowers explained.

After the Saginaw facility becomes fully functional in February, the plant will become a learning laboratory for GM personnel and interested parties from universities and other manufacturers.

Wallace is a staff writer for On Communications, *a sister publication of* Computerworld.

MAP changes; products update

From page 31

form to the IEEE 802.4 standard but operate at 5M bit/sec. instead of 10M bit/sec. Unlike the backbone facility, carrier-band nets use only one frequency channel on the broadband cable, which is accessed using token passing.

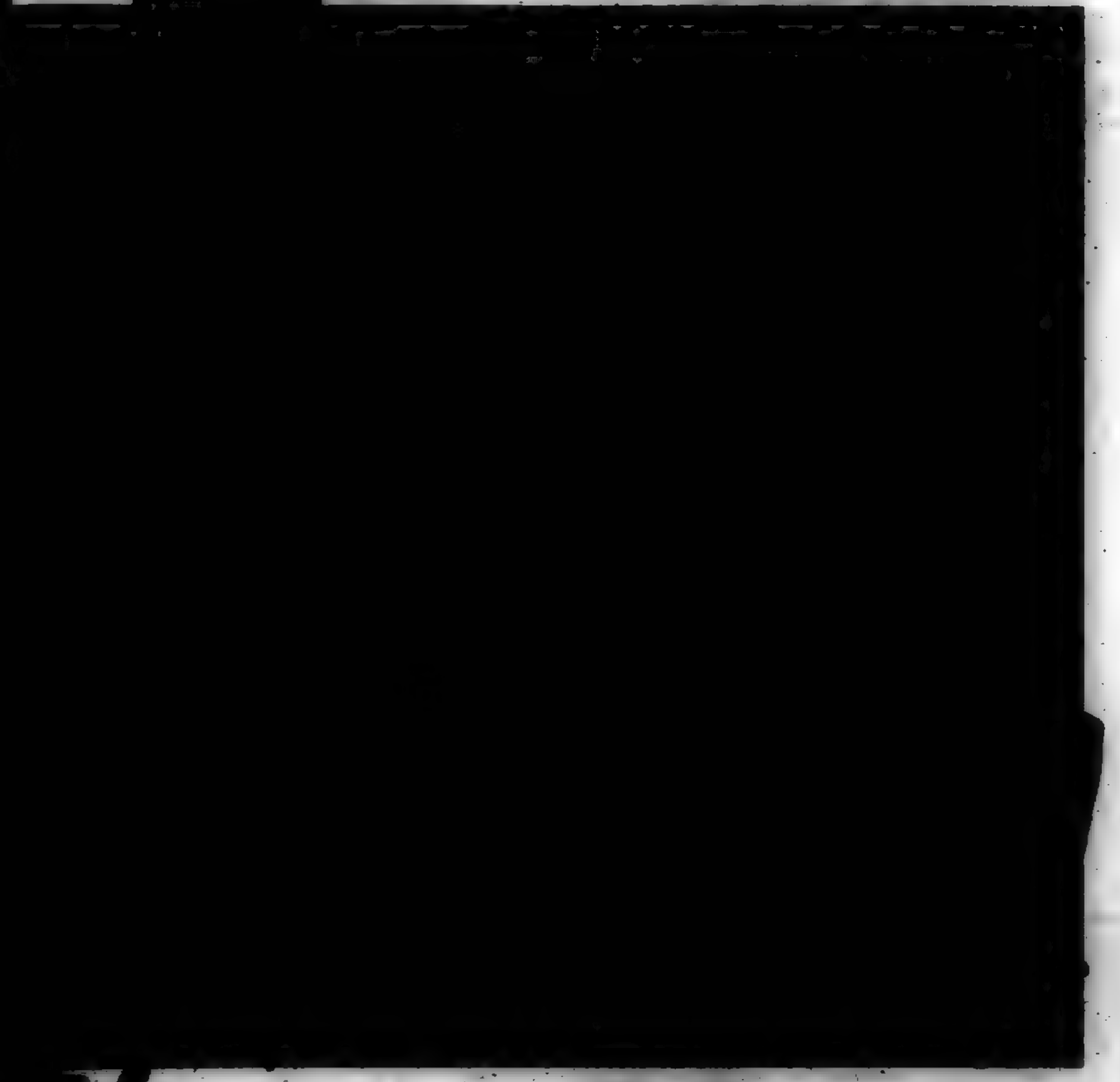
Because use of carrier-band nets is relegated to a small area often containing similar types of devices, the network's Enhanced Performance Architecture bypasses do without layers three, four, five and six of MAP's seven-layered network architecture. This speeds response time and provides for the real-time operating environment required by robots, which need msec responses.

Concord Data Systems, Inc. of Waltham, Mass., introduced carrier-band products at last week's Autofact show in Detroit. The company featured a 5M bit/sec. modem, a token scope network analyzer and a bridge for use between carrier-band and broadband networks.

Concord Data said the market for carrier-band network connections, although relatively new, will eventually supply the company with a higher percentage of revenue than broadband nets. In a Concord Data scenario, a plant may have 10-20 areas with broadband networks. Each area may have as many as 16 cells, each with 20 devices for a total of up to 6,000 carrier-band connections.

The firm also unveiled broadband products, including a 10M bit/sec. Mapserver. The Mapserver complies with MAP 2.1 standards for the first four layers of the seven-layer MAP model. The host attaches to Mapserver by an RS-422 or RS-449 interface at speeds up to 230K bit/sec.

CE AT WORK



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TELEX COMPUTER PRODUCTS, INC.

Good staff hard to find, keep

From page 31

attempting to instill a virtue that may not be transplantable.

With technology moving at such a fast pace and with a business climate that requires constant realignment, the communications manager needs a dynamic, self-motivated and creative staff. Look for these qualities when interviewing.

It is very expensive for an organization to have high turnover and to restaff. If search agencies are used, the fee can be as high as 30% of the base salary. A single Sunday paper advertisement may cost $25,000. Hundreds of hours are invested in the screening and interview process, all of which take away time from real business. Ultimately, several dozen people may be interviewed before the right individual is found.

Another cost to consider is that of transferring responsibilities. Departing employees are not likely to work too hard for the last few weeks, and it may take new employees several weeks before they are trained and ready to take over, resulting in lost time. Add to this the resources drained when other employees are used to coach newcomers.

High turnover also takes its toll in long-term projects that suffer in quality due to the lack of continuity. Often, needed documentation is lost or, even if handed over, not used efficiently by the new recipient because of lack of familiarity.

It is for these and other reasons that it is very important to create the right, stable conditions required to retain good people while avoiding unproductive inefficiencies at the same time.

Good people sometimes leave an organization because their raises were a few percentage points less than expected, equalling perhaps $500 to $1,000 a year. One such departure required rehiring someone at an estimated expense of $60,000, including agencies' fees, manager time to interview 20 candidates, cost of securing new military clearance plus two months of departure/training costs. It would take a 60-year career to make up the cost difference between the two alternatives.

If 10 people per year left an organization — at the costs outlined — the organizations incurs a half a million dollars a year in expenditure.

A fairly well developed theory of "situational leadership" is available to the manager contemplating a methodological approach to human resource management. Situational leadership envisions a management-style matrix that takes into account the maturity level of individuals.

An entry-level professional may be initially motivated by monetary rewards. A middle-level professional may be motivated by prospective staff size. A high-level professional may be fairly insensitive to nominal monetary differences but may value the potential exposure to executive management.

Situational leadership foresees four phases. Phase 1 for low maturity data communications professionals involves a lot of "telling" — high task and low relationship with the leader. Phase 2 for moderately mature professionals is a "selling" phase, with high task and high relationship with the leader. Phase 3, "participating," consists of low task and high relationship with the leader. Finally, for highly mature individuals there is a "delegating" phase, with low relationship with the leader and low task.

Notes from the news network

Today, only 15% of the devices on a factory floor communicate with other devices, according to Paul Morawski, executive director of the Computer and Automated Systems Association of the Society of Manufacturing Engineers (SME). Morawski also noted that in March 1984, there were 60 members of the SME's MAP user group. Today, there are 1,600 members, with new chapters in Canada and Europe.

■

Alan Kuritsky, product manager for software defined networks at AT&T Communications, said a Fortune 100 company was testing its Software Defined Network service, which was recently approved by the Federal Communications Commission. More than 20 other large companies had expressed interest in the service, Kuritsky claimed.

■

Patrick Zoeller, senior product manager at Wang Laboratories, estimated that there are more than 900 Wangnet and Fastlan installations. Approximately 30 new customers are being added each month.

■

Pacific Bell Telephone Co. in San Francisco late last month began testing a central office-based local-area network that company spokesmen say will be a prime competitor for private networks.

The system offers customers switched voice and data access at speeds up to 9.6K bit/sec., from multiple locations, over existing telephone wiring.

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SYSTEMS & PERIPHERALS

HARD TALK
Alan Paller

Strategy for the future

Cooperative processing is a new term being used at IBM headquarters and among the more advanced IBM users. Although it sounds to some like the name of a fraternity for computer operators, it actually is a strategy for the future of computing.

Cooperative processing has a difficult vocabulary, including terms like LU6.2, but it really is not very complicated. Cooperative processing occurs whenever two separate computers perform part of a single function. Many experts prevent intelligent terminals and intelligent hard-copy peripherals from being perceived as processors by defining a processor as something that runs an operating system like AT&T Unix, Digital Equipment Corp. VMS, IBM MVS and so on.

The best known cooperative process today is the use of separate computers as file servers. In this case, a person at one computer requests a file that is stored on a disk connected to a second computer. A message is sent automatically to the second computer, which gets the file and sends it back to the first computer. But cooperative processing had been in use in the graphics field for years before file servers became well understood.

For example, users on one computer at Amoco Oil Co. create charts on IBM 3279 graphics terminals and then ask for hard copies of the charts. The chart

See STRATEGY on page 45

Paller is president of AUI Data Graphics, Inc., an Arlington, Va., education and consulting firm specializing in graphics.

IBM 8100 draws praise, fire

Despite rumors of replacement, users' reactions still strong

By Donna Raimondi

The IBM 8100 distributed processing system, released by Big Blue in 1978, has elicited varied responses from its owners.

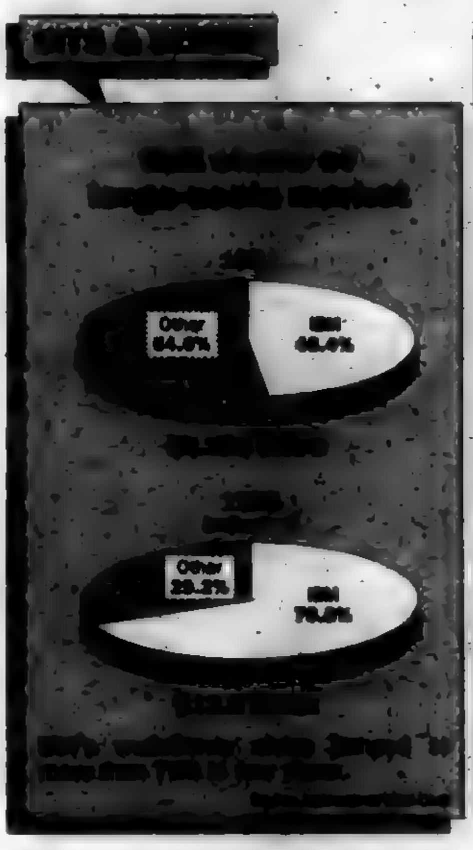
Today, amid speculation by customers and industry observers that the 8100 is doomed to be supplanted by the IBM System/36 or otherwise dropped, the owners' emotions remain strong.

For example, Wright Line in Worcester, Mass., installed a stand-alone 8100 system in 1981 with the intention of having it do approximately 90% of the company's word processing, said Jim Young, director of information management systems. While Young claimed that the 8100 performs well and accomplishes the tasks set out for it, he is not happy with some aspects of 8100 ownership.

At the time the 8100 came on board, Wright Line's data processing center consisted of two IBM mainframes: a 4381 for its production work and a 4341 for backup and development work. "At the time, we saw an important need to plan the linkup of word processing and data processing into a joint network," Young said.

IBM did not offer easy networking capabilities for the 8100 at purchase time, but stated that those capabilities would be available in the near future, Young said. That still has not happened. The machine can be networked but not without a lot of inconvenience and expense that make payback unlikely, he said.

See IBM on page 43



Altos systems, software debut

By Peggy Watt

SAN JOSE, Calif. — Altos Computer Systems, Inc. has announced two multiuser systems based on Intel Corp.'s 80286 microprocessor and a line of new and enhanced business software to go with new and old systems, all promised for shipment this month.

The Altos 886, an eight-user system, and the Altos 1086, a 10-user system, are compatible with existing Altos products and are the first mid-range Altos systems to use the 80286 chip, which is also used on the 20-user Altos 2086, according to an Altos spokesman. Both can be used as multiuser microcomputers under Microsoft Corp.'s Xenix or with the Altos Worknet local-area network or as file servers for MS-DOS-based local-area networks. They also have read and write diskettes compatible with the IBM Personal Computer AT under Xenix.

Like Altos's existing offerings, both systems will compete with microcomputer

See ALTOS on page 42

INSIDE

Burroughs begins shipping its V series/40

Flexible Computer adds two rack-mountable computers to its Flex/32 line/41

NEW THIS WEEK

- Tandem announces disk & tape storage subsystems
- Project Software and Development introduces a turnkey project management system
- Burroughs shows a laser printer

For more on these and other new products, see pp. 121-140.

INSTANT ANALYSIS

"I don't think we are anywhere close, but we do have to stay on top of these technologies."
— Charles Davis, Deloitte, Haskins & Sells, on the state of AI in corporate DP

Running interference: Shield your data from electronic pollution

DP manager must ensure proper protection

By Mike Caruso
Special to CW

Recently, more and more data processing managers have reported problems with protecting their DP operations and proprietary information.

The reason is that the level of electromagnetic interference that can disrupt operations or spoil vital data is on the rise, as is electronic espionage. The problem is by no means limited to secret government or military operations.

It is up to the manager of a company's DP operations to make sure that a facility is protected against electromagnetic interference. The best remedy is to shield the entire DP operation from electronic pollution. The question is, How can this be done properly?

This is not something one can leave up to an architect or the facilities people. They do not necessarily know everything about designing something as specialized as radio frequency shielding for a DP operations room.

Since performance of the operation is very much at stake, the manager should get involved in the design of the room. In particular, the DP manager should at least take part in the process of specifying protection levels and access control.

DP operations need shielding but not for the reason it was invented, which was to protect classified government operations. Today, the main reason for shielding a commercial DP operation is benign electromagnetic interference.

With the proliferation of electronic equipment, one never knows what new electronic apparatus — new emitters — will wind up across the hall from the DP operations or, for that matter, on the other side of the wall.

Moreover, the operating frequencies of much of today's electronic equipment in the microwave range can easily pass through minimal shielding. Low-cost, mesh-type or foil shielding, for example, may have been adequate against low frequencies but can be useless against today's microwave frequencies.

The following are some tips on getting the proper radio frequency shielding:

■ Insist on solid metal shielding. The manager needs a room that creates a continuous conductive cocoon around DP operations. This works because radio waves are attenuated by metal.

■ Install radio frequency shielding when the DP room is built, prior to the start-up of DP operations. Naturally, it is easier to install radio frequency shielding in the walls of a building that is under construction rather than a completed facility. However, it is possible to retrofit radio frequency shielding into an existing building. One warning, though — a company should be prepared to endure a four- to five-month inconve-

See SHIELD on page 42

Caruso is manager of security engineering for Keene Ray Proof of Norwalk, Conn., a manufacturer of radio-frequency-shielded chambers.

Pixel adds two supermicros to product line

Pixel Systems, Inc. of Woburn, Mass., has announced two additions to its line of supermicrocomputers, one at the high end and one at the low end of the product line.

The P80/20 is said to be a general-purpose, multiuser, multitasking system based on a 12.5-MHz Motorola, Inc. 68020 microprocessor.

The company claims that the processor performs three million instructions per second and includes two parallel and eight serial ports, with an optional 16-port serial card available and a 32-port optional card scheduled for release in the first quarter of 1986.

Allows zero-wait-state access

The P80/20 memory management unit reportedly allows zero-wait-state access to all memory modules through use of a two-level management scheme with page-modified and page-referenced bits.

The system, available with up to 16M bytes of memory, includes Pixel's implementation of AT&T Unix System V and includes virtual memory hardware that will be supported when Pixel releases Unix System V Release 2, Version 2.

The P80/20 has a starting list price of $23,500.

The Pixel System 4 is a four-user supermicro using an 8-MHz Motorola 68000 microprocessor and featuring 500K bytes of random-access memory, 40M bytes of hard-disk storage, eight serial ports, one parallel port, a floppy disk drive, two terminals and Unix System V, according to the vendor.

It costs $5,975.

Prices slashed as DEC phases out VT100 VDT

In keeping with its intention to drop the venerable VT100 VDT from its product line, Digital Equipment Corp., Maynard, Mass., has slashed prices by up to 54%, effective immediately.

The VT100 terminal price has been chopped from $1,945 to $895, the company said. Both the VT102 and the VT131 displays now cost $995, down from $1,595 and $1,695, respectively. The VT1XX-AB advance video option lists for $95, reduced from $180.

DEC will continue to support users of the VT100 line of products.

Since the VT200 family was introduced in 1983, market demand has shifted from the VT100 line to the more advanced VT200 terminal family, said Martin Toomey, terminals business unit marketing manager. The older display, introduced in 1978, spawned dozens of imitations from competing manufacturers [CW, Oct. 7].

Burroughs pushes V series despite snags

By Donna Raimondi

DETROIT — Burroughs Corp. has started volume shipments of its V 340 and V 380 medium-scale mainframe systems that will run under the company's MCPIX operating system.

The V series is being shipped despite problems that Burroughs is having delivering MCPIX Version 1 — problems that at least one beta test site user reported were corrected by an interim solution.

The systems, announced in March, are the first entries in Burroughs' V series, which will replace the company's B2000, B3000 and B4000 mainframes with an extended system architecture and increased memory capacity. Along with the systems, the company is shipping a feature called Quik Disk that allows users to designate a portion of the main memory as disk storage.

The Quik Disk program is an interim solution to the problems Burroughs is having getting its MCPIX 1 operating system ready, said beta test site user Peggy Price of Mt. Sinai Medical Center in Miami Beach. The feature is provided free, and it allows often-used files to be stored in memory for faster access. Price said she expected the operating system to be ready in first-quarter 1986, but a Burroughs spokesman said the earliest delivery date for the software will be June 1986.

Quik Disk allowed a batch program of more than 700,000 I/Os to run in two hours on Mt. Sinai's V 380, as opposed to the eight hours it took to run on the B4900, Price said. The medical center installed the B4900 with 5M bytes of main memory last August and has upgraded to a 20M-byte V 380. Without the Quik Disk, users would not be able to tap the full 20M bytes of main memory.

The purchase price for a V 340 with 10M bytes of main memory is $390,400, and the V 380 with the same memory costs $702,600. Examples of upgrade prices are $85,000 to go from a B4925 to a V 340 or from a B4955 to a V 380 and $395,000 to jump from a B4925 to a V 380.

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Flexible Computer adds two low-end units to Flex/32 line

By Donna Raimondi

DALLAS — Two rack-mountable low-end computers have joined Flexible Computer Corp.'s Flex/32 line of multiprocessors.

The Series 600 and Series 1200 are compatible with Flexible's Series 2000, 3000 and 6000 Flex/32 systems, the vendor said. The new computers are packaged in 19-in. rack-mountable card cages for embedding into desk-high consoles and systems.

The low-end 600 and 1200 series are said to allow systems integrators to develop parallel systems for applications that require embedded or desk-high cabinetry where processing power, memory and I/O bandwidth can be added as needed.

Software for the systems includes AT&T's Unix System V; a concurrency simulator to test parallel applications; Flexible's MMOS operating system; high-level concurrent languages such as Flexible's Concurrent C and Concurrent Fortran and Ada.

The Series 600 can contain as many as four 32-bit superminicomputers. Each of those computers comes with its own operating systems, 16- or 32-bit Motorola, Inc. VMEbus I/O channels and from 1M to 24.5M bytes of memory.

After installation, the Series 600, which has a maximum capacity of four computers, can be upgraded to a Series 1200, which has a maximum capacity of eight 32-bit superminicomputers, each with as much as 56.5M bytes of memory. Each series can be upgraded to any larger Flex/32 series, and multiple series can be linked together. Flex/32 multicomputers can be integrated into larger systems through networks such as Ethernet or General Motors Corp. Manufacturing Automation Protocol.

The Flex/32 system is said to be able to execute parts of large programs simultaneously in parallel; or separate processors can execute programs independently, the company said. Memory on each computer is local but shared as needed. All memory can be accessed by all computers.

Prices for the Series 600 range from $46,000 for a two-computer, 2M-byte main memory configuration to $100,000 for a 4M-byte, four-computer system. For the Series 1200, the range is from $56,000 for a 2M-byte, two-computer system to $190,000 for an 8M-byte, eight-computer system.

Flexible Computer, started in October 1983, recently released its annual figures that showed $1.1 million in revenue during third-quarter 1985. There are currently seven installations of the company's Flex/32 multicomputers, according to spokesman Robert Greenfield, including a 20-computer configuration at the supercomputer laboratory at the National Aeronautics and Space Administration's Langley Research Center.

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Rise Technology publishing system makes its debut

NEW YORK — Rise Technology, Inc. introduced a $75,000 electronic publishing system for producing in-house technical documentation at the Corporate Electronic Publishing show last month.

The ETP-1 combines image handling, text processing and plain paper printing, the Cambridge, Mass., company said. The unit includes a Motorola, Inc. 68010-based workstation, a monitor, a scanner and a video camera for capturing images, a laser proofer and a laser printer.

The ETP-1 is said to capture, manipulate and print photographic images as well as line art. The images are then merged with text in standard or user-developed formats.

— Donna Raimondi

IBM mini gets CDC disk system

MINNEAPOLIS — Control Data Corp. has announced its first 5¼-in. fixed-disk memory system for IBM's Series/1 minicomputer.

The CDC Certainty 220, available to OEMs and end users, is said to provide up to 64.5M bytes of storage capacity and to work in combination with the existing Certainty 810 tape backup system.

The Certainty 220 disk system is based on the same technology as CDC's Wren 5¼-in. Winchester disk drive. Data is reportedly stored on nine data surfaces on five platters with a 35-msec average access time.

The product was designed to allow two disk drives or a disk drive and a tape backup to be housed in a half-rack space in the Series/1 cabinet.

Prices for the disk drive with a 30-day warranty, controller, installation, cable and operating manual range from $6,500 to $9,285, depending on the quantity ordered. A tabletop enclosure costs $200. The monthly maintenance charge is less than $50, according to the company.

— James Connolly
]

Shield your data from pollution

From page 39

nience, because that is about how long a radio frequency shielding retrofit takes.

■ Guard against all radiation. There are actually two types of energy that DP operations must be protected against: radiated and conductive. But many DP managers do not realize this. Radiated energy exists in the familiar radio frequency emissions that travel through the air. But, there is also conductive energy, which travels through power transmission lines.

■ Filter transmission lines. Radio frequency filters should be specified for all incoming and outgoing power lines to guard against conductive energy. It is a safe bet to use electrical filters listed by Underwriters Laboratories, Inc. on all power lines. Also, it should be remembered that filters are needed for all new power lines added to DP after the start-up of operations.

Also, it is better to use fiber-optic isolators for data transmission in and out of the room. Because they are nonconductive, fiber-optic lines are intrinsically immune to electronic interference. With the right converters, fiber-optic isolators are compatible with most communications and signaling systems.

■ Specify the db attenuation level according to proximity of DP operations to outside interference. The average attenuation level of a radio-frequency-shielded room is 100 db. This means that the shielding reduces a field of 1V to 1 microvolt. However, one does not necessarily have to specify 100-db attenuation for DP operations. Both lower and higher performance rooms are available.

If DP operations are on the fifth floor of a facility and different companies occupy the surrounding floors, then 100 db should be specified. One company cannot control its neighbors, but it can protect DP operations against them. If operations are in a company-owned building and the nearest possible emitter is at least 50 feet away, a DP manager probably can get by with 60-db attenuation. This may save money.

■ Give careful consideration to doors, heating ventilation ducts, air conditioning ducts and other access areas. These areas represent the biggest potential breach in a radio-frequency-shielded room. Therefore, they must be handled very carefully. Depending on the traffic within a DP operations room, there are two types of doors to consider: vestibule and automatic.

A vestibule door arrangement is actually a minichamber, usually 6 ft by 4 ft, with two doors. Vestibule doors allow traffic to pass in and out of the room with both doors never being open at the same time. Therefore the shield is never broken.

Automatic doors are similar to the sensitive pad-type supermarket doors that swing automatically to accommodate traffic. Consequently, the shield is broken momentarily. The cost between vestibule and automatic doors is negligible. If DP operations require 100% around-the-clock protection, then a manager ought to

See SHIELD on page 43

Altos systems, software debut

From page 39

local-area networks, but the new models offer the faster 80286 chip for better performance in the middle price range, according to Altos. The company will continue to manufacture and sell its other mid-range products, which use the 80186 and 8086 microprocessors.

The desktop Altos 886 operates at 7.5 MHz and is available in four configurations, varying with the size of hard disk and the addition of a streaming tape backup system. Its basic configuration comes with 1M byte of random-access memory (RAM), nine RS-232 ports, a 25M-byte hard disk drive and single floppy drive, for $7,990.

The Altos 1086 is a floor-standing supermicro that runs at 8 MHz. The basic system comes with one RAM board, one serial port, file processor, 1.2M-byte floppy disk drive, 50M-byte hard disk drive and 60M-byte streaming tape backup, for $14,990. An 80M-byte hard disk drive and second serial port are optional.

Also available this month are some applications packages to run under the Altos Office Manager (AOM), an enhanced version of the Altos Office Executive multiuser integrated software and the AOM Tool Kit for resellers to integrate their own vertical market software into the system.

Modules available and supported by Altos include the following:

■ Altos Unify and Informix, for programming with IBM SQL. Informix costs $1,295 for the 80286-based hardware and $995 for the 8086- and 80186-based systems. Unify Development Module costs $1,495 for the 80286-based products and $1,295 for the 8086- and 80186-based systems. Unify Run Time Module costs $500.

■ Altos 20/20, now available for 80286-based systems, costs $1,295 with bit-mapped graphics and $895 without. It will be bundled with the Office Manager on the 68020-based Altos 3068 system.

■ Altos Accounting Manager, an RM-Cobol-based package, is available at $3,985 for the 1086 and $3,095 for the 886.

■ Altos Accountant, in Business Basic II, a BI-286 version with more modules, costs $4,690. There is also an 886 version for $3,490.

DON'T JUMP WIT

IBM 8100 draws users' praise, fire

From page 39

Wright Line's system was installed with the IBM DPCX operating system to do dedicated word processing, Young said. As long as the company stays with that function, the system is reliable and does exactly what it is supposed to do. If the company wants to install new functions, like electronic mail or document transfer capabilities, the problems begin.

IBM does not know the operating system, Young said. "If we have software problems on the 8100, we literally cannot get the help that we expect," Young said, adding that the same goes for the hardware.

Young had hoped to be able to put documents prepared on the 8100 into IBM's Professional Office System (PROFS) for electronic mailing and to move documents prepared in PROFS down to the 8100 for professional printing or retyping, he said. "To do that, we would have to install an additional product, IBM's Distributed Office Support System, and that is the kind of hooker I am talking about. . . . There is a big cost that we hadn't anticipated," he said.

When a need arose to put one of the 8100's terminals in a building across the street from an 8100 computer, Young wanted to use the existing leased phone lines that serve the mainframe computer system and its remote terminals. That could not be done, he said. "It gets back to IBM's strategy again. The lines we use are [Systems Network Architecture-compatible], and from the 8100 terminals, the communication outward to the 8100 is not in a format that is compatible with the data that we are transferring over in a regular sense."

IBM told Wright Line that it was possible to make the 8100 terminal communicate with the mainframe, then the mainframe will talk to the 8100 via a translation process. That process is too convoluted, obscure and inconvenient, Young said.

For Commercial Union Insurance Co. in Boston, however, the 8100 has been a good system, said Cornelius McCarthy, applications manager. Commercial Union has six 8100 nodes throughout the country, he said, running under the IBM DPPX operating system.

The unit in the U.S. headquarters in Boston is connected to the company's IBM 3080 series mainframe through DPPX, McCarthy said. The 8100 is used interactively during the day, and the data is run through the mainframe in batch mode unattended overnight.

The system is used 24 hours a day with few problems, McCarthy said. On the rare occasion when there is a glitch, IBM's service people are quick and knowledgeable about fixing it, he said.

About 20 IBM 8775 terminals are connected to the 8100 on IBM's hard-wired loop connection scheme for the 8100. The insurance company uses the system to perform data entry functions for its commercial line of insurance, he said.

IBM still supports and sells lots of 8100s, said Bill Ackerman of DPX, Inc., who writes a newsletter on the system. Typical customers are large corporations with IBM mainframes and remote locations around the country or world that require distributed processing with strong central-site control, he said. It is most popular with insurance companies, he said.

Rumors abound that IBM is trying to replace the 8100 with the System/36, but customers and consultants who know the machine well said that move is not practical. According to DPX's Ackerman, the System/36 could be used in place of the 8100 for office automation or word processing functions, but the 8100 is far more than an OA system; it is a powerful distributed processor. The System/36 supports distributed network software, but it is primitive compared with the 8100, he said.

The 8100 offers downstream support for a large number of devices. For example, it supports personal computers better than the System/36 does, Ackerman said.

IBM could attempt to hammer all of the tools of the 8100 onto the System/36, but it would be a major effort, Ackerman said.

Shield your data from pollution

From page 42

specify vestibule doors. Bear in mind, however, that about 24 sq ft of additional space is needed to accommodate vestibule doors.

- Make sure the room maintains its attenuation level. Radio frequency shielding can degrade over a period of time and should be checked periodically. It is best to get the shielding supplier to perform tests on your room.
- Upgrade shielding.
- Go with a professional. The faithful local contractor may be all right for installing wall board and heating, ventilating and air-conditioning duct work in a DP operations room, but shielding construction is a speciality job. That is why it is best to go with a knowledgeable contractor, someone who is fully experienced in designing and installing it. Due to the fact that radio frequency shielding degrades over time, it is a good idea to check out some of the contractor's previous customers. And, if a major capital expenditure is required, one should visit the vendors and learn firsthand about their capabilities and experience.

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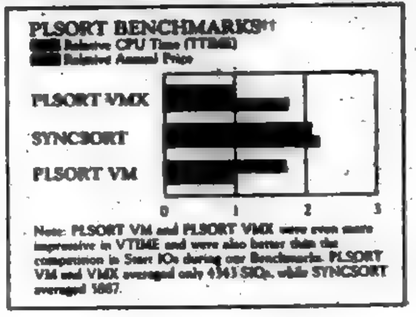

Note: PLSORT VM and PLSORT VMX were even more impressive in VTIME and were also better than the competition in Start IOs during our Benchmarks. PLSORT VM and VMX averaged only 4343 SIOs, while SYNCSORT averaged 5807.

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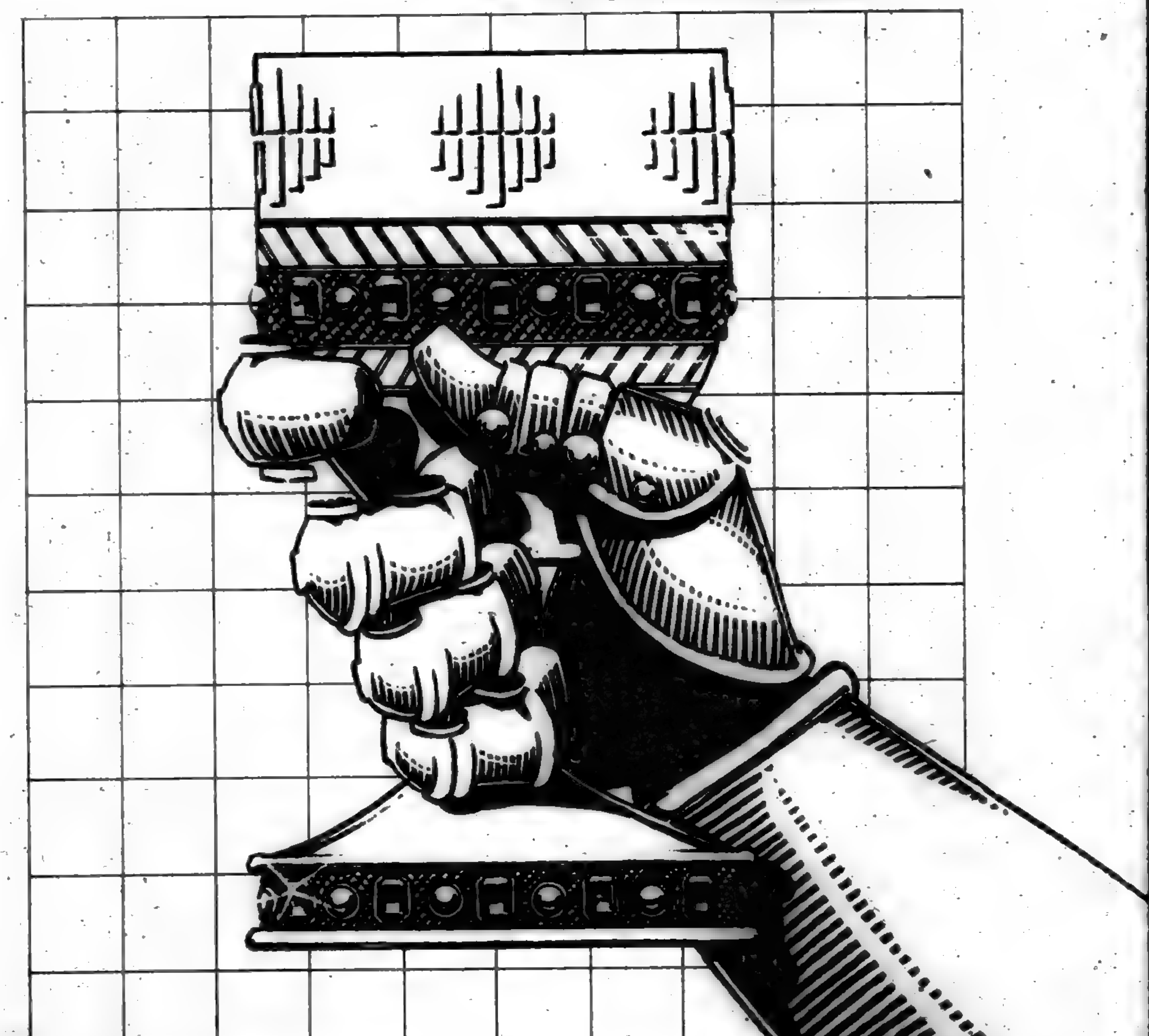


[†] IBM is a registered trademark of International Business Machines Corporation. [††] Benchmarks based upon average of several cases, ranging from 31,250 records to 1,000,000 records. Prices based upon one year lease price as of October 1, 1985. SYNCSORT is a trademark of Syncsort, Inc. (Release 5.2).

Strategy for the future

From page 39

requests are automatically processed on a separate IBM computer that has the necessary hardware and software to place the charts in the correct format.

Similarly, secretaries at General Motors Corp. type words and tables on their Wang Laboratories, Inc. word processors. Once they get approvals on the accuracy of the words and numbers, they transfer them to a Prime Computer, Inc. system, which has the hardware and software to convert the words and numbers into high-resolution slides for use in presentations.

These examples can help teach why cooperative processing will be so important in the future. Both the Amoco users and the GM users became accustomed to their workstations and to the computers that served those workstations. Both wanted to use capabilities that were not resident on those computers. But they faced different choices.

Amoco could have added the graphics hardware and software it needed to its large IBM computers, but this process would have cost the company nearly $200,000. In the GM's case, the high-quality graphics tools it needed were less expensive but would not work on its Wang computers.

So in the Amoco case, cooperative processing saved hundreds of thousands of dollars, while, in the GM case, cooperative processing made it possible to do a job without making it necessary to give up the Wang word processors.

Users want graphics

Today there are more than three million personal computers in industry and government on which users would like but cannot get the high-quality, high-volume computer graphics that mainframe graphics users are now receiving.

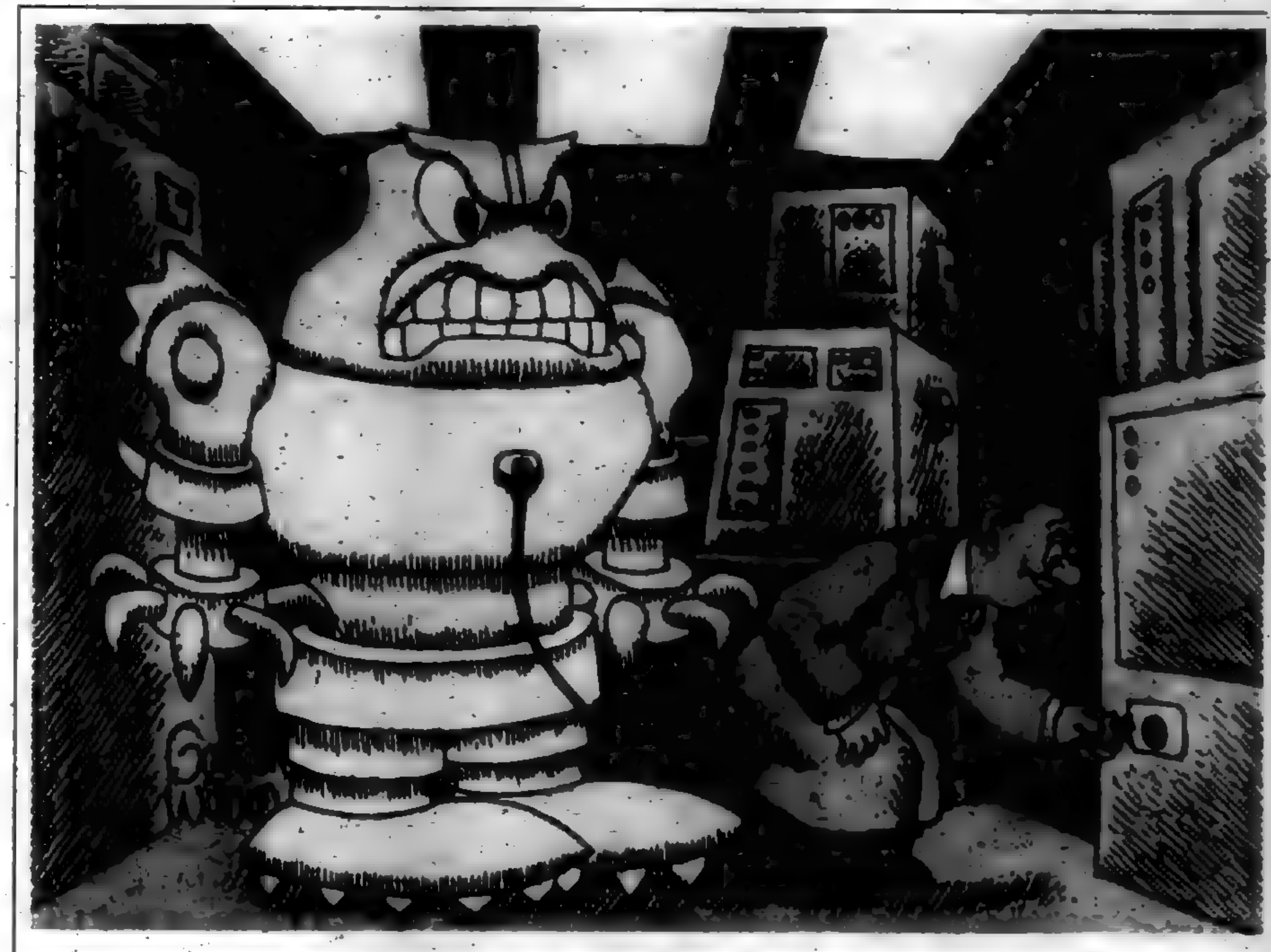
They have three choices: throw out their personal computers, get terminals to the mainframes and learn new languages; add tens of thousands of dollars worth of graphics hardware such as laser printers, color film recorders, thermal transfer printers and software to each of their personal computers; or try cooperative processing.

The first option makes users switch when they would rather fight. The second costs too much. Only the cooperative processing choice makes long-term sense.

Many advanced users of personal computer graphics are already moving to cooperative processing. At Eastman Kodak Co., for example, word processing and Lotus Development Corp. 1-2-3 users no longer have to buy plotters or film recorders to get charts and slides. They use special programs that translate their word processing documents and Lotus work sheets into Issco Corp. Tell-A-Graf requests that are sent automatically to one of dozens of minicomputers and mainframes on which the high-quality software resides. Very high-resolution film recorders are already connected to the mainframes and minis, as are high-quality laser printers and shared plotters. The users get the charts and slides and the three following bonuses:

- They can use the workstations and software they already know and like.
- They get access to the best graphics hardware and software without buying it.
- They save endless hours and errors by not having to operate their own plotters and film recorders.

> ”
>
> *Today there are more than three million personal computers in industry and government on which users would like but cannot get the high-quality, high-volume computer graphics that mainframe graphics users are getting.*



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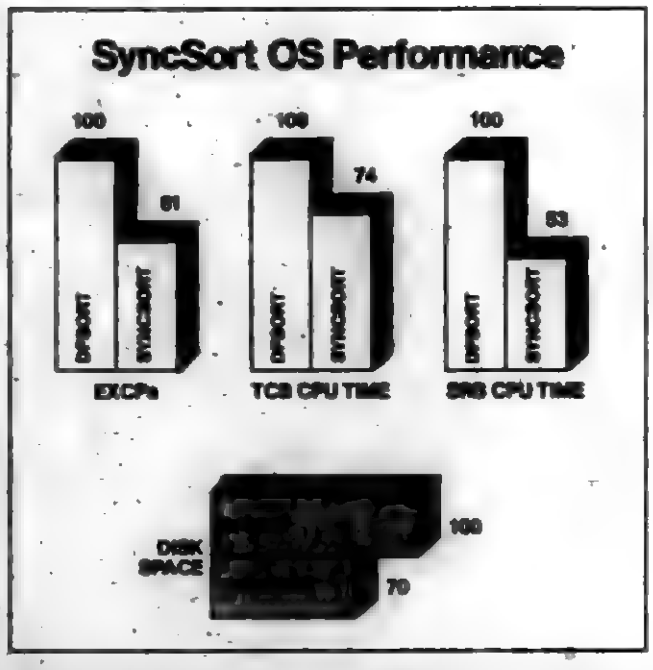

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SOFTWARE & SERVICES

SOFTALK
John Gallant
CW [illegible] Editor

Relational sell really straight?

Users starved for productivity tools have embraced the concepts of relational data base management systems and fourth-generation languages. As a result, vendors of products ranging from simple query languages to slightly modified hierarchical DBMS have revamped their marketing literature and their sales pitches so that the halls of the computer industry now echo with the battle cry of relational and fourth-generation, even fifth-generation, products. High-tech barkers bandy about phrases like "table-based" and "replacement for Cobol."

But users are wary, frustrated and confused. Press accounts and firsthand experience make it clear that fourth-generation languages have not been the panacea they were claimed to be. Cobol is not dead; it does not even appear to have contracted a fatal disease. Many of the DP shops that reportedly have come to rely on fourth-generation languages admit they still code all or portions of their heavy-duty production applications in Cobol — even assembler — for performance.

In a recent two-part *Computerworld* article, E. F. Codd, originator of the relational model for data base management, flatly stated, "No existing DBMS product can honestly claim to be fully relational at this time. The proposed [American National Standards Institute] standard does not fully comply with the relational model, so a DBMS' fidelity to the ANSI standard is no guarantee of relational capability" [CW, Oct. 14 and Oct. 21].

Codd applied a dozen rules of relational structure to two of the most widely installed DBMS. Although some observers claim Codd has modified his definition of a relational system, the DBMS failed to meet fully even one of those rules in his critique.

But, almost without exception, the major DBMS vendors have told users

See RELATIONAL on page 54

Need for info systems seen

But Linc II making few inroads in U.S. market

By Charles Babcock

NEW YORK — Gil Spencer and Peter Hoskins look at application generators as bolt-on boosters, a temporary fix for a long-term problem that tends to just get worse and worse.

That viewpoint is a curious one for the Christchurch, New Zealand, natives and originators of the Logic and Information Network Compiler, or Linc II, a product that Burroughs Corp. is marketing in the U.S. as "a fourth-generation application system generator," according to the 1985 Linc II users manual.

When questioned about the dichotomy, Spencer and Hoskins stand by their assessment that application generators will not relieve the application backlog. The two say that in the long run, even if done efficiently, the generation of more programs leads to more maintenance costs and may not help cope with a changing business environment. Instead, Spencer and Hoskins say, companies need an information systems generator, and that is how they characterize their product.

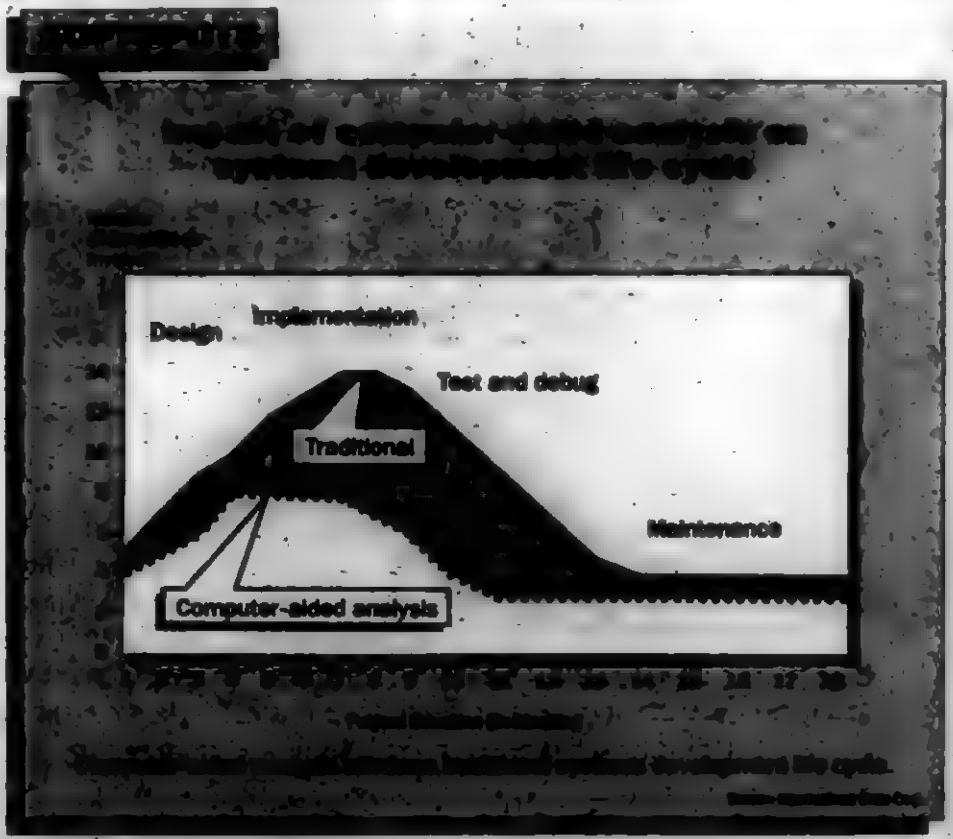
"Further talk of application generators is a dead end," Hoskins said during a recent stopover at John F. Kennedy International Airport. Hoskins and Spencer were in the U.S. visiting Burroughs' headquarters in Detroit and consulting with the Ford Motor Co. and other Linc II users. Though the pair has sold the rights to Linc II to Burroughs, they remain active in its development and promotion.

Despite its originators' efforts, Linc II has made relatively few inroads into DP shops in this country since being launched in 1982, and Spencer and Hoskins offered a critique that suggested U.S. DP managers are too conservative.

"Everyone is trying to increase the productivity of the data processing department, but data processing is the one part of the company that the chief executive can't control," Hoskins said.

In hopes of achieving a gain in productivity, companies typically buy more programming talent, processing power and

See NEED on page 54



[illegible] systems development life cycle.

Source: [illegible] Corp.

INSIDE

The federal judiciary has adopted AT&T's Unix System V as a standard/52

NEW THIS WEEK

- Integrated Systems releases Version 2 of ALSP for VAX/VMS
- MDS Qantel upgrades QMRP software

For more on these and other new products, see pp. 111-149.

INSTANT ANALYSIS

"Everyone is trying to increase the productivity of the data processing department, but data processing is the one part of the company that the chief executive can't control."

— Peter Hoskins, developer of Logic and the Information Network Compiler

Spotlight

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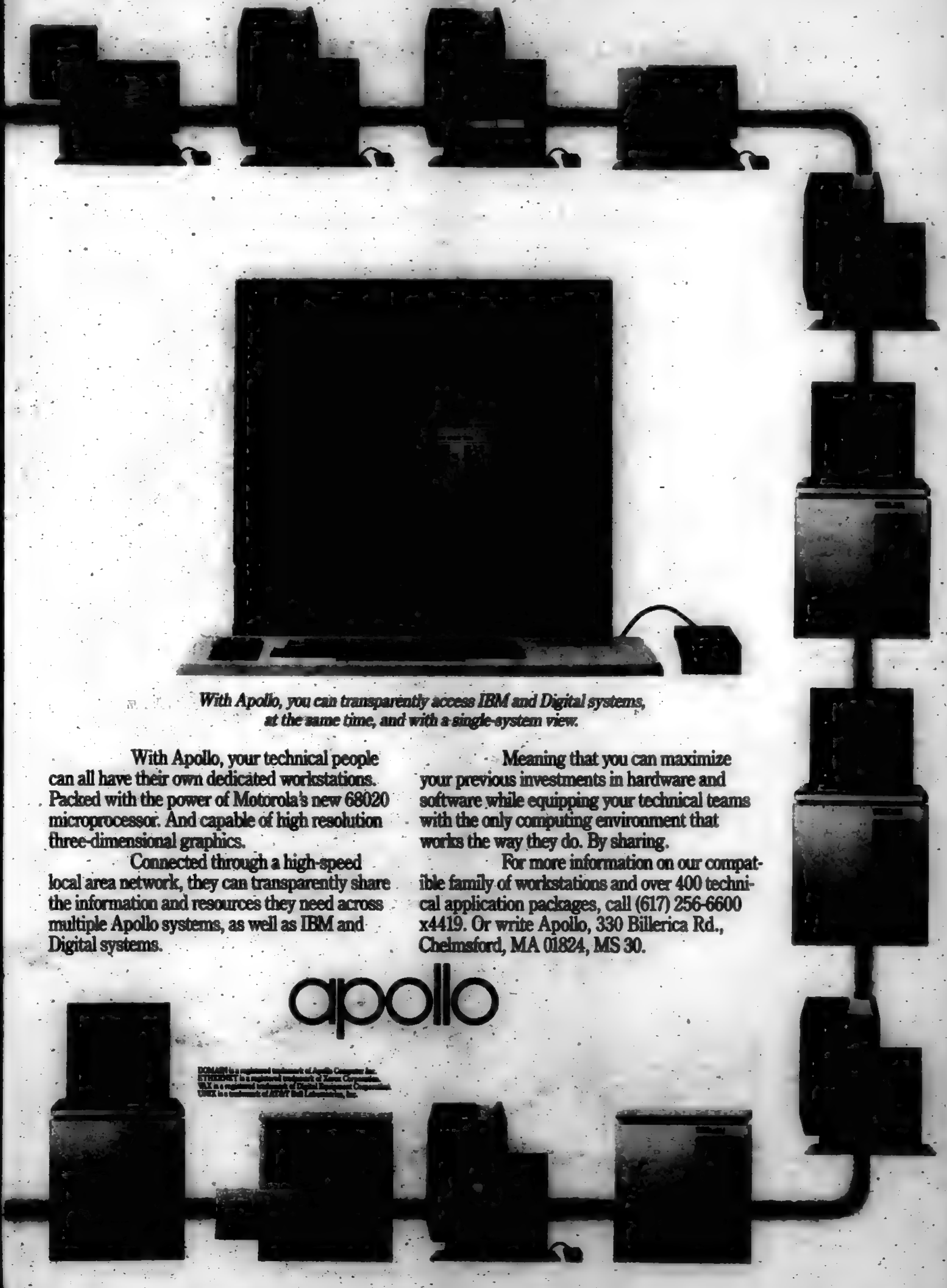

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Uccel releases enhanced micro-mainframe link

Uccel Corp. of Dallas announced that its Perfect Link Manager micro-mainframe link package can now be used to update mainframe data maintained in IBM CICS or VSAM file structures from a microcomputer.

Version 2 of Perfect Link also features improved data security features at both the file and-record levels as well as compatibility with terminal emulator boards from Forte Data Systems, Inc. and ITT Courier Terminal Systems, Inc., an Uccel spokesman reported.

Perfect Link Manager can be bought as a stand-alone product.

The link product can also be packaged with Uccel's financial services and general accounting software, the vendor reported.

Runs on PC-DOS, MS-DOS

Perfect Link runs on IBM PC-DOS or Microsoft Corp. MS-DOS microcomputer operating systems and on IBM MVS and DOS/VSE mainframe operating systems, according to Uccel.

Perfect Link Version 2 prices range from $20,000 to $30,000, depending on the environment, a spokesman said.

ADR updates Metacobol precompiler

Applied Data Research, Inc. (ADR) of Princeton, N.J., has announced support for IBM's VS Cobol II compiler with Release 9.9 of ADR/Metacobol Cobol precompiler.

The Metacobol basic processor now recognizes the IBM VS Cobol II dialect, which implements the 1985 ANSI Cobol standard and structured programming language elements.

Release 9.9 provides conversion aids to the VS Cobol II dialect from either the 1968 or 1974 ANSI standard. In addition, the release provides a structured programming formatter. The formatter reformats VS Cobol II programs according to the structured programming syntax available in VS Cobol II, the vendor said.

The Metacobol conversion aids identify program code that is incompatible with the new compiler. In most cases, the Metacobol aids automatically convert the incompatible code. If a specific function cannot be duplicated because there is no VS Cobol II equivalent, an appropriate message is generated.

Release 9.9 of Metacobol, available for IBM 370, 4300 and 3030, 3080 and 3090 series mainframes and compatibles, starts at $9,700 for DOS and $12,200 for OS environments.

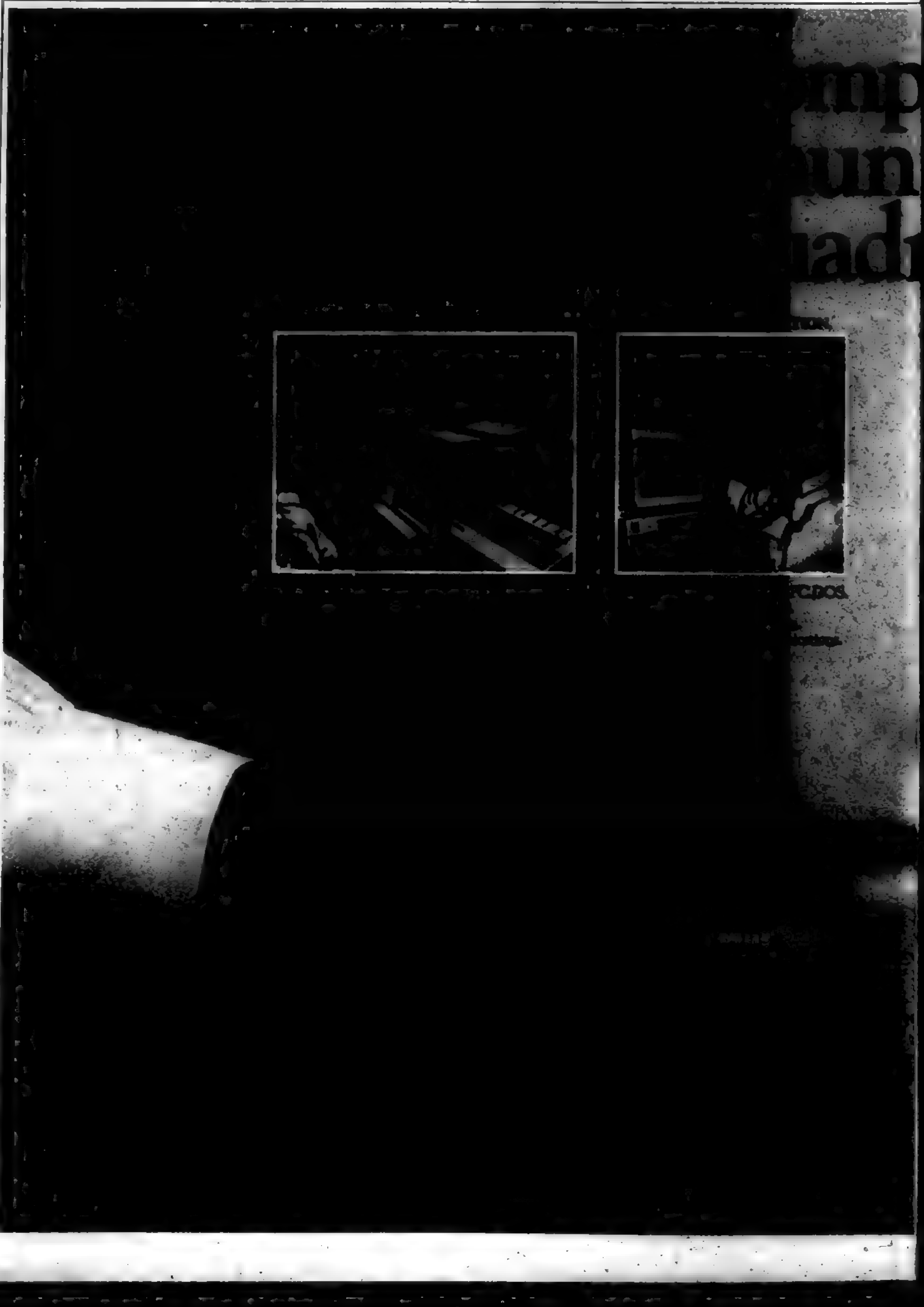
Prime management decision tool bows

Prime Computer, Inc. of Natick, Mass., has announced Management Decision Link (MDL), a menu-driven package that extracts data from computer-aided design drawings produced with Prime Medusa design drafting software.

MDL pulls data from Prime Medusa two- and three-dimensional drawings and transfers it to various Prime data base management packages or third-party application software, the vendor said. Prime packages that support the product include Information data management software, Information Connection decision support software, MRPII manufacturing data management systems and Primenet.

MDL reportedly allows users to extract data for use in such areas as cost accounting and master product scheduling.

The product requires Prime Medusa Version 2.01 and Primos Version 19.4. MDL runs on all Prime products supported by Prime Medusa. It is priced from $5,000 to $8,000.



Control Data fortifies its computer-aided design offerings

Cybernet service, products unveiled

By John Gallant

MINNEAPOLIS — Control Data Corp. recently unveiled a new service and several products aimed at bolstering its electronic computer-aided design capabilities.

The company's Cybernet Services division introduced Cyberport, a service that, for a fixed monthly price of $15,000, gives a remote user Cyber 205 supercomputer applications processing capabilities and 10 million characters of on-line storage.

According to John Willey II, general manager of CDC's electronic CAD Program Office, Cyberport offers users roughly the equivalent processing capability of a dedicated Digital Equipment Corp. VAX-11/780 24 hours a day at a fixed monthly cost, which can be lowered through agreements for multiple months or ports.

"Most DP managers cannot afford to rely on conventional remote computing services due to the pricing structure based on usage," Willey said. "Now, applications like [electronic CAD] are more affordable because of the fixed cost."

The Cyberport service, which can be accessed through a microcomputer workstation with dial-up capabilities or a host computer through high-speed, dedicated leased lines, offers network access points in 200 U.S. cities.

Communications charges are not included in the Cyberport pricing offer, which expires at year's end.

CDC also announced three logic design programs for microcomputers and its Cyber 205 supercomputer.

Verilog is a behavioral-level simulator that allows an engineer to combine high-level block descriptions with resistor-transistor logic, functional, gate- and switch-level circuit representations. Verilog runs on the IBM Personal Computer and costs $15,000.

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> *'Most DP managers cannot afford to rely on conventional remote computing services. Now, applications like [electronic CAD] are more affordable.'*
>
> **— John Willey**
> **Control Data Corp.**

Oceanview was described as a postprocessor for logic simulators that enables design engineers to compare different signals simultaneously. It graphically displays the waveforms of simulated signals and allows the designer to view key areas of the signals.

Oceanview also runs on the IBM Personal Computer and costs $1,000.

Running on the Cyber 205, Aidssim is a logic and concurrent fault simulator. It can simulate random sequential logic networks, and it provides incremental fault simulation and the capability for setting and restoring checkpoints of network state. The package costs $80,000 for a corporate license.

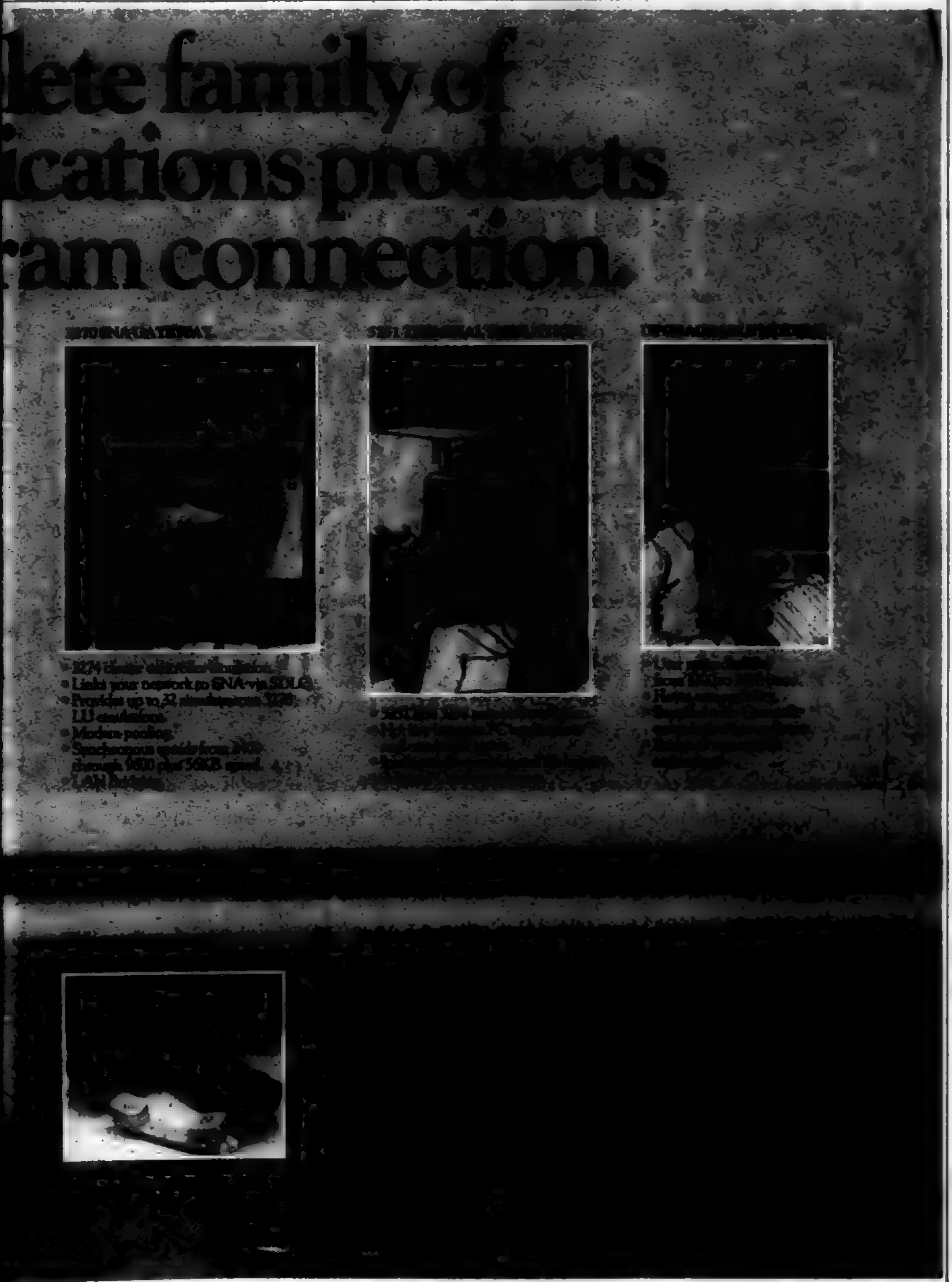
MIDAS enhancements

CDC also unveiled enhancements to its Modular Integrated Design Automation System (MIDAS), its electronic CAD software for the Cyber series processors.

The enhancements improve simulation efficiency and facilitate changes to gate array layouts.

MIDAS Boolean Evaluation, an added high-speed functional simulator, handles complex system designs. The gate array routing program allows a designer to modify the appropriate logic interconnect statements when changing microtypes, placement or logic.

MIDAS costs between $105,000 and $750,000.



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Federal judiciary branch turns to Unix for DP operations

By Mitch Betts

WASHINGTON, D.C. — The entire third branch of the U.S. government, the federal judiciary, will soon be using AT&T's Unix System V as the standard operating system for administrative DP operations, a Federal Judicial Center official said recently.

Robert Borochoff, research computer scientist at the center, said the federal courts are joining the ranks of a growing number of government offices that are choosing Unix. Borochoff is a leading member of Unicorn, the federal government's Unix users group.

The federal government reportedly accounts for nearly 20% of the overall Unix market, with large users at the U.S. Department of Defense, the Internal Revenue Service [CW, April 15] and the U.S. Postal Service.

Government users tend to select Unix for its portability. Borochoff explained that the portability of Unix will enable the courts to become vendor independent so that hardware procurements can attract multiple competitors.

Other advantages of Unix, Borochoff said, include the following:

- The same user training can be supplied across all systems.
- The same applications software can be supplied to all systems.
- The applications programs can be developed prior to hardware selection.

"There is no better operation environment [currently] available that allows vendor independence and software development and portability," Borochoff said in an address at the Federal Computer Conference.

He explained that the Federal Judiciary Center's research and innovation office has developed prototypes of the applications software for three appellate courts. The programs will be distributed in early 1986, and software for district and bankruptcy courts will follow.

The center is working to automate all 13 appellate courts, 94 district courts and 94 bankruptcy courts, which employ 17,000 people and operate under a $1 billion budget, Borochoff said.

At present, the judiciary has an 8-year-old centralized DP operation, with six mainframes in Washington, D.C., that serve various terminals and printers in the field via a value-added network. But Borochoff said that rising telecommunications costs and the courts' desire for more local control have prompted the judiciary to plan for a distributed processing system.

With a distributed system, he noted, courts of varying sizes can obtain hardware, such as minicomputers, that meets their requirements, and the expense of adding more processing power will be less than the expense of adding mainframes.

Honeywell adds tool

Honeywell, Inc. of Minneapolis plans to add a mathematical programming application for its computer systems operating under its GCOS 8, CP-6 and Multics operating systems.

Sciconic, made by Scicon Ltd. of the UK, provides mathematical programming techniques for users in the petrochemical, manufacturing, metals, food processing, agricultural, distribution and transportation industries. It is intended for such applications as blending, resource allocation, production planning, facilities location and manpower planning.

Honeywell will also offer the Sciconic-MGG option for producing reports.

Both Sciconic and the MGG option operate on Honeywell's DPS 8, DPS 88 and DPS 90 systems. They are scheduled for availability in the first half of 1986. Sciconic costs $22,500, and the MGG option costs $9,000.

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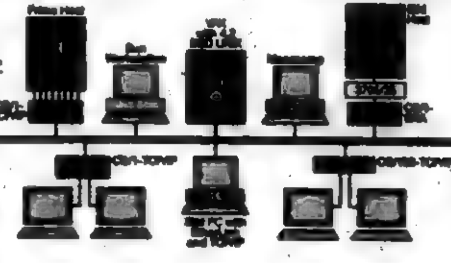


Volatility of data files key in determining long-range plans

SOFTLINE
Frank Sweet

Have you ever noticed that there are just two kinds of data entities in the world?

Imagine a 10,000-record vendor file to which, on average, 100 new vendor names are added each month and 100 inactive ones purged. The monthly volatility of the file, represented by the turnover rate divided by population, is 1%. Now consider a file of 1,000 purchase orders where 1,000 orders are added each month and the same number closed. Its volatility would be 100%.

Compute the volatility of the permanent files in your DP shop and you will discover there are two populations out there — two classes of records. A histogram shows two peaks, one around 1% like the vendor example, the other near 100% like the purchase order case. Volatility is binary, it seems, and almost every record falls into one group or the other.

The reason is that we computerize information about two classes of real-world phenomena: objects and events. Objects are tangible things that exist independently of time. Vendors, customers and warehouses are all objects. The volatility of object-related records is low, around 1%.

Events are happenings; each occurs at a specific instant. Freight deliveries, shipments, labor charges and receipts are events. Their volatility is high, around 100%. Known as transaction data or permanent work files, events keep track of what is happening in the real world. They include such items as: date, when did it happen?; responsibility, who did it?; cause, why did it happen?; and the like. Events, in other words, keep happening.

Distinguishing between classes of entities is not difficult. You will notice, for instance, that fields such as shipment date, order date and patient admission date make sense in that the words convey clear images. Employee date, freighter date and vendor date, on the other hand, are somehow unclear and incomplete.

Reasons to distinguish

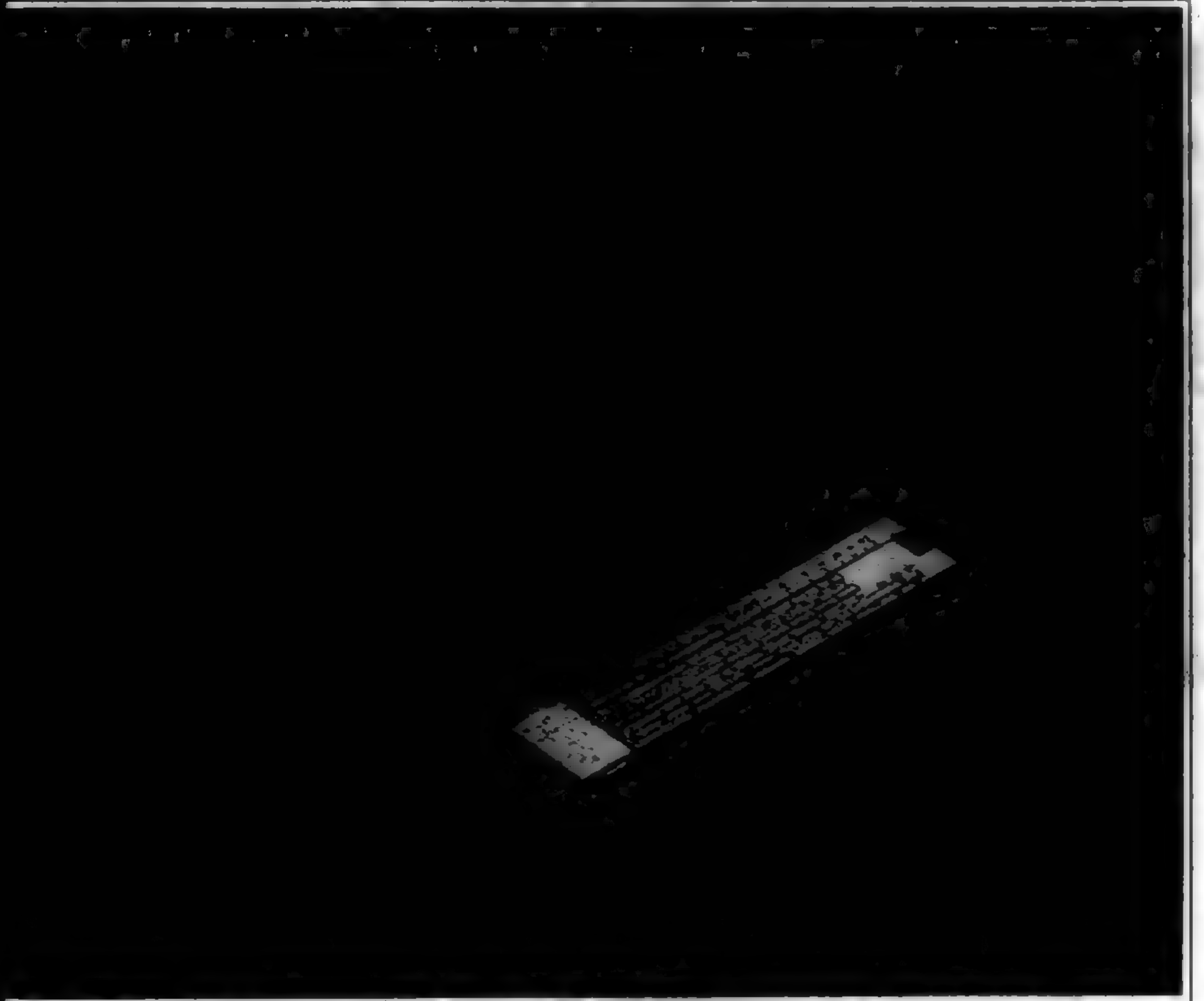
There are reasons to distinguish between objects and events. First, we can derive events from objects but not vice versa. This means that in constructing a long-range plan — an overall data base architecture — for a pool of shared data, we begin with the easily identified object records and then derive events by diagram manipulation.

Second, shared files imply standard data names and, more important, standard key field formats. Both ideas can be sold more easily if we first apply them to involatile reference data, rather than to less widely familiar events. Third, how we physically implement a design into our data base management system depends on each record's volatility. Multiple access paths, backup/recovery procedures and migration techniques all vary with volatility.

Two cautions must be noted. First, do not confuse records in another system with objects. Objects have an external reality while records model either objects or events. It would be wrong, for example, to consider a purchase order record involatile on the grounds that it models a physical thing, a document.

Second, do not be overly strict in interpreting tangible reality. Nations, sales districts and colors are not tangible in the strictest sense, yet they would be involatile object entities in a data base nonetheless. Again, compute volatility when in doubt.

Sweet is corporate manager of data administration for the Charter Co., a Fortune 100 firm in Jacksonville, Fla.



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Relational sell really straight?

From page 47

that they were either relational all along or that they have upgraded their products to relational.

Granted, Codd is a purist. He is dealing in theory while vendors must develop real-world products. But Codd's statements are sobering. What have DBMS vendors been telling users?

If their products are not basically or fully relational, should they be touted as relational? How can users be anything but skeptical when weighing vendor claims against the harsh analysis of experts such as Codd?

This is not to say Codd is the final word on what constitutes a relational system. Reasonable men differ. It is only intended to show how confusing the issue of relational vs. nonrelational is becoming.

But more important, confusion and the fear of purchasing very expensive products that may not live up to their advance billing may account for why many users have chosen to stick with older software technologies.

'The devil you know'

The rationale that "the devil you know is better than the devil you don't" may explain why many users have only dabbled with fourth-generation languages and have refused to run production systems under a relational DBMS.

Nor is this intended as an attack on the capabilities of the languages or DBMS. As a rule, vendors strive to provide the best products they can develop.

And, in general, software vendors have probably made state-of-the-art technology as commercially viable as possible.

No, this is an issue for marketing, sales and advertising. Vendors serve no one when they oversell or apply improper or unclear terminology to their products. Users become skeptical and leery of investing in such products. Vendors set themselves up for user disappointment and, in extreme cases, media attention that focuses on the failings of their products.

Straightforward explanation

Perhaps a larger community of users would embrace these two classes of products if vendors would explain in a more straightforward fashion how they function. Fourth-generation language vendors should tell users exactly which applications, or portions of applications, the products can be used to develop and which applications should not be developed with them.

DBMS vendors should discuss how their products compare with some model for relational systems, Codd's or some other accepted standard, and describe clearly the basic architecture of their systems.

Users are not demanding that vendors suddenly supply all the latest technology or completely revamp all their existing products to new ways of thinking. All they want is to know in advance what they are buying and to avoid disappointment in the future.

Need for info systems seen

From page 47

application generators to pump out more programs. But turning out programs in the absence of an information system may make the backlog even worse, the two said.

"Information systems are the way to go. It is the only technology that releases you from the bloody trap of applications," Spencer said.

By Spencer's definition, an information system makes use of a central data base management system, data dictionary, fourth-generation language and other tools oriented toward an overall business mission.

An information system keeps fixed information about the business in a common data base, it contains definitions of business activities that encode why the business exists, and it is able to generate profiles or views of the data and functions that yield the needed business information, Spencer and Hoskins said.

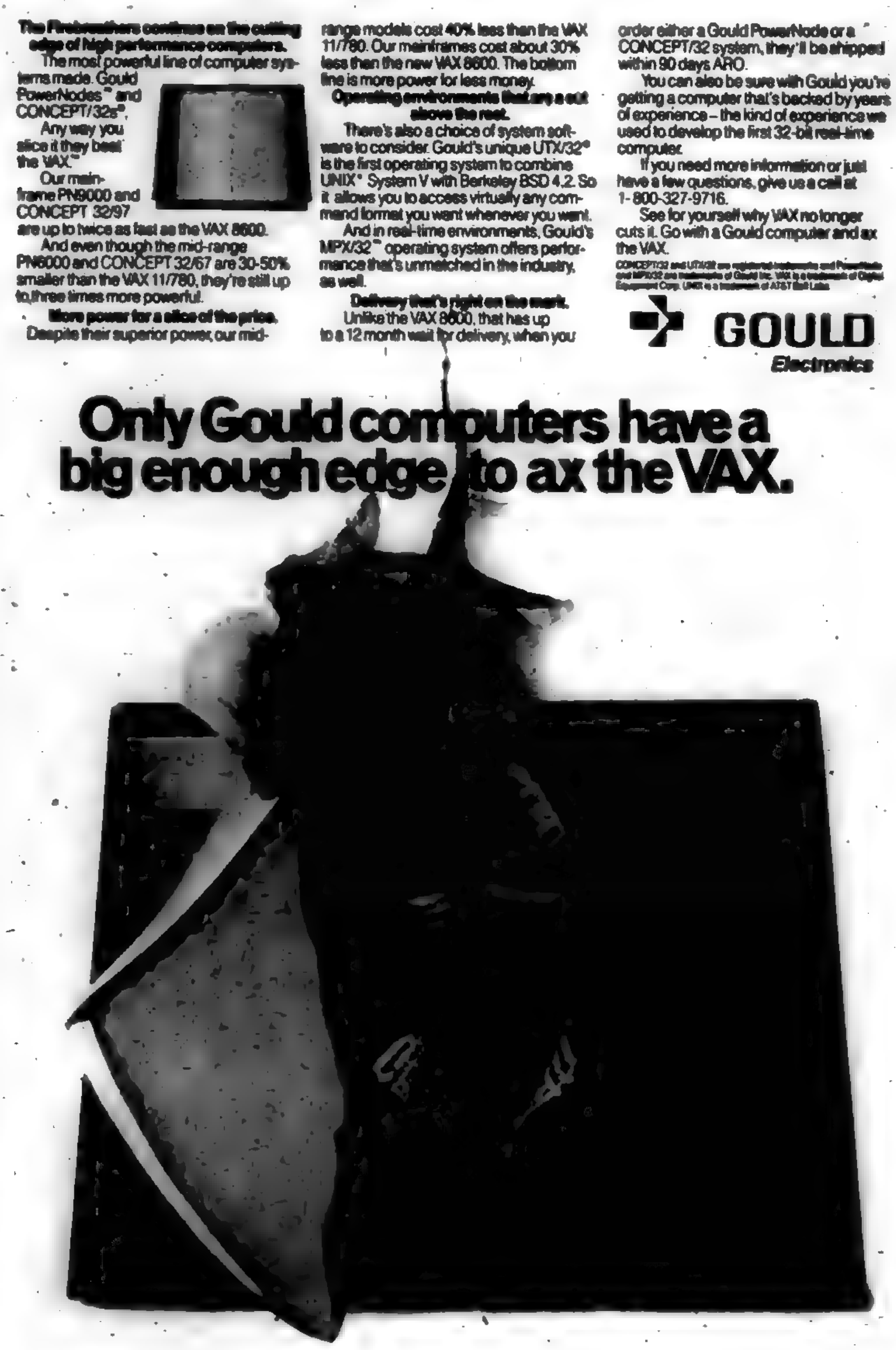
"We've worked with organisations where three different people give you three different answers to the question of what were the monthly revenues. With an information system, you can only get one answer," Spencer said.

U.S. data processing managers are wedded to the piecemeal applications approach, and the major vendors are "pandering to them" by selling applications generators, in Hoskins' view. "We're hung up on programming and programmer's productivity. The true user is the business, not DP," he said.

While Linc II has been sold as an application generator in the past, Hoskins and Spencer said Burroughs is maturing in its marketing, and the product is now presented as an information systems generator.

Even so, not everyone is able to use it that way. At Liberty Travel, Inc. in Paramus, N.J. — headquarters for a 190-office chain — Stephen J. Marengo, director of technical services, said his staff is using Linc II to rewrite the 39 applications used by the business so that they will run on a Burroughs A9 Model F.

In many cases, the applications are being substantially enhanced, but the process is still one of "chipping away a piece at a time" rather than producing a unified information system, Marengo said.



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Language barriers

From page 1

> *'A fourth-generation language is a programmer's tool. If it's simple enough for end users, it won't have the power needed for the professionals.'*
>
> — Philip Dorn
> Dorn Computer Consultants, Inc.

functions of Cobol, graphics tools, a micro-mainframe link or full microcomputer version.

Analyst George Schussel, president of Digital Consulting Associates, Inc. of Andover, Mass., which stages a well-attended seminar on fourth-generation languages, divides the marketplace into two broad categories — so-called information center languages that feature their own DBMS and that are meant to solve a range of data analysis problems for a variety of users; and professional transaction processing application-building facilities, meant for use by professional programmers.

But Vaughn Merlyn of the Atlanta-based Merlyn Corp., said, "A fourth-generation language is whatever a vendor wants it to be."

Merlyn divides the products into two categories: one of stand-alone products that have their own DBMS — such as Information Builders, Inc.'s Focus, Martin Marietta Data Systems' Ramis and D&B Computing Service Co.'s Nomad2 — and another of products sold by the DBMS vendors — such as Cullinet Software, Inc.'s ADS/On-Line, Software AG's Natural, ADR's Ideal and Cincom Systems, Inc.'s Mantis, Application Development System.

But can end-user-oriented languages really be called fourth-generation languages? Can a language that is easily used by nonprogrammers really be a useful tool for developing production systems? "A fourth-generation language is a programmer's tool. If it's simple enough for end users, it won't have the power needed for the professionals," said Philip Dorn of the New York-based Dorn Computer Consultants, Inc.

Conversely, the "James Martin Report on High-Productivity Languages" states that a fourth-generation language must be appropriate for use by both end users and professionals. Report editor Peter Mimno told *Computerworld*, "The most important criterion is the ability to get data to a personal computer and operate on it with a variety of tools."

Two contrasting products illustrate the identity dilemma. Management Science America, Inc. (MSA) markets its Information/Expert (I/E) product as a fourth-generation language productivity tool. Merlyn said, "I/E is a reporting system. I believe some day MSA will provide the tools to allow it to grow into a fourth-generation language, but it's not there yet."

On the other hand, IBM does not call its SQL/DS a fourth-generation language though it conforms to the Martin report definition. An IBM spokesman said SQL/DS is "a fourth-generation language-based data base manager. But it doesn't cover the complete spectrum of a fourth-generation language." SQL/DS is missing statements equivalent to Cobol IF, THEN or ELSE, "which are critical for some applications," the spokesman said. SQL/DS is mentioned in fourth-generation surveys because of its strong data manipulation capabilities. As to whether IBM will someday market SQL/DS as a fourth-

See LANGUAGE on page 61

Selected fourth-generation languages for the IBM mainframe environment*

Company Name / Product Name	Applied Data Research, Inc. (ADR) ADR/Ideal Version 1, Release 2	Cincom Systems, Inc. Mantis, Application Development System Version 4	Computer Corporation of America (CCA) User Language Version 5	Cullinet Software, Inc. Application Development System/On-Line Release 10	D&B Computing Services Co. Nomad2 Version 390	Henco Software, Inc. Info Version 8
Mainframe Software Environment	MVS, VS1, DOS/VSE, CICS	MVS; DOS/VSE; Cincom TIS/XA-CM; CICS; IMS/DC; VM/CMS; Digital Equipment Corp. VMS; Wang Laboratories, Inc. VS; Honeywell, Inc. IDS; JC-L TDMS; TPS	MVS, DOS/VSE, VM/CMS, CICS, TSO	MVS, DOS/VSE, VM/CMS, CICS, TSO	MVS, VM/CMS, TSO	VM/CMS; VMS; Data General Corp. MV/AOS; Prime Computer, Inc. Primos; Harris Corp. NOS; Honeywell GCOS Model 400 Level IV
Data Base Management System File Structures Accessed	ADR Datacom/DB, VSAM, QSAM	Cincom Supra, Total, Datacom/DB, Software AG Adabas, VSAM, DL/1, IMS, SQL/DS	CCA Model 204, BSAM, QSAM, VSAM	Cullinet IDMS/R, VSAM	Nomad 2, read/write/create access to SQL/DS; read-only access to QSAM, ISAM, VSAM, IMS	CMS, ISAM, RMS, DG Infos II, Prime Midas, Harris VISP, Honeywell ISAM
Exits to External Subroutines Allowed	Cobol, assembler	Cobol, Fortran, PL/I, assembler	IBM assembler only	Cobol, PL/I, Fortran, assembler, RPG-II	Cobol, Fortran, PL/I, assembler	Cobol, Fortran, PL/I, Basic
Can Transfer Control to Programs in Other Languages	Yes	Yes	Yes (via assembler bridge to Cobol, Fortran, PL/I)	Yes	Yes	Yes
Can Be Called by Programs in Other Languages	No	Yes	Yes (through Model 204 Host Language Interface)	Yes	Yes	Yes
Generates Compiled or Interpretive Code	Compiled	Interpretive	Neither; code is interpreted once and tokenized	Compiled	Interpretive (semicompiled by Prescan feature)	Interpretive
Micros Supported	No	Micro-mainframe link; no personal computer version	PC 204 link; no personal computer version	Information Center Management System link optional; no personal computer version	Transmit link optional, personal computer versions for IBM Personal Computer XT/370, AT/370 only	No IBM link; DEC, DG, Prime, Harris, Honeywell have link; PC-Info runs on variety of micros
Procedural or Nonprocedural Type of Language/Target User	Primarily procedural, for professional programmers	Primarily procedural, for professional programmers and experienced users	Procedural, for end users and professionals	Nonprocedural, for end users and professionals	Procedural, for end users and professionals	Primarily nonprocedural, for end users and professionals
Data Dictionary Active or Passive	Active (ADR/Data Dictionary required)	Active (called directory by Cincom)	Dictionary/204 within Model 204	Active (requires IDMS Integrated Data Dictionary)	Active (passive Nomad2 Data Dictionary optional)	Passive
Screen-Painting Facility	Yes	Yes	No	On-Line Mapping optional	Yes	Yes
Graphics Capability	No	Interface to IBM Graphic Display Data Manager (GDDM)	Interface to SAS Graph, Issco Corp. Tell-a-graf	No	Yes	None offered for IBM; Decgraph and DG Comprehensive Electronic Office system interfaces; Info-Versagraph optional for Prime, Harris
Data Query Language	ADR Dataquery optional	Spectra query language; for Supra DBMS, optional	Access 204 optional	On-Line Query optional	Yes	Yes
Report Writer Facility	Yes	Yes	Access 204 optional	Culprit optional	Yes	Yes
Price	OS $95,000; DOS $75,000	$30,000 to $60,000, depending on users	Packaged with Model 204 DBMS, $55,000 to $235,000	$60,000 for users with IDMS	$135,000	$30,000; $1,200 for PC-Info

*The above list is intended to represent a sampling of the major fourth-generation languages available for the IBM mainframe environment. [illegible] on the basis of available product research and interviews with industry consultants and specialists.

CW Chart

Chemical firm mixes Cobol, Ramis II for programming solution

By John Desmond

The total solution has yet to arrive for Monsanto Co. of St. Louis, a user of Martin Marietta Data Systems' Ramis II fourth-generation language and data base management system (DBMS).

Monsanto is mixing fourth-generation language code and Cobol code in its mainstream applications. The multibillion-dollar chemical firm, ranked 51st on the Fortune 500 list, no longer writes programs entirely in Cobol, preferring to call in Cobol contract programmers when there is a major Cobol coding job.

"The historic stuff is still Cobol," said Warren Fitzgerald, internal consultant on interactive computing and data management at Monsanto, regarding his firm's essential applications. "The standard applications such as general ledger will run forever. But central MIS is getting away from Cobol as much as possible."

Interactive applications at Monsanto are concentrated in a VM/CMS environment on IBM 3080-class mainframes. Most departmental systems are Digital Equipment Corp. VAX machines. Five years ago, Monsanto made a commitment to interactive computing. Four years ago, the company evaluated fourth-generation language products and chose Ramis II.

> ”
>
> *'Central MIS is getting away from Cobol as much as possible.'*
>
> — Warren Fitzgerald
> Monsanto Co.

Monsanto has since trained 1,300 employees to use Ramis II. Users can have a personal data base and, usually, access to a departmental data base. Users access this data for whatever applications they are capable of coding.

"The data bases are not for big transaction applications. The department data bases exist to have information available to managers," Fitzgerald said.

For example, no longer do standard reports on how a department spends its money each month have to be printed in batch by central MIS and distributed. Via Ramis II applications, these and other reports are available on-line, Fitzgerald said.

Why not use Ramis to develop production applications? "The applications already exist, and there is no reason to change them," Fitzgerald said. "Most are standard IMS [IBM DBMS] applications. Ramis does not support [applications requiring] concurrent updating well, while IMS does."

Monsanto has installed a read-only version of Ramis in its mainframe MVS environment so that users can extract data from production data bases.

In future Ramis enhancements, Monsanto said it would like to see support for more than one index file to speed data base searches. Every Monsanto report is listed in a data base. With the current product, a user types in a key word, and a search of the entire data base is conducted.

If the product provided a directory to indexes, a complete search would not be required. "We create our own separate index files to facilitate searches. We have to do that as a separate step," Fitzgerald said. "It would be nice if the system could handle all this in the background." Fitzgerald said Martin Marietta has indicated this feature will be provided in future releases.

Selected fourth-generation languages for the IBM mainframe environment*

Company Name / Product Name	Higher Order Software, Inc. IBM Use-It Version 1.2 VAX Use-It Version 3	IBM SQL/DS	Information Builders, Inc. Focus Version 5	Martin Marietta Data Systems Ramis II Release 86.2	Software AG Natural Version 1.2
[illegible]	MVS, TSO; DEC VMS 4	DOS/VSE; SSX/VSE; VM, CICS, (IMS)	MVS, DOS/VSE, VM/CMS, TSO, CICS; VMS	[illegible]	[illegible]
Data Base Management System File Structures Accessed	IBM IMS	SQL/DS, DL/1 (via extract)	IMS; DB2; SQL/DS; DL/1; IDMS/R; Adabas; Model 204; SAS Institute, Inc.'s System 2000; Focus/DB	Ramis II, VSAM, ISAM, QSAM, Adabas, IDMS/R, Total, DL/1, IMS	Adabas, VSAM, DL/1
Exits to External Subroutines Allowed	On IBM: C, Cobol, PL/I, Fortran, assembler; on VAX: assembler, C, Cobol, Fortran, Pascal	Cobol, Fortran, PL/I, assembler, APL	Cobol, Fortran, PL/I, assembler	Cobol, Fortran, PL/I, assembler	Cobol, Fortran, PL/I, assembler, RPG-II
Can Transfer Control to Programs in Other Languages	Yes	Yes	Yes	Yes	Yes
Can Be Called by Programs in Other Languages	Yes	Yes	No	Yes	Yes
Generates Compiled Or Interpretive Code	Not applicable	Compiled	Report writing is interpretive; Data Maintenance Language can be compiled	Combination — System Building Executive dialog manager compiled; nonprocedural statements interpreted	Combination, compiles strings of address parameter lists
Micros Supported	No	Host Data Base View link optional; no personal computer version	FocTalk link optional; PC/Focus for IBM micros	[illegible]	Natural Connection [illegible]; no personal computer version
Procedural or Nonprocedural Type of Language/Target User	Neither, code generated automatically from specifications for end users and professionals	Nonprocedural, for end users and professionals	Primarily nonprocedural, for end users and professionals	Nonprocedural, for end users and professionals	Nonprocedural, for end users and professionals
Data Dictionary Active or Passive	Passive	Active (called catalog by IBM)	Passive (Focus Data Dictionary required)	Active	Active (requires Predict data dictionary)
Screen-Painting Facility	VAX version only	DB Edit, SQL Edit optional	TED Editor/Screen Painter optional	Formatted Screen Manager optional	Yes
Graphics Capability	No	Query Management Facility (QMF) optional	Within Focus; also interface to Issco Tell-a-graf and SAS Graph	Plot, interface to SAS Graph optional	Interface to [illegible]
Data Query Language	No	Within SQL/DS (QMF for end users; Application System, Interactive SQL optional)	Yes	Yes	Yes
Report Writer Facility	No	QMF optional	Yes	Yes	Yes
Price	$92,000	$464/mo license	IBM: $66,000 to $110,000; VAX: $6,000 to $52,000; PC Focus, $1,595	$30,000 to $200,000	$30,000 to $60,000

*[illegible] and interviews with industry consultants and researchers.

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Now departments like Employee Relations can handle thousands of personnel letters, shift work schedules, and process paychecks. Contracts Administration can create individual vendor contracts by mixing and matching stored phrases. And with InfoCalc, an integrated electronic spreadsheet, Operations can substantially reduce the time required to coordinate the parks' round-the-clock activity.

And because all the systems run through the same office software, Six Flags also enjoys many of the efficiencies of a centralized system—like standardized corporate reports.

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Performance comparisons no easy task

With no clear definition of what constitutes a transaction and no standard way of referring to transaction volume, comparing the abilities of fourth-generation languages to execute high-volume, transaction-oriented applications is no easy matter.

Fourth-generation language vendors give a range of figures for what volume of transaction processing their products can accommodate. Some do profess not to be in the high-volume market, such as Henco Software, Inc., which markets Info.

John Holman, Henco's vice-president of product development, said his firm is targeting users of departmental processors who want to work off distributed data bases. "We assumed people want to set up their own data bases, so as not to be dependent on the corporate" or central data base system, he said.

Therefore, Henco offers Info on a variety of minicomputers but only in IBM VM environments on mainframes. "Many, many users who have access to a medium-size supermini can't wait for MIS to get a job done," he said of his market.

IBM is the most specific when it comes to enumerating transaction volume. Assuming a transaction is 15 I/Os, the operating system is VM and the transaction processing is consuming 50% of CPU resources, an IBM spokesman said IBM can process from two to 10 transaction/sec. across its range of processors.

A spokesman for Computer Corporation of America said a major user of its User Language is doing 50 update/sec. in a production environment. Cullinet Software, Inc. was not specific about what transaction volume ADS/On-line supports. A spokesman said only that the transaction volume supported depends on what is supported by IBM hardware.

Some vendors use a figure for how many terminals can access an application written in their fourth-generation languages. A Cincom Systems, Inc. spokesman said its Mantis is installed in a 1,000-terminal network in a U.S. bank. A spokesman for D&B Computing Services Co. said applications written with Nomad2 can support 25 to 30 concurrent users against a single file. A Martin Marietta Data Systems spokesman said Ramis II can support 10 terminals concurrently.

How much is enough? The IBM spokesman said the number of shops processing more than 10 transaction/sec. "is not impressive." Frank Fish, vice-president of sales in the Information Technologies division of Martin Marietta Corp. said, "Only 10 companies in the world do beyond 10 transaction/sec."

Still, some vendors are targeting this transaction processing market. Don Wszolek, director of marketing for Information Builders, Inc., marketers of Focus, said, "We're putting in a research and development effort in the next year on how to tackle that high end" of the transaction processing market.

— John Desmond

Natural selection: Brokerage trades in Cobol

Fourth-generation tool boosts productivity

At the Morgan Stanley and Co. brokerage in New York, Software AG's Natural is in, and Cobol is out, although not completely.

Citing a positive experience with the West Germany-based firm's fourth-generation language, Scott Abbey, vice-president of data administration at Morgan Stanley, said he cannot understand why more DP shops do not employ a fourth-generation language.

Morgan Stanley has achieved a 4:1 productivity improvement, measured by cost per program, using Natural. The company — an IBM MVS/XA shop with 2,400 terminals on-line to IBM 3090 Model 200 and National Advanced Systems Corp. 9080 mainframes — has churned out more than 11,000 programs so far this year.

The company's major application written in Natural is its Trade Analysis and Processing System, a full brokerage processing system supporting account definitions, trades and orders, statements and journals. The firm employs 120 programmers.

The company has found that Natural applications consume more CPU cycles than Cobol applications, but the cost of necessary hardware is justified, Abbey said. "Since the people costs are going up per unit of work while the hardware cost is going down, we like to throw as much of the [processing] burden at the hardware, the decreasing cost factor," he said.

Morgan Stanley is not measuring how many transaction/sec. are being processed with Natural applications. "We don't measure in those terms. We do measure how many trades per day we can support," Abbey said. His machines run at 72% of capacity at peak volume today, he said.

> ”
>
> *Morgan Stanley has achieved a 4:1 productivity improvement from programming in Natural.*

Certain applications are not appropriate for Natural, Abbey has learned. He writes financial modeling and forecasting programs in APL, using a product from I. P. Sharpe Associates of Toronto. "Natural is not well suited to heavily computationally oriented tasks," he said.

The company's applications are split, with about two-thirds running on Natural and one-third on APL. For other users who cannot find a total solution from one vendor, Abbey advised, "The key is to make sure the products you get can be integrated to provide a single solution to the end user. He doesn't want to know you have APL for this and Natural for that. He just wants to press a button on his terminal and get the answer."

Interestingly, some PL/I, Cobol and assembler code is maintained to optimize the performance of certain applications, such as a module that posts journals to the general ledger, which is invoked thousands of times a day. "These programs were carefully chosen. If we rewrote these programs in Natural, we could double our CPU consumption," Abbey said.

For those users who have decided to implement a fourth-generation language for the first time, Abbey advised, "The best way to implement is to make a rule that you will do all your development in the fourth-generation language. Don't leave it to the discretion of the programmer, who will always go back to the tried-and-true method. Secondly, make sure that whatever environment you choose has a strong [data base management system] as its underpinning."

— John Desmond

Vendors rate their products against Cobol for efficiency and transaction volume

Company and Product	Describe the programming productivity gains and CPU efficiency of your language vs. Cobol.	What volume of transaction processing does your language support?
Applied Data Research, Inc. **ADR/Ideal**	*"Customers advise us that a 4:1 gain [is achieved] in development. Ideal will not operate as efficiently as Cobol, [because] there is a certain overhead in determining proper [data] access paths."*	*"Moderately high. At times, [users] must drop into Cobol or assembler to enhance performance."*
Cincom Systems, Inc. **Mantis, Application Development System**	*"It varies from 5:1 to 20:1. Our interpretive programs perform as well as Cobol because Mantis statements enact assembler routines. Degradation problems have to do with I/O."*	*"We can support order processing on a 300- to 400-terminal network with a volume of 100,000 transactions daily."*
Computer Corporation of America **User Language**	*"Productivity gains are 50:1 to 100:1 vs. Cobol. User Language works on a par with Cobol and Fortran."*	*"One customer does 50 update/sec. in a production environment. We've done up to 400 transaction/sec. in an on-line updating application."*
Cullinet Software, Inc. **Application Development System/On-Line**	*"A 10:1 programming productivity gain ... since ADS/Online generates noninterpretive, fully compiled code, it is equal in efficiency to Cobol."*	*"There are no restrictions on volume or data base size. A primary design criterion was to handle high performance in a production mode."*
D&B Computing Services Co. **Nomad2**	*"It ranges from 5:1 to 20:1. In some cases, we perform better than Cobol [because] you can write bad Cobol. [But] we are not out to replace Cobol."*	*"Nomad is not designed for high volume. . . . We support up to 25 to 30 concurrent users against a single file."*
Henco Software, Inc. **Info**	*"We achieve a 10:1 to 20:1 gain. Performance for query and reporting is equal to Cobol, while program performance is 60% to 80% that of Cobol."*	*"High-volume, transaction-oriented applications are not recommended."*
Higher Order Software, Inc. **Use.It**	*"Our product can cut development time 50% or reduce required manpower by 40%."*	*"We don't know the upper limit. It's ideally suited to Cobol banking applications and Fortran scientific applications."*
IBM **SQL/DS**	*"Customer claims run from 2:1 to 10:1; we make no claim. The gains SQL/DS provides are primarily in manipulation of data."*	*"The range is 2 to 10 transaction/sec. across processors. SQL/DS can absolutely be used to develop high-volume, transaction-oriented applications."*
Information Builders, Inc. **Focus**	*"The average is 10:1. On I/O, performance is equal [to Cobol]. Focus uses [up to] two times as many CPU cycles as Cobol."*	*"A volume of 10 to 15 transaction/sec. is supported. We recommend 70 to 80 on-line terminals to a machine."*
Martin Marietta Data Systems **Ramis II**	*"[From a 700-reply survey], gains were 10:1 for building complete applications and 10:1 for maintaining data."*	*"Ramis II is for low to medium transaction volume. We can handle up to 1,000 transaction/hour."*
Software AG **Natural**	*"We get [illegible] productivity gain, 10:1 for programming. In extended arithmetic processing, you will [illegible] the CPU overhead with Natural vs. Cobol. [illegible] in compile time."*	*"We support [illegible] 5 transaction/sec. to 40 [illegible] with a bigger machine, we can process up to [illegible] transaction/sec. in a network supporting [illegible] to 1,500 terminals."*

Language barriers

From page 55

generation language, the spokesman had no comment.

If improved productivity is the promise of fourth-generation languages, users have a range of productivity improvements from which to choose. Vendor claims range from a 3 to 1 productivity gain to 100 to 1. Gains vary by segment of the system development life cycle. Some vendors are sophisticated in their measurement of the gains, others admit off the record that their estimated gains are essentially guesses.

Perhaps among the most important benefits of fourth-generation languages is a reduction in the level of future maintenance that must be performed. Vendors said productivity gains in the maintenance phase of the systems development life cycle are hard to measure. User Scott Abbey of Morgan Stanley said Software AG's Natural is easier to maintain, because each program is restricted to about 500 lines. One consultant said maintenance should not be a factor in the productivity equation, because fourth-generation languages should be used to build prototype applications, which should then be converted to Cobol (see story page 60).

IBM adroitly sidesteps the question of productivity measure by stating, "We make no claim" while citing user reports of a 2 to 1 to 10 to 1 productivity gain with SQL/DS. Martin Marietta cited a survey of 700 users in reporting productivity gains of 25 to 1 for ad hoc reporting to 10 to 1 for building complete applications.

> *'Fourth-generation languages are the way to go. [Users] save money.'*
>
> — **Scott Abbey**
> **Morgan Stanley and Co.**

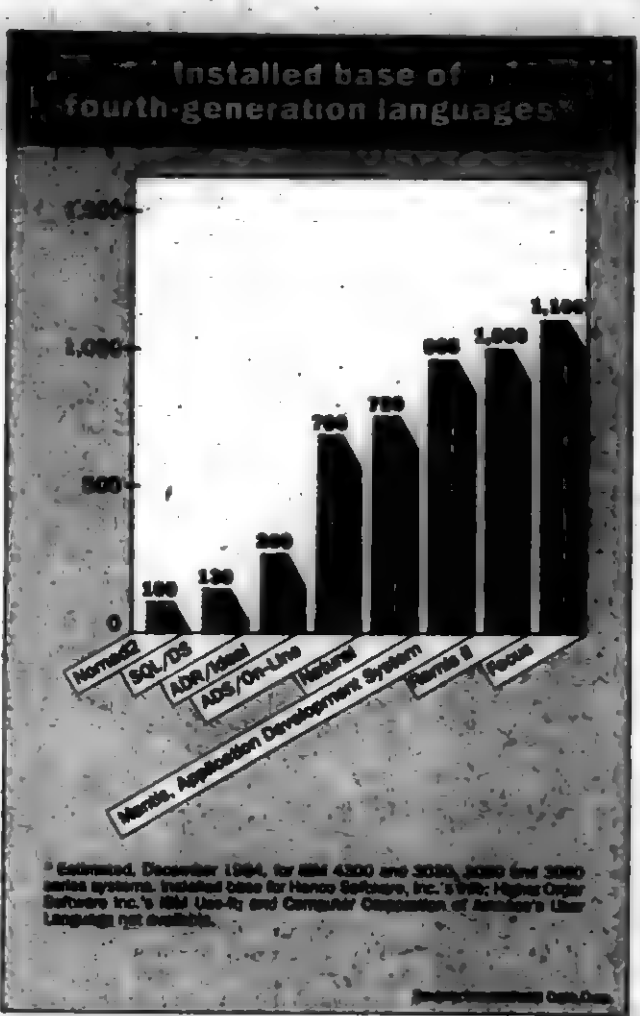
The great counterbalance to better productivity is performance. Can applications developed with a fourth-generation language perform as well as Cobol ones? Will performance bottlenecks stretch response times too far? Is the mainframe big enough to handle the job? Is the cost of buying the necessary hardware justified?

"You can argue about the efficiencies of [fourth-generation language] programs versus Cobol, but the productivity gains are so great and the machines so fast that now nobody worries about losing efficiency in the program," said Warren Fitzgerald, internal consultant on interactive computing and data management for Monsanto Co., based in St. Louis. Monsanto brought in Martin Marietta's Ramis II four years ago. Today, most new applications are written in Ramis II although mainstream production applications are maintained in Cobol.

When high-transaction-processing applications must be written or revised, Monsanto relies on Cobol contract programmers. "We don't do much Cobol programming ourselves anymore," Fitzgerald said. "It's so much easier and faster to develop an application with a fourth-generation language" (see story page 56).

One way the vendors are trying to improve performance and satisfy better the demand for a high-level language for high-transaction applications is by converting language statements into a code more closely resembling fast executing machine in-

See LANGUAGE on page 62



* Estimated, December 1984, for IBM 4300 and 3030, 3080 and 3090 series systems. Installed base for Henco Software, Inc.'s Info; Higher Order Software Inc.'s IBM Use-It; and Computer Corporation of America's User Language not available.

Source: International Data Corp.

Information Builders' Focus has long been the fourth-generation language market leader, but Focus lost market share in 1983-84, falling from 49.6% of the total market in 1983 to 42.4% in 1984, according to International Data Corp.

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Language barriers

From page 61

structions (see story page 60).

Software AG's Natural uses a "p-code" system, in which language statements are compiled to strings of address parameter lists, according to Peter Page, initiator of Natural and executive vice-president of Software AG in Darmstadt, West Germany. To enhance performance, the next release of Natural will mix machine code with p-code, Page said.

The same concept is called something different by Computer Coporation of America whose User Language is "tokenized," meaning the code is interpreted once and embedded with tokens. During execution, the tokens point to subroutines in the company's Model 204 DBMS.

Exactly where the performance bottleneck of a fourth-generation language occurs — and whether the fourth-generation code either makes it or falls short in a full production system — is not related to CPU cycle speed so much as to the number of I/Os that language functions require between the CPU and DBMS, according to several vendors and analysts.

According to Martin Kral, product manager for Cincom's Mantis, which generates interpretive code, "An interpretive version needs to reference data — that's I/O. The degradation problems have to do with I/O, not with cycles."

One vendor maintained that the bottleneck is an operating system limitation. Robert Vonderhaar, senior Nomad2 product manager for D&B Computing, whose product is available for IBM MVS/TSO and VM/CMS operating systems, said, "Those pipes are slow by definition. Neither operating system provides good ways to do high-volume, multiple access to a data base [transactions] such as 200 users trying to update at the same time."

Another vendor maintained that the performance bottleneck is DBMS dependent, hinging on how many users can concurrently update the DBMS. Jim Acquaviva, director of product marketing for Cullinet, said, "Concurrent updating is solved in IDMS/R."

Performance aside, more DP managers are using personal computer versions of fourth-generation languages in the continuing effort to whittle application backlogs.

The vendors are increasingly catering to this need by providing personal computer versions of their products that go beyond micro-mainframe links.

Henco offers PC-Info, a full personal computer implementation of its product, for a variety of microcomputers. Information Builders offers PC/Focus for the IBM Personal Computer. D&B Computing Services developed a microcomputer version of Nomad2 for the IBM Personal Computer XT and AT 370, models which, unfortunately for D&B Computing, have not caught on in the marketplace.

Several other vendors are developing versions of their languages to run on micros. The list includes Software AG, which plans to announce a personal computer version of Natural in 1986, and Cincom Systems, which is developing a version of Mantis for microcomputers. A Cincom spokesman cautioned that the product will not be fully compatible with the mainframe version of Mantis but will be written from scratch to take advantage of microcomputer capabilities.

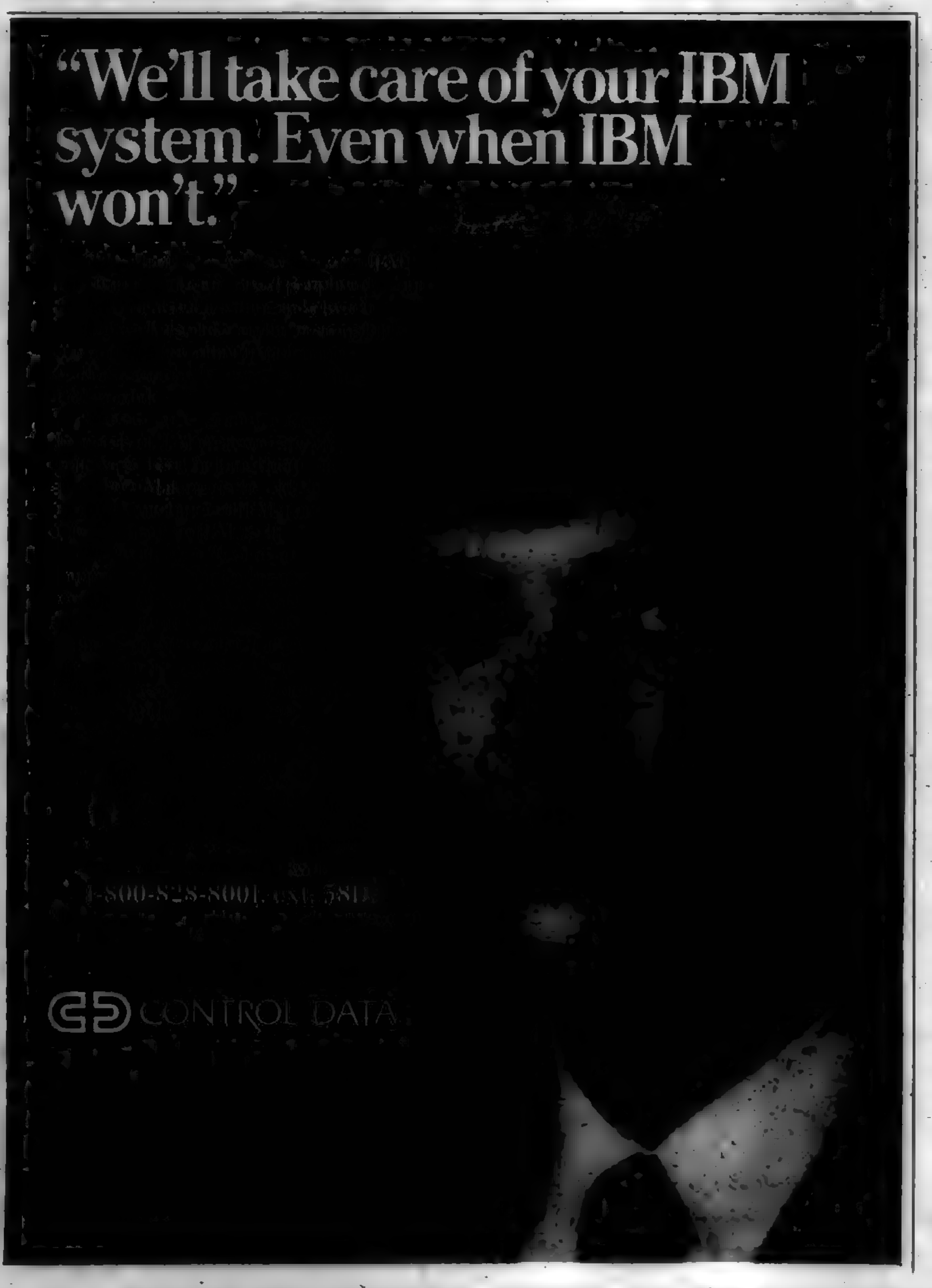
If fourth-generation languages are an important key to improving productivity, and if productivity is the No. 1 issue in most DP shops today, why are the languages not being accepted more quickly by managers? "The biggest obstacle is the stubbornness of the DP manager who insists on doing everything in Cobol. In small and medium-to-small-size shops, there is a tremendous resistance to accepting modern productivity tools," Dorn said.

According to Mimno, nearly every topical issue facing DP managers today is embodied in the decision of why or how to incorporate a fourth-generation language. "The fourth-generation languages should be used in a way that produces a benefit for the business — not just a change from Cobol. The strategy should be, How can these products be used to make information a strategic resource of the corporation? This applies extremely well to fourth-generation languages. Organizations need to understand what the end users are doing and target them. MIS departments do that extremely poorly. The challenge is getting MIS to be more business oriented."

Whether the fourth-generation languages can replace Cobol or should coexist with Cobol is an evolving question. Dr. Schussel said, "A combination of principal fourth-generation language products can eliminate all Cobol in most shops today."

But the Morgan Stanley experience shows otherwise. Even though the New York-based brokerage firm has implemented thousands of applications in Software AG's Natural, for high-volume transaction-oriented applications, Cobol still has an important role in the shop. According to Morgan Stanley's Abbey, "There are things you should not do in a fourth-generation language. If you're careful about your [application] design, you can identify those things after the application is running and fix them."

That apparently is taking place now at the New Jersey Department of Motor Vehicles, where, according to an ADR spokesman, bottlenecks in the Ideal application are being rewritten in a lower level language to boost performance.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The time has come for straight talk about database management systems.

"The only reason to buy a database management system is to build better applications."

Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEO's of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

John J. Cullinane
Chairman of the Board

© [illegible] Cullinet Software, Inc., Westwood, MA [illegible]

The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications; as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of on-line and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

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IDMS/R: More than a relational DBMS

Cullinet

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System cures hospital's incompatibility woes, permits upgrade

WASHINGTON, D.C. — A hospital here found a way to get around the problem of upgrading to IBM 3380 disk drives while running two operating systems not supported by the new drives.

The data processing department of George Washington University Hospital is currently involved in a number of priority projects, according to David Campbell, VM senior systems programmer. The hospital uses a 16M-byte IBM 3083 Model KX computer and an 8M-byte 4341 Model 2 mainframe processor, both running IBM's VM facility, which, in turn, allows them to run multiple IBM operating systems. Both systems run IBM's DOS and OS/VS1 operating systems under VM, and the 3083 also runs MVS. Under DOS, both machines also support the IBM CICS environment, Campbell said.

Doctors at the hospital can gain access to individual medical histories, and administrators can perform patient registration and billing from any of the more than 200 terminals located throughout the hospital, Campbell said. Programmers increasingly are kept busy developing new systems, which include automating pharmacy order management, he said. DP is also incorporating financial systems, such as insurance claims processing, into the on-line environment.

Key to the continued success of these functions are plans to complete a migration to IBM's MVS operating system, a task already begun, Campbell said. If both machines were running only MVS, throughput would increase by roughly 30%, he said.

[illegible]

Application: Emulator

Business: Hospital

User: George Washington University Hospital

Tied closely to this were plans to replace the existing IBM 3350 and 3375 disk drives with IBM 3380 drives on both CPUs, he said. Doing this would improve performance, reduce maintenance and — most important to the hospital — reclaim the much-needed computer room floor space, he said. The obstacle directly in the way of these goals was the incompatibility posed by the operating systems in use — DOS/VSE and OS/VS1 — and the target 3380 DASD, he said.

The hospital decided that the effort required to upgrade the DOS and OS operating systems to gain the necessary compatibility with the 3380 drives was not worth the manpower and expense, especially in light of the eventual move to MVS and use of the 3380 devices in native mode, Campbell said.

Cambell went through a pile of "junk mail" one day and came across a postcard from SDI Co. of San Mateo, Calif., regarding a product called VM Magic, which causes 3380 disk drives to pretend to be 3350s or 3375, Campbell said. He showed the card to the hospital's MVS programmer, who, in turn, gave it to his boss, Jerry Dowell, Campbell said.

'Fake out DOS and VS1'

Dowell, assistant director for MIS, requested the product on a trial basis, Campbell said. Campbell installed the package and began what was to be a brief initial test period, he said. "VM/Magic allowed us to fake out DOS and VS1," he said.

MIS personnel at the medical center were initially skeptical because the product was relatively new, Campbell said. The hospital first emulated one spindle of the 3350 on the newly installed 3380s about a year ago, while the 3350s remained as backup, he added. After running problem free for approximately one week, the 3350s were carted out to the hall, and the whole disk system was converted to 3380s, he said.

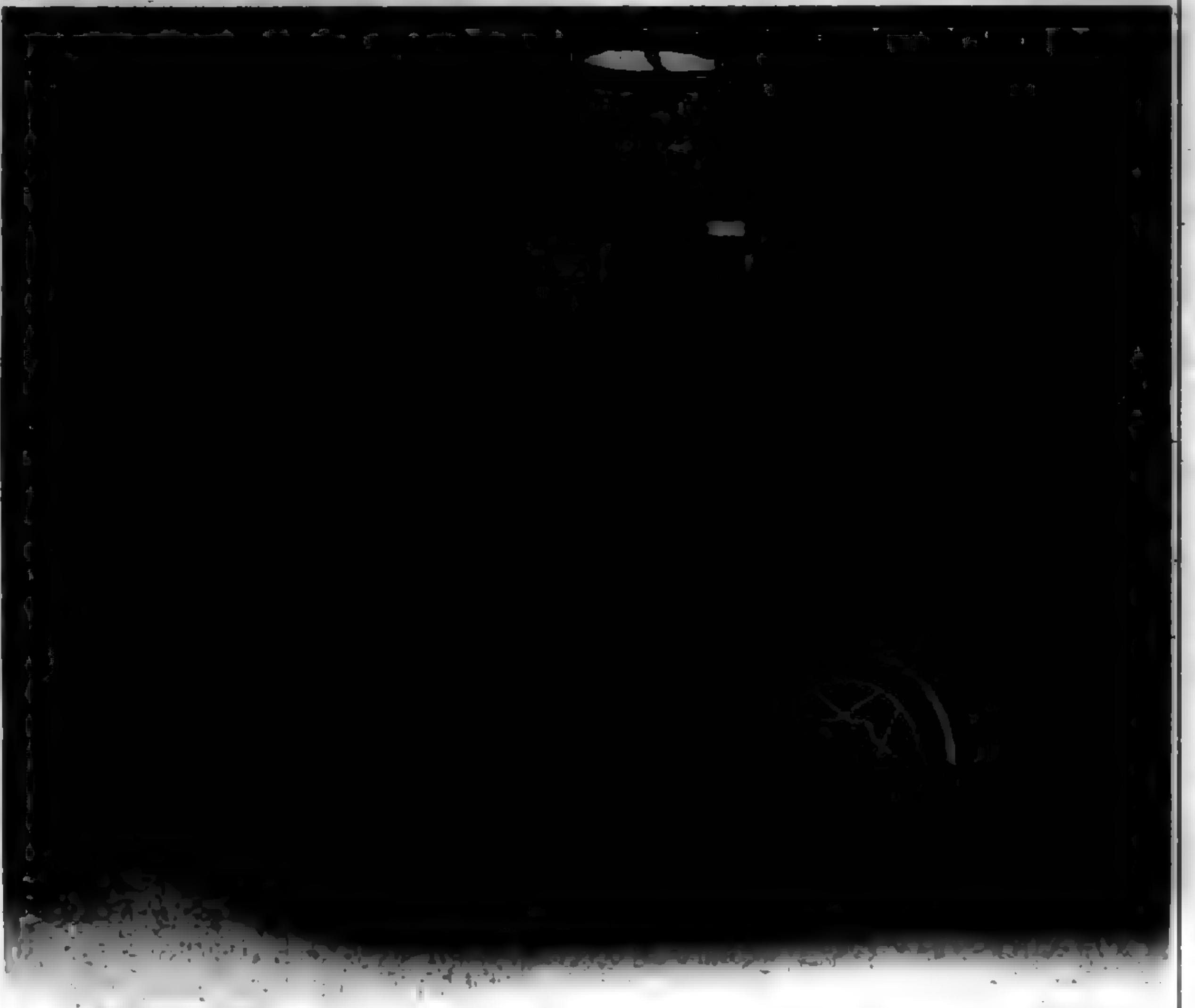
Within a month, the 3375s had also been removed from the computer room, Campbell said. The medical center has eliminated all of the old disk drives and replaced them with 2¼ strings (40 addresses) of 3380s. The anticipated benefits of saved computer room space and cost justification have come true, he said.

Computer room space was saved by eliminating one of three 3880 storage directors, Campbell said, and by the smaller size of the 3380s. The home freezer-size 3380 contains four spindles and 2.5G bytes of data, he said. About four 3350s fit on a 3380, he added, and two 3375s take up the same floor space as a 3380.

Dollar savings are harder to pinpoint, Cambell said, but the cost savings more than offset the cost of VM/Magic, he said.

Disk I/O operations are supposed to be performed at the speed of the 3380, not at the speed of the simulated disk device, but in actuality, they are slower than that, Campbell said. "It's still much faster than a 3350," he added.

"When we installed VM Magic, it was still a relatively new product, and there were some rough areas in the installation documentation. But they [SDI] listened to what I had to say and actually incorporated my comments into the manual."



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Playing card supplier cuts staff, expenses with in-house system

Users were able to teach data base their language

CINCINNATI — The world's largest supplier of playing cards was able to cut its clerical staff and its operating expenses when it brought a computer system in-house.

U.S. Playing Cards, Inc., the manufacturer of Bicycle, Bee, Congress and other playing card brands, celebrated the 100th anniversary of its Bicycle brand this year. Around the same time, the company investigated computer systems that would help upgrade it to a fully automated corporation, according to Ingrid Fabian, corporate data processing manager for the company.

In an effort to help its employees make a smooth transition from old-fashioned office machines to high-tech equipment, Mike Schlarmann, who was then DP manager of the company, chose to install McDonnell Douglas Computer Systems Co.'s (formerly Microdata Corp.) Sequel 3240. The system runs Mandata, Inc. of Cincinnati's Manage-2000 manufacturing package as a skeleton system, Fabian said. She and her staff customized the Manage-2000 package to meet the firm's needs.

Modules in the package originally included accounts receivable and payable, general ledger and inventory. Since then, the company has added payroll and purchasing functions, which have also been customized, she said.

System learned users' vocabulary

Users can query the data base using Microdata's Natural English software, which permits users to teach the computer to learn their vocabulary. The system's capability of using everyday language in queries was a major factor in user acceptance of the equipment, Fabian said. She developed a common glossary of terms for users and has limited the number of people who can make changes to the glossary because there are now too many people on the system for everyone to be making changes, she said.

"I can say, 'How many Bee cards did Joe Smith sell last month?' and the computer knows Joe Smith, Bee and the time period, and it will give me a listing," Fabian said.

U.S. Playing Cards originally purchased the Sequel 3240 system with 1M byte of main memory, 128M bytes of disk storage, a tape drive, two printers and 10 terminals in November 1983, and the system was fully operational by the end of December. Since then, the company has enhanced the system to 5M bytes of main memory, 1G byte of storage, eight printers and 52 terminals, she said.

The additional users are people who asked to be added to the system, she said. "The staff who requested things discovered I could fill their requests in 10 minutes to two hours, so they wanted to learn," she said. Fabian said she has a waiting list of people to train.

The company eliminated an outside service bureau that had been keeping track of the company's records. The service bureau was a division of Diamond International, the company that formerly owned U.S. Playing Cards, Fabian said. When Diamond sold the card company, its division informed the card company that it had three months to get off its time-sharing system. At that time, U.S. Playing Cards submitted handwritten forms once a day to the time-sharing service, and the jobs were run in batch mode overnight. "We didn't even have a keypunch machine," she said. Errors had to wait to be corrected until the next night, she added.

The company initially looked at IBM's System/38 as well as the Microdata machine, Fabian said. They chose the Microdata unit because it was a flexible machine that could be added to and because it ran the software package that they wanted, she said.

[illegible]

Application: In-house computer system

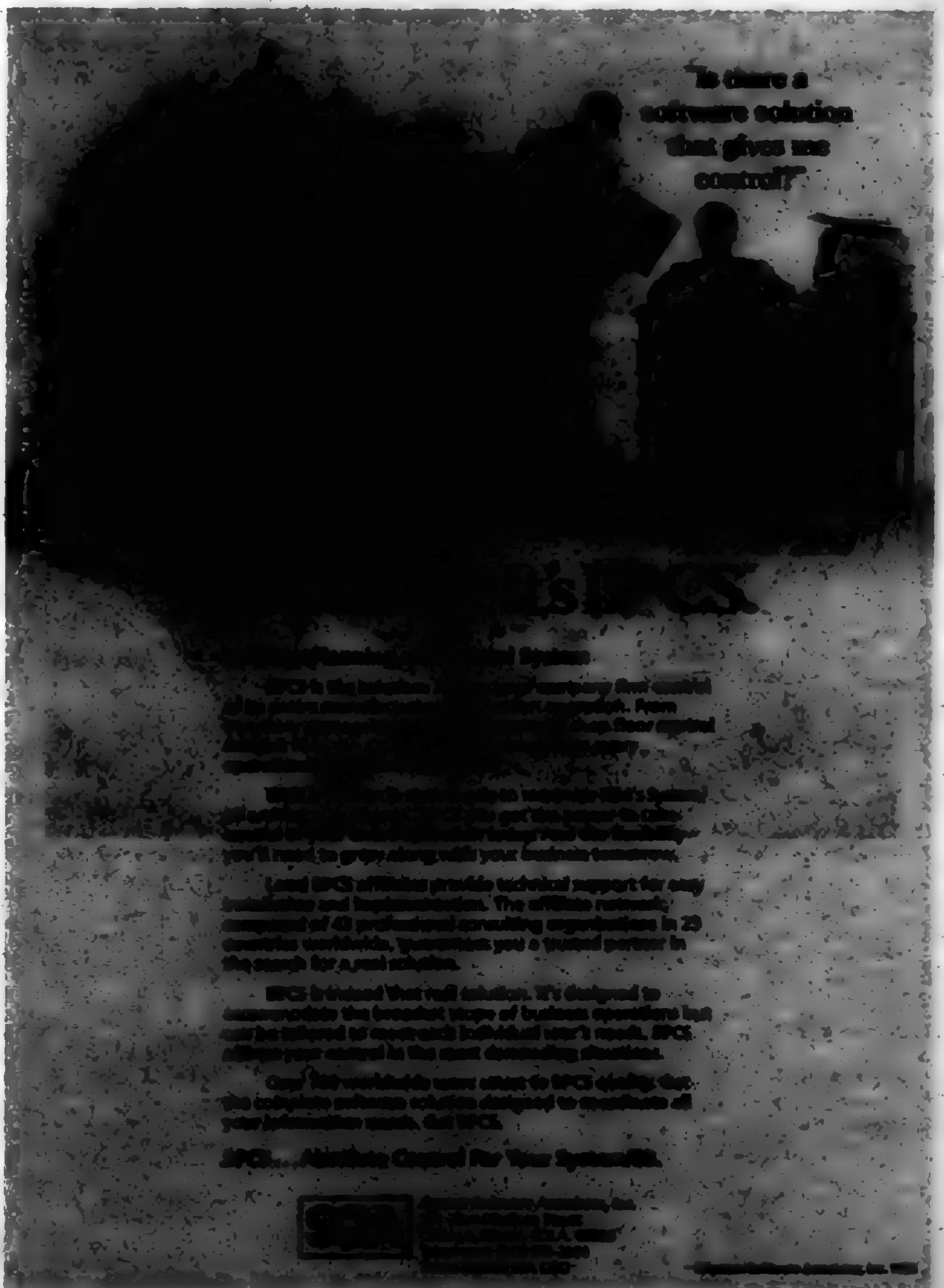
Business: Playing card company

User: U.S. Playing Cards, Inc.

The criteria has been validated, Fabian said. The system has doubled in capacity without having to sell or exchange any of the original equipment.

The initial equipment investment was $220,000, which the company recovered in seven months, Fabian said. The cost of the system has doubled since the first installation, but she said she expects those costs to be recovered by the end of this year.

The clerical staff has been reduced by about 10%, according to Fabian. Orders that used to be taken manually are now entered on-line while the clerk takes the order on the telephone, she said. When the order is finished and verified, labels and packing slips are printed out in the shipping department at the same time, she said.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Electronic publishing system helps packaging firm chart growth

GREENWICH, Conn. — When a large packaging company diversified into new and unrelated businesses, the controller's office was faced with treble the amount of financial information it was expected to produce on a monthly basis.

Directors and executives wanted more and better analysis, but until the department obtained an electronic publishing system, analysts were too busy with cutting and pasting to attempt trend analyses and forecasts.

American Can Co. began its diversification drive in 1981, moving into the complex and competitive fields of information-based financial services and specialty retailing. As these businesses were added, the controller office's monthly briefing books, provided as decision aids for the executive committee and board of directors, swelled from 20-page booklets to 70-page tomes.

Production, which involved the pasting together of typewritten text and plotter-produced charts and graphs for assembly on a Xerox Corp. color copier, became a logistical nightmare.

"When I came to the company a couple of years ago, I wanted some additional trend charts added into these books," said David Chemerow, vice-president and corporate controller. "What I discovered was that it would take 48 hours just to run the extra information through the plotter. We were simply running out of days in the month," according to Chemerow.

Top line summary

Application: Electronic publishing system

Business: Packaging, financial services

User: American Can Co.

The mainframe plotters were not the only obstacle to progress, according to William Lowry, director of corporate systems development and analysis.

Color copiers slow

The Xerox color copier that represented the final leg of production also ate up volumes of time that could have been devoted to analysis. "Color copiers are pretty slow," he said. "Ours produced about 2½ copies a minute . . . when it worked."

At the beginning of this year, Lowry decided that it was time for the controller's office to capitalize on the growing trend toward distributed microcomputing at American Can; he purchased an Interleaf Electronic Publishing System for the department from Interleaf, Inc. of Cambridge, Mass.

The system, which cost the company $80,000, consists of Interleaf software running on a Sun Microsystems, Inc. Sun 2/120 workstation with a 130M-byte disk drive and an Imagen Corp. 8/300 laser printer equipped with Interleaf fonts and graphics software.

Lowry considered other publishing systems, including those from Xerox and Compugraphic Corp., but Interleaf, he said, offered the functionality that was needed in terms of graphics creation and integration "at a cost we felt was appropriate to the function."

Two people manage the system

Two people manage the system's operation: one secretary and one analyst, who is primarily responsible for updating the monthly numbers in tables and charts and creating new displays as they become necessary. Although more than 40 different chart and graph styles are available through the system, design innovation is a low priority for this application.

"One of the major reasons that I pushed this project," Lowry said, "was the improved readability you get with typesetting. I've seen a lot of studies that show typeset documents can be read more quickly and with better comprehension than typewritten material."

Although affordability definitely entered into the purchase decision, cost savings were not a major goal in the acquisition.

"I'd say we are realizing at least six to eight man-hours a month in savings," he estimated. "But the real benefit is that we are producing a bigger and better book at no additional cost."

Beyond the elimination of time-consuming cut-and-paste work for analysts, the Interleaf system has the potential of cutting down on information entry redundancies. It accepts text and data files transferred from remote personal computers through an Ethernet network to an AT&T 3B2/300 computer.

Eventually that capacity may facilitate the flow of financial information from the company's various business divisions to the controller's office, but, as yet, the only remote communicators are two analysts, according to Lowry.

The only negative trade-off resulting from the switch-over has been the loss of color capability. The board does miss having its charts in color, Lowry said.

Supermicrocomputer network hoists forklift firm's business

CHARLOTTE, N.C. — The demand for materials handling equipment such as forklift trucks is a cyclical one. To avoid what would otherwise be a cyclical rise and fall in its employment levels, Carolina Handling, Inc., a forklift sales and service firm, turned to a communications network to link computers at the firm's four locations.

"Communication between offices and with customers has been our key to staying in business and to continuing our growth," according to Donald Pratt, president of Carolina Handling. In May 1982, the company installed a Zilog, Inc. System 8000 supermicrocomputer network to keep track of client information and interoffice records.

Carolina Handling has branch offices in North Carolina, South Carolina and Georgia, each with a Zilog Model 11+. "These models have added new power and speed to our business environment," Pratt said. The time-sharing computers, small enough to fit under a desk, reportedly can support up to eight users.

A Zilog Model 31, meanwhile, was installed at headquarters. Capable of handling up to 24 users, the Model 31 supports 320M bytes of Winchester disk storage and 4M bytes of main memory, typical of the requirements that Carolina Handling needed for its new system.

"We needed a monstrous data base. Our forklift equipment records are maintained for 25 years, instead of the usual 10," Pratt explained.

Flexibility winning feature

System 8000 architecture, based on Zilog's 16-bit Z8001 microprocessor, reportedly provides both the Model 11+ and Model 31 with flexibility, a feature that Pratt said was key in winning Zilog the company's contract. Approximately three other vendors, including IBM, had also been considered for the network, Pratt noted.

"The minicomputer system we were using [previously] was not compatible with any other manufacturer's components," Pratt said. "There wasn't a wide enough range of peripherals available from them to satisfy our requirements."

Additional flexibility is provided by the System 8000's AT&T Unix operating system, Pratt said. Unix allows Carolina Handling to use high-level application programs such as Fortran, Cobol, Pascal and Basic.

Carolina Handling's system, Pratt said, is completely interactive from department to department, office to office. "Everyone uses the Zilog system for inquiries, parts ordering, inventory, billing, invoicing, repairs and sales," he said.

Although information can be accessed from any point in the system, each location has control of its own data base.

Zilog supermicrocomputers form the base of the data phone communications at Carolina Handling. Several Televideo Systems, Inc. and Wyse Technology, Inc. terminals; Ven-Tel, Inc. modems; and Texas Instruments, Inc. printers round out the system to make the interstate communication possible.

Pratt said he also appreciated what he called the Zilog system's reliability. "If our equipment went down for one week, it would take us four weeks to get it straightened out; we would lose 10% of the year's revenue," he said. "Our Zilog system has never caused us any problems."

Carolina Handling has also found the Zilog equipment has helped it to serve clients more effectively. "Everyone in the company knows how to use the system," he said. "When a customer calls in for any kind of information, be it sales or maintenance, we can provide it immediately. This ability to help customers more efficiently reflects positively upon our business."

Carolina Handling further strengthens its client relationships by using the Zilog system to help it prepare two free proprietary reporting services for customers: PUSH, or Parts Usage Sales History, and MASH, or Monthly Analysis of Service History.

[illegible]

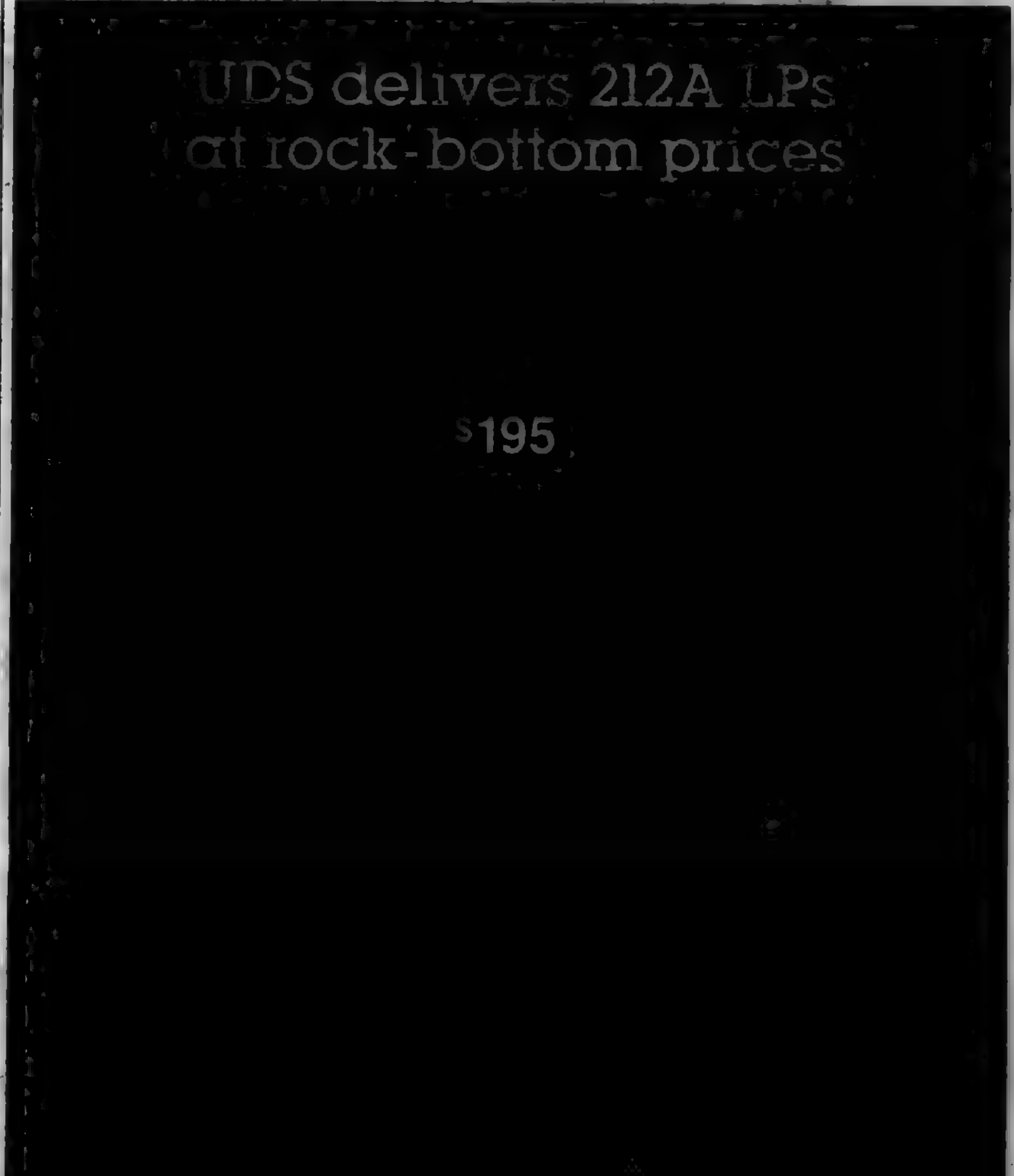
Application: Supermicrocomputer network

Business: Forklift sales and service

User: Carolina Handling, Inc.

Installation of the supermicro system has also benefited Carolina Handling directly. "We attribute our growth during the capital goods recession to the Zilog equipment," Pratt said. "We have 125 employees and never had to lay anyone off because of our success. During this time, we maintained our customer base, even adding to it."

The Zilog supermicro provides Carolina Handling with a comprehensive data processing environment and interstate communications. The system is multiuser capable, multifunctional and totally upgradable. "The capabilities of our present system are critical to our continued success as a business. As offices grow, our system can grow," Pratt said.



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Textile firm keeps pace with growth through system advances

LAWRENCE, Mass. — In an industry where most U.S. competitors have been decimated by foreign competition, the 45-year-old Lawrence Textile Co. has seen its business grow 60% in 1983 and 40% last year. To keep pace with this growth, the firm has been using its computer system to gain production efficiencies.

Lawrence Textile, founded in 1940 by Sam R. Benigno, serves the textile industry by inspecting incoming unfinished cloth against more than 100 defect codes, performing any of more than 800 different fabric treatments and then shipping the uncut cloth to finished goods manufacturers. In a typical year, Lawrence Textile reportedly will process more than 11 million yards of fabric in 50 different types and colors from a dozen mills.

[illegible]

Application: Inventory management and production control

Business: Textile services

User: Lawrence Textile Co.

According to company Vice-President Thomas Benigno, "Advances in inventory management and production control, made possible by computers, have enabled us to offer mills as well as finished goods manufacturers an unsurpassed degree of quality control safeguards."

The company has used Honeywell, Inc. computers exclusively since installing its first, a Model 58, in 1974. That system was replaced in 1976 by a Level 62 computer, which, in turn, has been replaced by a new DPS 4 system, installed last year when a new 60,000 sq-ft add-on facility attached to the company's original building was opened.

Thomas said that he chose Honeywell to supply his computer needs, in part for a geographical reason: The Honeywell plant is located just up the road from him in Lawrence. As a result, he said, factory service workers usually respond to his calls within two hours. He considered switching to IBM at one time, he said, but found IBM could not help him with his Cobol-based programming needs.

Thomas' calls for service have been few, another plus for the equipment, he said. "For the most part, in all the years I've had Honeywell, I think the system was down three times," he said.

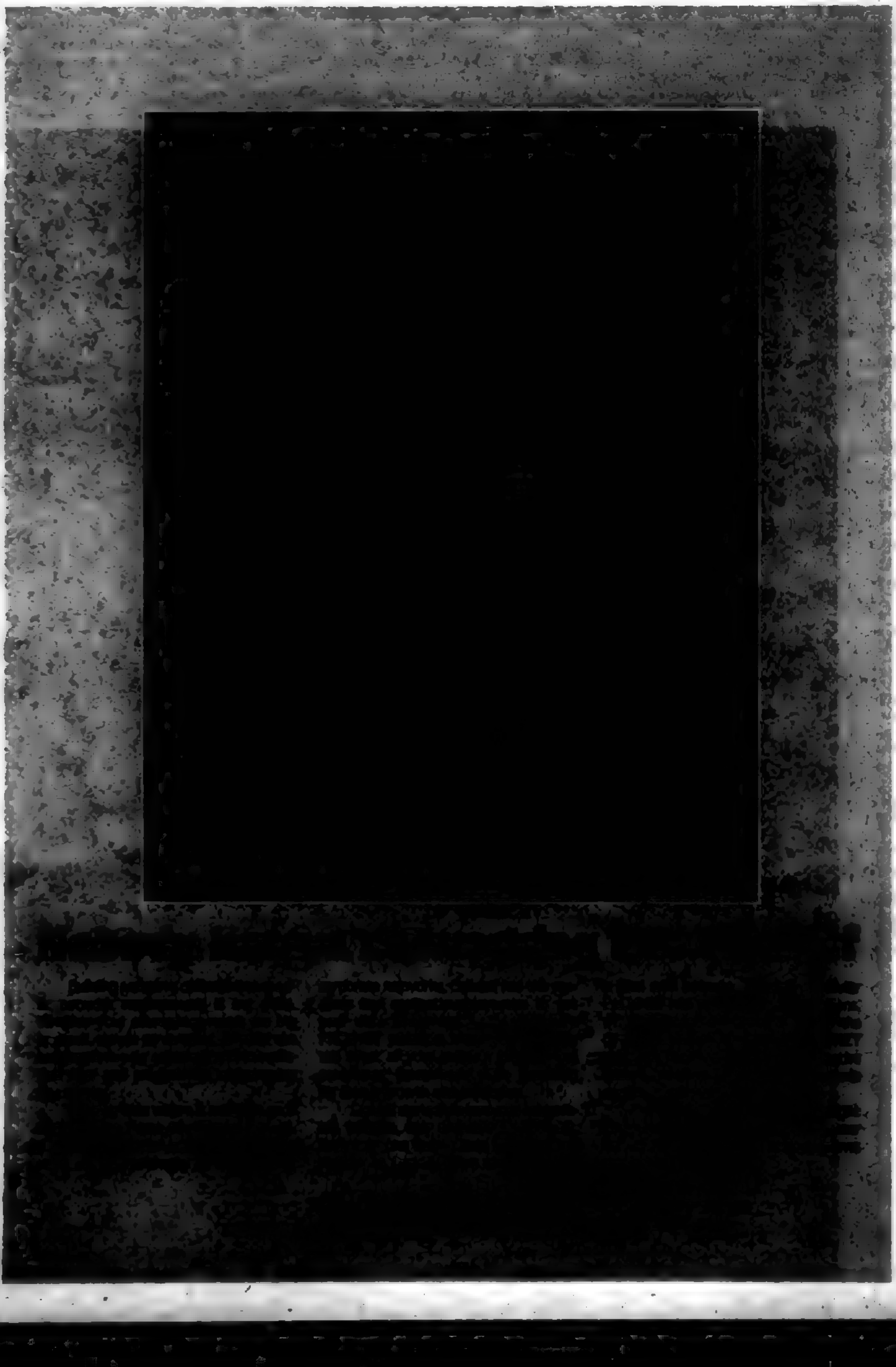
Another plus for the textile firm was Honeywell support, Thomas said. During the installation of the Level 62 mini, Honeywell provided conversion aids as well as a "technical aide who worked side by side with me" to bring the system up, Thomas explained.

When the company moved up from the Level 62 to a DPS 4, Thomas said, "There was practically zero [time spent] for conversion."

Thomas said that he has performed all the computer programming on the Honeywell systems, although he has no formal DP training. "The computer posts all details relative to shipper, customer, date received, quantity, description of cloth, treatments to be performed and more," he said. "We also installed a smaller Honeywell computer in 1983 to generate bar code labels, which, once attached to all separate goods, help us track the cloth throughout our treatment and storage processes."

Lawrence Textile has more than $250,000 invested in Honeywell computer equipment, Thomas reported. The DPS 4 system in use at Lawrence Textile is configured with 1M byte of memory and five Honeywell 330 80M-byte disk drives. Mass memory can be expanded to 12 drives, something that, Thomas said, he especially likes about the system.

The DPS 4 uses the same software, terminals, printers and mass storage devices as the Level 62 machine.



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CALENDAR

WEEK OF NOVEMBER 17

NOVEMBER 18-19, BOSTON — **Software Tools Conference for Artificial Intelligence/Expert Systems.** Contact: Warren Briggs, Conference Chairman, Suffolk University, Boston, Mass. 02108.

NOVEMBER 18-19, SAN FRANCISCO — **Real Estate Investment Opportunities for Financial Institutions.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 18-19, STAMFORD, CONN. — **Software Management Strategies Conference.** Contact: Mimi Ford, Gartner Group, Inc., P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

NOVEMBER 18-22, ARLINGTON, VA. — **Tutorial Week Washington '85.** Contact: Martez A. Camilleri, Institute of Electrical and Electronics Engineers, Inc. Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

NOVEMBER 18-22, HOUSTON — **Structured Systems Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

NOVEMBER 18-22, LAKE BUENA VISTA, FLA. — **Comprehensive Course in Data Communications.** Contact: Data Communications, Special Projects Conference Management Center, c/o Information-Breakthroughs, Inc., 445 W. Main St., Wyckoff, N.J. 07481.

NOVEMBER 18-22, SAN FRANCISCO — **Database Management Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092. Also being held Dec. 2-6 in Houston and Dec. 9-13 in Chicago.

NOVEMBER 20, BOSTON — **T-1 Carrier Strategies.** Contact: DMW Group, Inc., Seminar Division, 2020 Hogback Road, Ann Arbor, Mich. 48104. Also being held Dec. 3 in Los Angeles.

NOVEMBER 20-21, ROSEMONT, ILL. — **Network Management/Technical Control.** Contact: Louise Myerow, Registration Manager, CW/Conference Management Group, CW Communications/Inc., 375 Cochituate Road, Framingham, Mass. 01701.

NOVEMBER 20-24, LAS VEGAS — **Comdex/Fall '85.** Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

NOVEMBER 21, BURLINGTON, MASS. — **MPE Tune-up.** Contact: Charles Volz, Volz Associates, 34 Undine Ave., Winthrop, Mass. 02152.

NOVEMBER 21-22, SAN FRANCISCO — **Import/Export Financing for the Small to Mid-Sized Bank.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 21-22, WASHINGTON, D.C. — **PC as a Programmer/Analyst Workstation.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held Dec. 12-13 in Boston.

NOVEMBER 22, BURLINGTON, MASS. — **Operator Tune-up.** Contact: Charles Volz, Volz Associates, 34 Undine Ave., Winthrop, Mass. 02152.

WEEK OF NOVEMBER 24

NOVEMBER 25-27, ATLANTA — **Strategic Analysis, Planning and Forecasting on the Personal Computer.** Contact: Vern Lautner, American Management Association, 135 W. 50th St., New York, N.Y. 10020.

NOVEMBER 29 - DECEMBER 1, PACIFIC GROVE, CALIF. — **Forth Modification Laboratory Conference.** Contact: Forth Interest Group, P.O. Box 8231, San Jose, Calif. 95155.

WEEK OF DECEMBER 1

DECEMBER 2, NEW ORLEANS — **VSAM Foundations.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 2-3, CHICAGO — **Application Prototyping: A Key to Successful Systems Development.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

DECEMBER 2-3, CHICAGO — **In-House vs. Contract Maintenance.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 2-4, CARY, N.C. — **Introduction to Statistics Using SAS/STAT Software.** Contact: Sally Roberson, SAS Institute, Inc., P.O. Box 8000, SAS Circle, Cary, N.C. 27511.

DECEMBER 2-4, DALLAS — **CICS Command-Level Programming.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

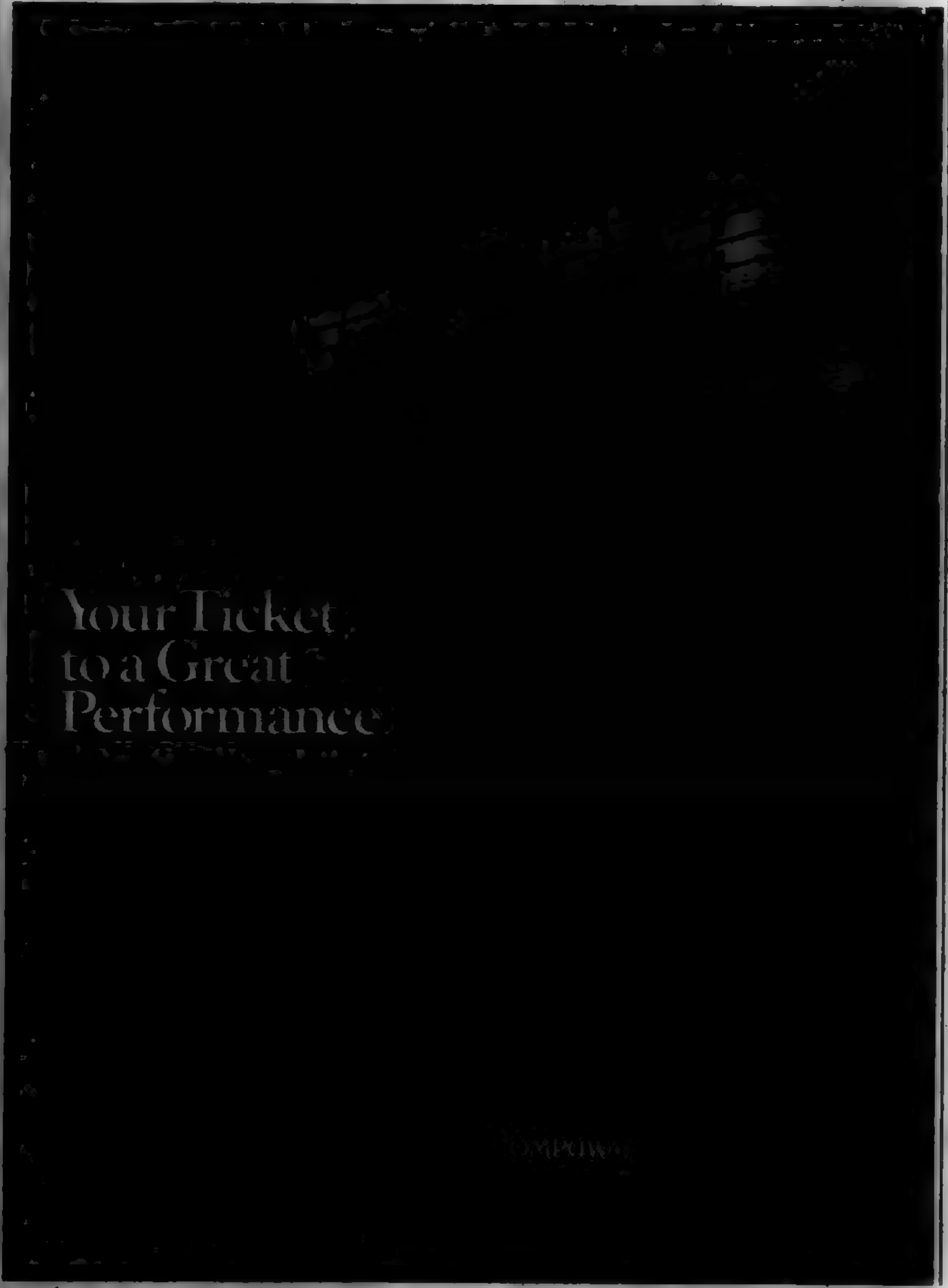
DECEMBER 2-4, HOUSTON — **IBM Large Computer Market Conference.** Contact: Aleba Gartner, Gartner Group, Inc., P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

DECEMBER 2-4, NEW YORK — **How to Select and Implement a Telephone System.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 2-4, SAN FRANCISCO — **Data Communications I — Basic Concepts.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 2-4, WEST PALM

See CALENDAR on page 77



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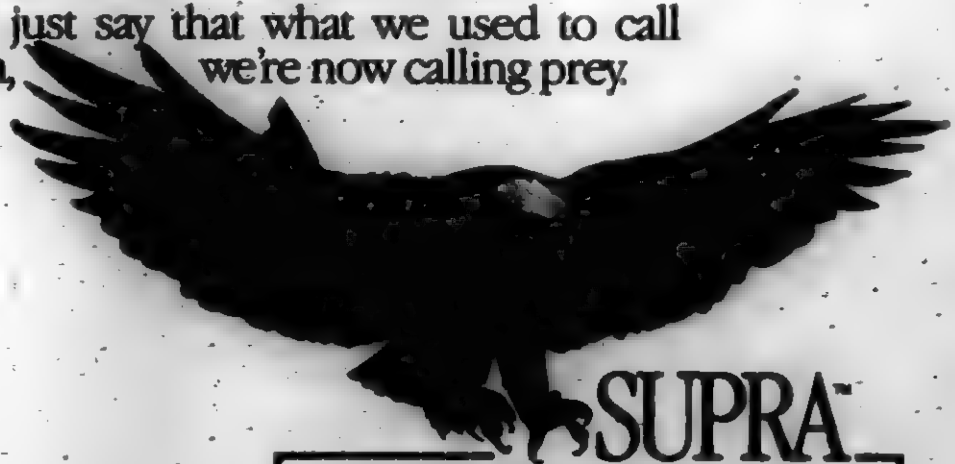

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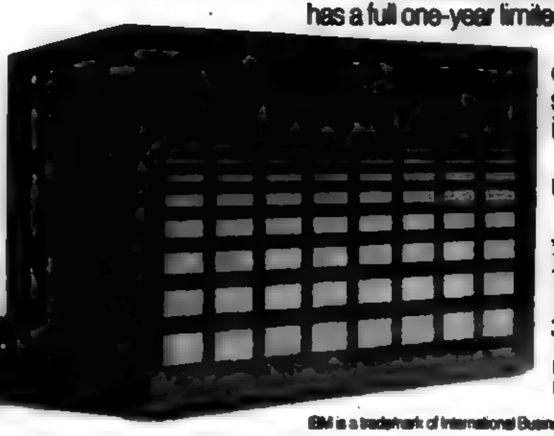

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CALENDAR from page 72

BEACH, FLA. — **Data Dictionaries: Concepts, Contents and Uses.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 2-5, BURBANK, CALIF. — **IMS/ADF II Application Development.** Contact: IMS Consulting, Inc., Suite 305, 16601 Ventura Blvd., Encino, Calif. 91436.

DECEMBER 2-5, NEW ORLEANS — **Global Telecommunications Conference — Globecom '85.** Contact: Tommy Mayne, Globecom '85, Canal Place One, New Orleans, La. 70130.

DECEMBER 2-6, ATLANTA — **Structured Analysis & Design Techniques Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

DECEMBER 2-6, NEW YORK — **CICS/VS Command Level Programming Course.** Contact: Bob Warwick, Branch Manager, Computer Assistance, Inc., 130 W. 37th St., New York, N.Y. 10018.

DECEMBER 2-6, WAKEFIELD, MASS. — **Tutorials for Professional Development.** Contact: Association for Computing Machinery, Tutorials for Professional Development, P.O. Box 9209, Church St. Station, New York, N.Y. 10249.

DECEMBER 2-6, WASHINGTON, D.C. — **Defense Computers and Graphics.** Contact: World Computer Graphics Association, Inc., Suite 399, 2033 M St. N.W., Washington, D.C. 20036.

DECEMBER 3-4, BATON ROUGE, LA. — **Bank Director's Seminar.** Contact: Peggy Meyer, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

DECEMBER 3-5, LOS ANGELES — **SAS Processing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Dec. 10-12 in Arlington, Va.

DECEMBER 3-5, NEW YORK — **Telemarketing/East.** Contact: Philip Carroll, Telemarketing East/West, Inc., P.O. Box 829, Arnold, Md. 21012.

DECEMBER 3-5, WASHINGTON, D.C. — **Analysis of Research Data: Practical Applications.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

DECEMBER 3-6, DALLAS — **North American Telecommunications Association (NATA) 1985 Convention & Exhibition Showcase.** Contact: NATA Convention Department, Suite 550, 2000 M St. N.W., Washington, D.C. 20036.

DECEMBER 3-6, NASHVILLE — **ATMS, The Electronic Delivery Systems Conference.** Contact: Peggy Meyer, Bank Administratión Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

DECEMBER 4-5, CHICAGO — **Data Communications II — Digital Communications Systems.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 4-5, PALO ALTO, CALIF. — **California Computer Show.** Contact: Norm DeNardi Enterprises, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

DECEMBER 4-6, PHOENIX — **Arizona Electronics Expo.** Contact: Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

DECEMBER 4-6, FORT LAUDERDALE, FLA. — **CICS Internals for Systems Programmers.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 4-6, LOS ANGELES — **SAS Macro Language Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Dec. 11-13 in Arlington, Va.

DECEMBER 5, DALLAS — **CDLA's Regional Reception.** Contact: Dianne L. Sims, Manager of Convention Planning, Computer Dealers and Lessors Association, Inc., 1212 Potomac St. N.W., Washington, D.C. 20007.

DECEMBER 5-6, BOSTON — **Local Area Networks.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 5-6, NEW YORK — **Optimizing Long Distance Services.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 5-6, SAN FRANCISCO — **Integrating Voice and Data in the PBX.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521. Also being held Dec. 12-13 in New York.

DECEMBER 5-6, WASHINGTON, D.C. — **Introduction to Telecommunications Systems: Technologies and Applications.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 5-6, WEST PALM BEACH, FLA. — **Data Administration: Development and Practice.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

WEEK OF DECEMBER 8

DECEMBER 8-11, CHICAGO — **1985 Fall Industrial Engineering Conference.** Contact: Stephanie Starr, Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

DECEMBER 9-10, BOSTON — **Systems Analysis & Design for the HP 3000.** Contact: Charles Volz, Volz Associates, 34 Undine Ave., Winthrop, Mass. 02152.

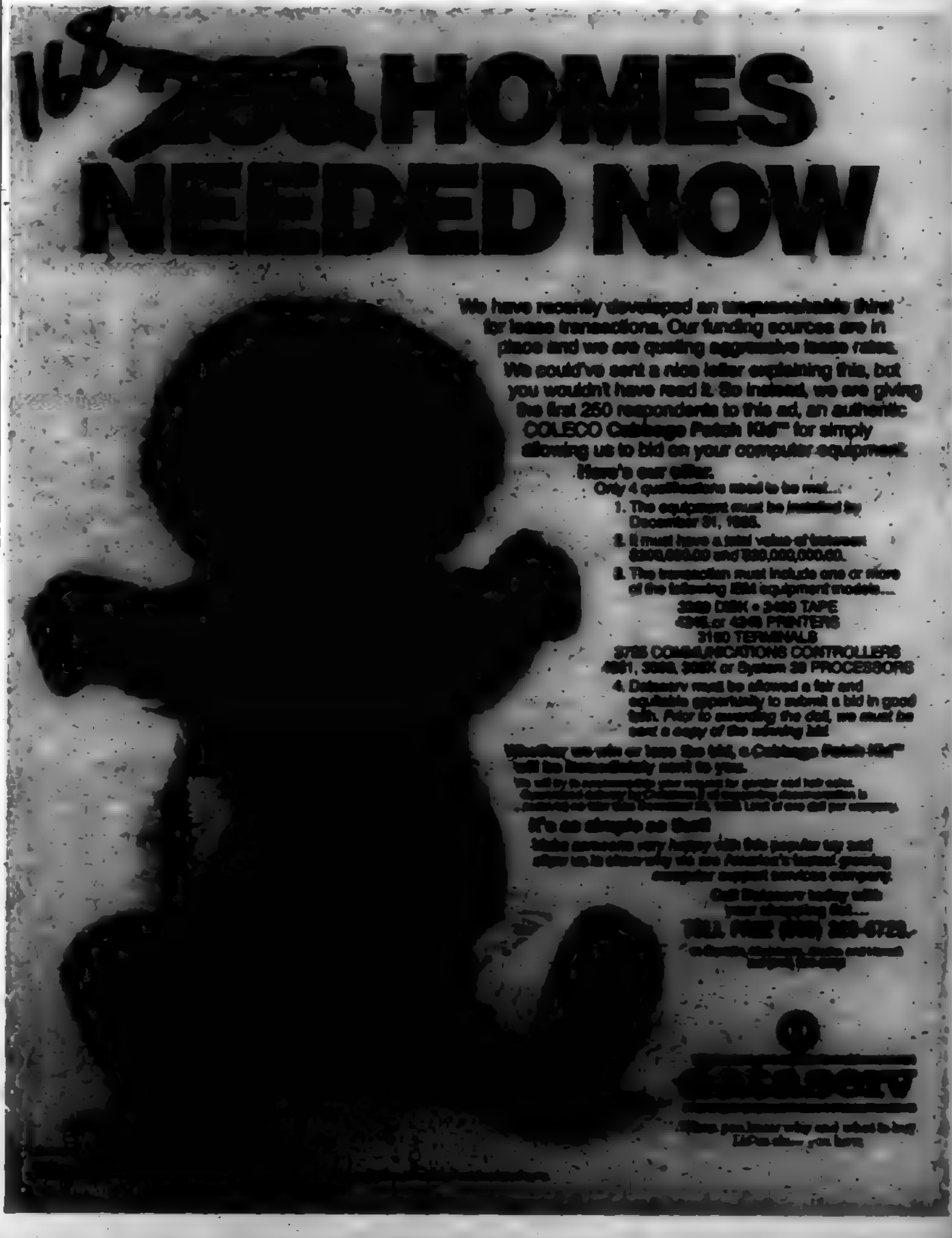
DECEMBER 9-10, DALLAS — **PC/MIS Managers Speak Out!** Contact: Ken Orton, Future Computing, Inc., 8111 LBJ Freeway, Dallas, Texas 75251.

DECEMBER 9-10, DALLAS — **Third Annual Microcomputer Conference.** Contact: Financial Managers Society, Inc., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

DECEMBER 9-10, LOS ANGELES — **Introduction to VSE/SP 2.1 for Systems Programmers.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 9-10, ORLANDO, FLA. — **Satellite Communications.** Contact: TMSA Seminars, c/o Technology Training Corp., P.O. Box 3606, Dept. SATCOM, 3420 Kashiwa

See CALENDAR on page 78



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CALENDAR from page 77

St., Torrance, Calif. 90510. Also being held Dec. 12-13 in Washington, D.C.

DECEMBER 9-10, SOMERSET, N.J. — **Writing Management Reports.** Contact: Mary Ann Cluggish, Information Mapping, Inc., 275 Wyman St., Waltham, Mass. 02154. Also being held Dec. 11-12 in Somerset and Jan. 7-8 in Boston.

DECEMBER 9-10, WEST PALM BEACH, FLA. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 9-11, ORLANDO, FLA. — **VM/SP Structure, Flow and Tuning.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 9-11, SAN FRANCISCO — **Telecommunications Management.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 9-11, WASHINGTON, D.C. — **Financial Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

DECEMBER 9-13, LOS ANGELES — **Telecommunications and Communications Engineering Program.** Contact: University of California at Los Angeles Extension Department of Engineering and Science, P.O. Box 24901, Los Angeles, Calif. 90024.

DECEMBER 9-13, MIAMI BEACH, FLA. — **The 2nd Conference on Artificial Intelligence Applications.** Contact: Trade Associates, Inc., Exposition Management, Suite 200, 12250 Rockville Pike, Rockville, Md. 20852.

DECEMBER 9-13, NEW YORK — **VTAM for Practitioners.** Contact: Judith Anderson, American Data Group, Inc., 3685 Woodberry Drive, Duluth, Ga. 30136.

DECEMBER 10-11, WASHINGTON, D.C. — **T-1 and Virtual Networks.** Contact: Telestrategies, Inc., P.O. Box 811, 1355 Beverly Road, McLean, Va. 22101.

DECEMBER 10-12, COLUMBUS, OHIO — **EASE Authoring Workshop.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 10-12, DENVER — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

DECEMBER 10-12, PHILADELPHIA — **1986 Videodisc, Optical Disk & CD-ROM Conference/Exposition.** Contact: Jean-Paul Emard or Marilyn Reed, Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

DECEMBER 10-12, TOKYO — **Interface in Japan.** Contact: Peter B. Young or Linda M. Yogel, The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

DECEMBER 11-12, DENVER — **SAS Report Writing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

DECEMBER 11-13, ANAHEIM, CALIF. — **Dexpo West '85 — The Eighth National DEC-Compatible Exposition.** Contact: Carol Henderson, Expoconsul International, Inc., 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

DECEMBER 11-13, LOS ANGELES — **DOS/VSE Internals, Debugging & Problem Determination.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 11-13, WEST PALM BEACH, FLA. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 12-13, DALLAS — **Troubleshooting the Data Communications Networks.** Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940. Also being held Dec. 19-20 in Boston.

DECEMBER 12-13, SAN FRANCISCO — **Financial Analysis for Telecommunications Equipment Acquisition.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 13, DALLAS — **MIS/DP/Telecommunications Consultants.** Contact: Barbara Moosche-kian, Infomart, 1950 Stemmons Freeway, Dallas, Texas 75207.

WEEK OF DECEMBER 15

DECEMBER 16-18, NEW YORK — **Data Analysis & Logical Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop West, Houston, Texas 77092.

DECEMBER 17-19, WASHINGTON, D.C. — **System 2000 Applications Programming Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

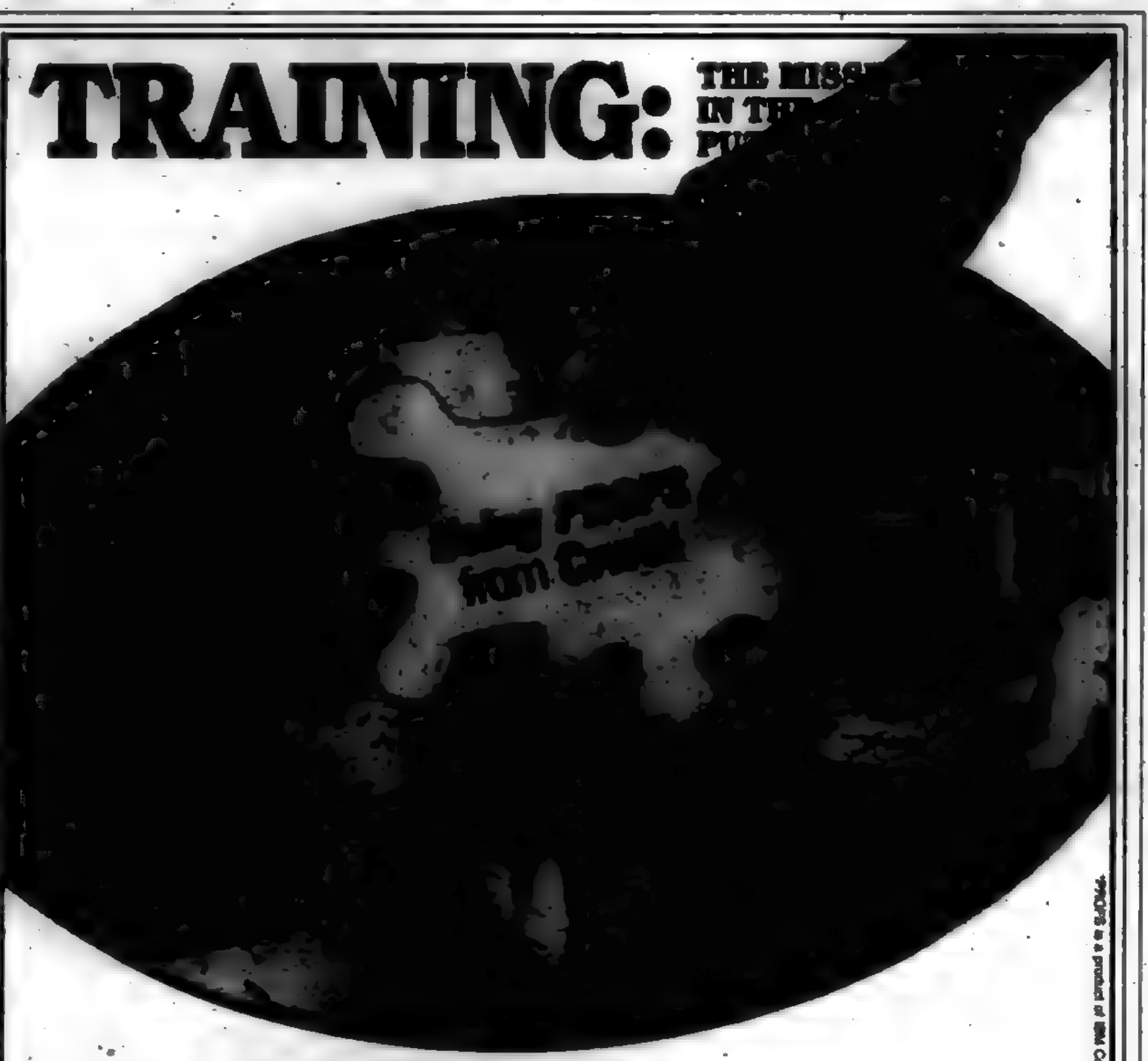
DECEMBER 19, COLUMBUS, OHIO — **DOS/VSE Working with Shared DASD.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

WEEK OF JANUARY 5

JANUARY 6-8, IRVINE, CALIF. — **Automated Business Technologies '86.** Contact: James Ramsey, Automated Business Technologies '86, Suite 386, 8532 Commonwealth Ave., Buena Park, Calif. 90621.

JANUARY 6-9, ANAHEIM, CALIF. — **ATE West.** Contact: Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

JANUARY 8-11, MILWAUKEE — **Mini and Microcomputer Concepts.** Contact: John T. Snedeker, University of Wisconsin at Milwaukee Extension, 929 N. Sixth St., Milwaukee, Wis. 53203.



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COMPAQ

Redefining the micro standard

By Eric Bender
Senior Editor

By building a true IBM compatible, yet not a clone, and distributing through dealers, Compaq grew faster than any industry start-up.

Not surprisingly, the Compaq Computer Corp. corporate headquarters are unobtrusive, hidden in 55 acres of nondescript woods just outside the Houston city limits. But once inside the campus, visitors see a rare sight among computer suppliers this year — construction crews finishing off giant new buildings.

Four years ago, Compaq did not exist, and this year it expects to join the Fortune 500. Annual sales approach half a billion dollars, employment nears 1,700, and sometime next year the personal computer firm will sprawl over almost a million square feet of space worldwide.

This is the most successful computer start-up in industry history, a company that grew far faster than did Apple Computer, Inc., bumping Apple to third place on corporate America's desks along the way.

Compaq fought its way to maturity through a landscape choked with hundreds of competitors, most of them now dead or just barely twitching. The company's ads say that it rose to the top because a Compaq product "simply works better," but obviously the recipe for success was not that simple.

Flying back to Houston one October evening, Compaq President Rod Canion patiently answered a familiar string of questions — on competition between distribution channels, on IBM, on the drawbacks of offshore manufacturing, on market research techniques, on entering the French market, on the foibles of the press, on local-area network options, on LCD limitations and on dozens of other topics.

The next day in his office, musing on Compaq's decision-making structure, Canion sums it up in an offhand remark: "If you look at Compaq, you see very few external mistakes. For example, all our products really have been successful, and no other company has been able to do that. Our distribution decisions are all right."

In typical Compaq style, that assessment comes across as a quiet statement of fact rather than a boast, and it draws very little criticism.

"They have done an incredible job," says Michelle Preston of L. F. Rothschild, Unterberg Towbin. In all aspects of building a computer supplier, "Compaq has had a near-perfect record of execution," she says.

"Compaq has done an amazing number of things correctly," agrees Margaret Rodenberg, manager of product management at Entre Computers, Inc. in McLean, Va. "They have far more dealer loyalty than any other manufacturer in the industry."

"They are the recognized, acceptable second source to IBM in big corporations, and that says it all," comments Everett Meserve of Arthur D. Little, Inc. in Cambridge, Mass.

Of course, there's an obvious note of caution, which information systems expert Michael Hammer recently expressed in another context: "An industry in which you can go from zero to a billion [dollars] in five years is one in which you can go the other way just as fast."

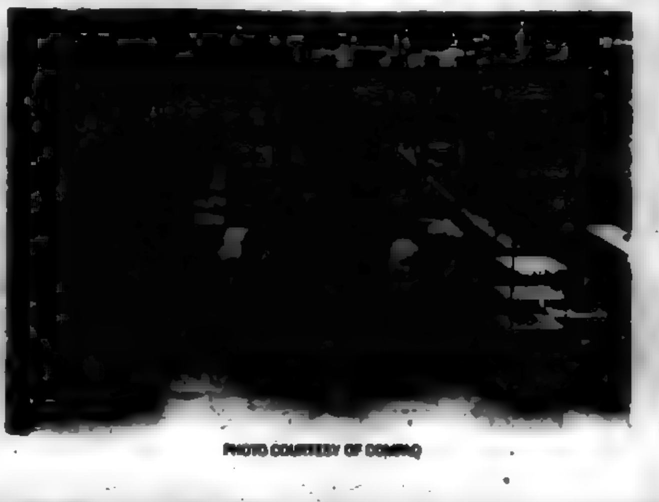

PHOTO COURTESY OF COMPAQ

But that's nothing new, points out Kevin Ellington, senior vice-president of Compaq's Personal Computers Division. "Our demise has been forecast every quarter since we began in business."

Compaq was founded in February 1982 by Canion, Jim Harris and Bill Murto, who had worked together at Texas Instruments, Inc. Eating out one day, they sketched the outline of their first product, the Compaq Portable, on a place mat.

Early on, the start-up gained the backing of industry guru Ben Rosen, who became Compaq's chairman. "First, we thought highly of the people," Rosen says. "Second, we knew from our own experience that what the world really needed was a full-function portable with no compromises."

With initial support from venture capitalists Sevin Rosen Partners, Compaq raised $10 million of venture capital in its first year. The computer company's product and distribution strategies, unchanged since the first day, differentiated Compaq from the pack of personal computer vendors.

Like other start-ups, Compaq quickly realized that the IBM Personal Computer had set a standard. Unlike most vendors, Compaq labored to produce truly compatible systems that were not IBM clones. "Offering totally compatible systems with enhanced value — that was different from other manufacturers in the early days," Preston says.

Just as important, Compaq bypassed conflict among distribution channels with the unique strategy of selling its products exclusively through dealers.

The Compaq Portable, introduced in the fall and shipped in early 1983, was the first significant IBM-compatible portable system, and it quickly became a best-seller.

In 1983, Compaq's first full year of sales, the company established a record in U.S. business by exceeding $111 million in revenue.

That explosive growth stretched the company thin.

A conversation with Rod Canion

"I would probably still be at Texas Instruments or running a Mexican restaurant if I hadn't walked into a Radio Shack store one day in 1981 to kill some time and asked to see this Visicalc I'd heard so much about."

Rod Canion, cofounder and president of Compaq Computer Corp., was interviewed last month at his Houston office by Computerworld *Senior Editor Eric Bender.*

You wear a badge like everyone else here, and you fly coach. Why?

If you're going to have a rule, it applies to everybody. It's common sense if you don't want to start creating structures or classes of employees. Obviously, salaries are different, experience levels are different, but that's all taken care of in the general salary area. Basically, everybody should be treated the same. We don't have any named reserved parking places; if you get here early, you get the good place.

[Preferential treatments] don't make sense to me; and on the converse, they create the wrong kind of feelings. A lot of the older companies use that as a management tool; they want to encourage you to strive to be able to get those things. I just think those are the wrong kind of incentives.

When Compaq was just getting started, the large sums of venture capital were a substantial advantage. How did you raise that?

Well, we worked for it. It wasn't easy. We had some things going for us. Ben Rosen was one of the biggest factors; both his reputation in the investment community and his knowledge of the investment community were very valuable to us. We raised our first million and a half basically by convincing Sevin Rosen Partners and [Kleiner, Perkins, Caufield & Byers] that we had some idea of what we were going to do and that it might be worth the risk.

From that point on, it was a matter of executing our plan. We built the prototype and were meeting our schedules by the time we went back and began raising our next $8.5 million. We actually began making our first investor meetings on the day when the first prototype started working; we didn't waste any time laying the groundwork for our next round of financing.

That turned out to be pretty difficult. We've always been a plain kind of company; we talk about basics, and we talk about marketing things, and venture capitalists at that time weren't looking for those. They were looking for the hook, the gee-whiz technology that nobody else had.

But we put a lot of work into going and talking to people and showing them what we were doing. We were able to round up another $8.5 million that we closed in the first week of September. The next step was to launch the product, sign up some dealers and get the factory going. That was sort of the culmination of the whole year of work.

We made the announcement, and it was well covered in the press. We convinced some very significant dealers to come in with us, which was a major part of the overall success. Then, we actually shipped on schedule in January.

That allowed us to raise the third round, which we closed in March, for another $20 million. That money was absolutely required.

We really wouldn't have been able to do the job we did of entering the desktop market if we hadn't done the public offering [in December 1983]. We almost missed that window — 1983 was the peak [for high-tech public offerings], and then it started diving, and we caught it right on the edge.

PHOTO BY ERIC BENDER

> *"We had to decide whether we went where IBM was or where IBM wasn't. We decided to execute a strategy that would allow us to coexist with the dealers where IBM was. If we had gone the other path, we wouldn't be here today."*

Compaq has maintained consistent policies in product design and distribution since inception — IBM-compatibility and dealer-only. How did those two come about?

[In distribution,] almost any company gave you some examples of what not to do and what to do. Xerox Corp. just happened to be the most outstanding example because they had such a good opportunity and almost nothing came of it.

There was nobody going exclusively through dealers. That was our own invention. But how to deal with the dealers — what they expected and what they needed — we had to get from the dealers themselves and from observing what other people had tried.

We were starting from the point of "Don't create conflicts in your distribution channels." That led us to go exclusively through dealers initially, and then our experience confirmed that we would be much better off to focus on and extend the capabilities of the dealers as opposed to try to go and do something else on our own.

One of the fundamental issues we had to decide was whether we went where IBM was or where IBM wasn't. That was really a critical decision.

It was hard to make a case, at first, to go where IBM was because IBM would keep moving around and eventually step on you. The other side was that if you went out where IBM wasn't and you had an IBM compatible, those dealers needed to compete against the dealers who had IBM.

We didn't do that. That was a declining position in terms of strength. The biggest opportunity you'd ever have would be on Day One, because as IBM kept expanding its dealer base, if you were trying to be where they weren't, you would either shrink back or later try to come to where they were.

So we finally decided that if we were going to be successful, we were going to have to execute a strategy that would allow us to coexist with the dealers where IBM was. That was fundamental. If we had gone the other path, which a lot of our competitors did, we wouldn't be here today.

But you still have requests from corporate accounts who want to buy direct.

Yes. I think they would get mad at us if all we said was "No, we don't want your business." We explain to them why it makes sense for them and for us to have the dealer there.

We don't supply some of the things a dealer supplies. There's a whole set of things that are needed, from the product all the way through to long-term service and support, and it takes both of us to do the job right.

Compaq is forever addressing two bugaboos: IBM is going to beat Compaq to death through price, or IBM is going to beat Compaq to death through proprietary architecture.

In the case of pricing, we believe that our costs are competitive with IBM. We don't feel like we have to have a big cost advantage to be able to compete because we've built a different kind of an image or a different kind of position. We can sell more value, more function in a product for a comparable or a higher price, which puts us in the position of simply needing to have competitive costs.

The question then becomes, how low a margin will IBM take in order to, let's say, drive their competition out of the marketplace? That becomes a lot of different theoretical arguments. If [IBM tries] to sell [a product] at a loss or give it away, I think the company would be in some sort of legal problem, and IBM is very sensitive to that.

The other side is that they're having profit problems now as a corporation, and part of the reason is because of the low margins they've already had on Personal Computers. So if anything, I would say that they're going to be moving to improve their margins on the Personal Computers, not to get lower margins. It would be a poor business decision for them to sacrifice their profits across the board.

How quickly will IBM move away from the basic Personal Computer to next-generation systems?

I think they'll reach the point where they try eventually to replace the Personal Computer XT with some new product, and that's going to be hard for them to

"Hiring was a real challenge," says Cecil Parker, vice-president for human resources. "Who had ever heard of Compaq? 'Houston, Texas, you kidding me?'"

And the company's hiring policy — "It's easier to do without than to make a misfit work into a well-working situation" — compounded the short-term problem, he observes.

"The long-term impact of just getting warm bodies would be damaging," but the lack of personnel was extremely painful, Ellington notes. "We had key areas that needed attention, and we couldn't find the right person, so we wouldn't hire."

From a financial control point of view, "You have to, from day one, have the people and processes in place," says John Gribi, senior vice-president for finance. "You can't insert it later on.

"So before we shipped product, we had all of our computerized systems that we use today in place and had the appropriate size financial staff. . . . That fit well with Rod [Canion's] concept that we were a large company in its formative stages."

Maintaining controls would have been impossible without personal computers and packaged MRP and accounting software, Gribi declares.

Without those, "At the speed we were going, I would have had to hire programmers before the company was formed," he jokes.

Fighting the tide

Early in 1983, Compaq tapped venture capitalists for another $20 million, but it soon required even more funds to fuel expansion. The company was gearing up to launch its first desktop systems.

In December 1983, Compaq fought against the ebb tide for high-tech public offerings and raised $66 million. Simultaneously, it released the Portable Plus, a hard-disk version that, again, had no significant competition at birth.

Six months later, the firm rolled out the Deskpro line, a broad family of modular desktop systems based on the more powerful Intel Corp. 8086 chip but offering the same IBM compatibility.

In March, the company's Dallas-based Compaq Telecommunications Corp. subsidiary (see story, p. 91) announced its initial product, Telecompaq, a personal computer/phone combination.

In April, Compaq rolled out its long-awaited series of Intel 80286-based systems in an extravaganza broadcast live to 10 cities worldwide, with entertainment headlined by the Pointer Sisters. The new products allowed the company to make the

Ellington

> *'What if IBM goes to a proprietary operating system? I would pray they would. . . . IBM has too much sense for that. Open architecture is what has made them successful. There is such a huge ground swell of third-party hardware and software that the standard is going to continue to grow.'*

Guess who just unveiled seven

The new IBM 3161 ASCII Display Station is really seven different ASCII displays in one.

In addition to its own function-rich native mode, the new IBM 3161 can emulate:

- IBM 3101 Model 881
- ADDS Viewpoint*
- Hazeltine 1500*
- Lear Siegler ADM-3A*
- Lear Siegler ADM-5*
- TeleVideo 910*

Besides fitting nicely into existing systems, the IBM 3161 also offers impressive improvements in ergonomics.

Improved Ergonomics For Improved Productivity

Take the 102-key ASCII-style keyboard, for example. Its low profile, gentle contour and typewriter touch make for faster keying with fewer errors. The keyboard has programmable function and editing keys so it can be custom-tailored to meet your application needs.

Then, for comfortable viewing, there's the tilt and swivel of the 12" display. And the sharp, clear 8 x 16 character matrix for easy reading. Plus cursor, character and field attributes (blink, reverse video, underscore, dual intensity, etc.). And scrolling. And partitioning. And lots more.

The IBM 3163 with Plug-in Cartridge

And, as if that weren't enough, we're also announcing

The sharp 8 x 16 character matrix helps make for easier reading and fewer operator errors.

a second new ASCII display station with even higher function—the IBM 3163.

Outwardly, these two new displays look alike. But the 3163, in addition to its built-in emulation of the IBM 3101 Model 881, also offers the ability to emulate the DEC VT 52 and VT 100* by means of a unique plug-in cartridge.

And while you'll like the power and flexibility of the 3161, for your high-function applications the 3163 goes even further. For example, a 7,680-character buffer and up to three windows enable you to view and modify portions of different host data bases. The 3163 lets you redefine and even recap the keys.

On both displays the setup is menu-guided and written in plain English, so it can be done easily and quickly. The point is, both are designed to improve your user productivity.

Very Attractive Prices

The price per terminal is $695 for the 3161 and $1,095 for the 3163. Quantity discounts are available. What's more, IBM maintenance offerings start as low as $35 per year per terminal for customer carry-in repair.

Now there's a new family of ASCII displays with the quality, service and support IBM is famous for. Both displays are available through IBM Authorized Distributors and IBM marketing representatives.

FEATURES	3161	3163
Lines x Characters	25 x 80	25 x 80
Double-sized chars	No	Yes
Line drawing chars	[illegible]	[illegible]
Vertical scroll	Jump	Jump/Smooth
Definable function keys	[illegible]	[illegible]
Windowing	No	Yes
Partitioning	Horiz	Vert/Horiz

Call 1 800 IBM-2468, Ext. LE/90 for the name of an Authorized Distributor near you.

IBM

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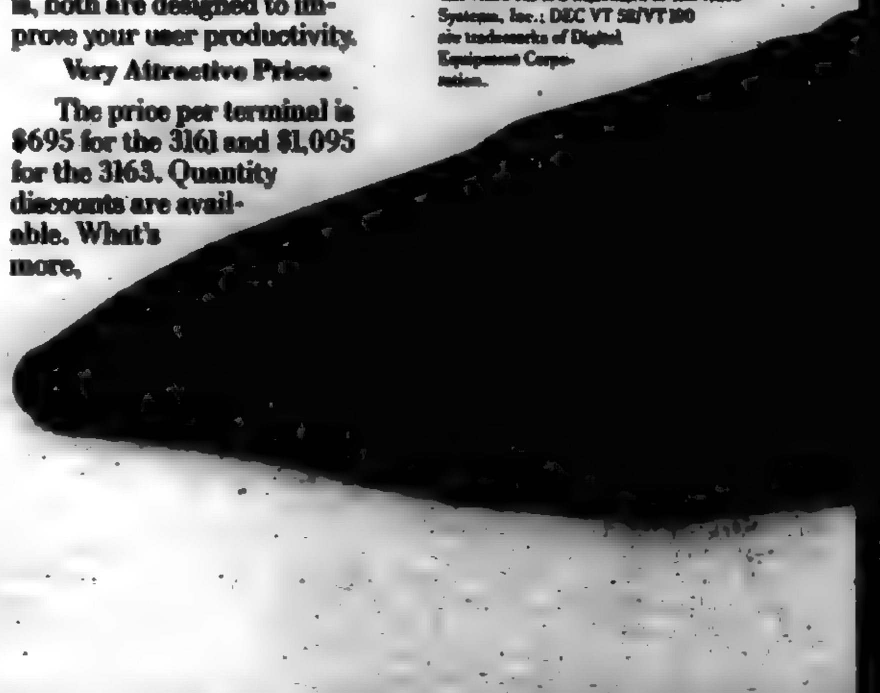

somewhat debatable claim that it offers the broadest line of business personal computers on the market.

Compaq executives often talk about the IBM Personal Computer standard with the reverence investment counselors once reserved for tax-free municipal bonds.

"What if IBM goes to a proprietary operating system?" Ellington asks. "I would pray they would. That would be wonderful. IBM has too much sense for that.

"Open architecture is what has made them successful," he observes. "There is such a huge ground swell of third-party hardware and software that the standard is going to continue to grow."

Reputation and rumors

Compaq products earn a solid reputation for compatibility and good engineering, analysts and dealers say.

"Word of mouth really sold them initially," observes the Yankee Group's Chris Christiansen. "A lot of these machines still go to technical engineering people who admire the fact that the machine consistently works, and they also admire the elegant simplicity of the construction."

Compaq's "greatest perceived challenge was the advent of the IBM Portable [Personal Computer]," Rosen says. But the industry consensus is that the IBM device, which debuted in February 1984, is just not as good a machine. Compaq's portable line continues to outsell the IBM entry by 10:1, according to most estimates.

"It's always nice for any company to have luck," Preston says. "The IBM Portable was as much a failure as the PCjr."

Today, rumors center on laptop micros. "People have been asking us where our laptop is since January 1984," Ellington says. "We continue to say that we are not going to bring out a laptop until we can bring out a full-function device. Since that time, our competitors have continued to bring out machines that do not sell."

Fine-tuning

Compaq currently is fine-tuning its third laptop design. "We developed two and shot both of them," Ellington says. One reason, he suggests, is that a laptop "cries out to use the 3½-in. floppy." But that's not a standard, and Compaq doesn't see itself as creating standards.

While IBM, Compaq and "other people that missed the merry-go-round the first time" are now offering 80286-based systems, total industry sales of the high-end products disappoint some, Ellington acknowledges. The high-end products now account for about one-fifth of the business personal computer market, he estimates.

> ”
>
> *Compaq products earn a solid reputation for compatibility and good engineering, analysts and dealers say.*

Higher pricing is one hold-up; the other is that "the software that takes advantage of that architecture isn't out there," Ellington notes.

Like all its major competitors, Compaq tightly guards details on upcoming products. Rosen notes only that "generally, we try not to provide things that are available elsewhere and in good supply."

Tip of the iceberg

Clearly, however, one major thrust is into communications. Preston describes the Telecompaq "as just the tip of the iceberg."

Compaq also will work to ensure its basic product line takes advantage of IBM and third-party options. In one case, the company offered a retrofit Basic I/O Subsystem chip that made its existing systems compatible with the IBM PC Network. Compaq is currently checking compatibility on IBM's token-ring network.

By concentrating on enhanced features and selling within IBM's price range, Compaq avoids most of the bloodletting that occurs among vendors competing on price. As long as Compaq can keep its manufacturing costs competitive, Canion believes, it won't be vulnerable in pricing.

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Compaq currently fills 241,000 square feet of manufacturing space. Its highly automated new factory, now being expanded by 107,000 square feet, is designed for flexible production schemes and ships machines directly out the door to dealers.

The company evaluated offshore production alternatives but decided against them for the moment. This decision was made because overseas suppliers would lock the company into set production volumes rather than letting it respond to the market variations on short notice, Canion emphasizes.

Avoiding conflicts

"Any moves you make in distribution are going to be with you for a long, long time," Canion points out. With more than 2,500 outlets worldwide, Compaq's basic dealer-only distribution scheme remains unchanged.

The company is still asked by large corporations to sell direct, and it still refuses, saying that dealers provide many crucial services. Corporate Sales Director Ross Cooley also lists several "flexibilities that a dealer has that direct sales doesn't," including the ability to integrate third-party products and to give special pricing. Compaq's dealers are supported by more than 100 field sales personnel in the U.S. and Canada.

Compaq's setup pleases dealers who are tired of going up against IBM's direct sales force. They also like a second source. "No businessman wants to have an 80% dependency on one vendor," Cooley points out.

Gribi

> *'You have to, from day one, have the people and processes in place. . . . That fit well with [Canion's] concept that we were a large company in its formative stages'*

Compaq: Starting big from the beginning

"There are no textbooks on how to go from zero to 111 million to 329 million dollars in a fiercely competitive business," according to venture capitalist Ben Rosen. A prime reason Compaq pulled off that stunt in less than three years was that "the company hired the management of a billion-dollar company as a start-up," according to Rosen.

"We started at the beginning knowing we were going to have to be big to succeed," Kevin Ellington, senior vice-president of Compaq's Personal Computers Division, explains.

"We structured an organization chart and recruited a lot of people who were really overqualified for their jobs at that time. . . . We hired [illegible]

[illegible] job and had no intention of leaving IBM when Compaq first called. Like Sparks, however, he was an early member of the IBM Personal Computer team, and he missed the feeling of entrepreneurship after being "pulled back to the monolith" in Rye Brook, N.Y.

Once they took the leap and moved to Houston, [illegible] stayed. [illegible]

[illegible]

HINTS FOR THE COMPETITION

1 Look out for the new [illegible]

2 [illegible] COMDEX [illegible]

3 Be prepared [illegible] back to the drawing board.

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> *'[Compaq is] still very small relative to the competitors: IBM, AT&T and Apple. We have to show agility and a keen understanding of the market and provide what the market needs without compromising. Any mistake could cost the company dearly. . . . Our products have to be right.'*

The policy clearly pays off for Compaq as well. "Some people confuse channels with markets," Ellington says. "You can look at too many examples of conflicting channels; that has been the major reason why most of the minicomputer suppliers were not successful in micros. IBM is the only company that has been successful at having multiple channels."

"We don't set out as a goal to keep dealers happy," Ellington declares. "There have been many cases where temporarily they have been very unhappy with us." Instead, he says, Compaq aims to put together a complete strategy for manufacturer, dealer and customer and sell that strategy to the dealer. "We probably spend a disproportionate amount of resources on market research and marketing efforts, and we use that data to try to educate the channel."

In one case a few months ago, market research picked up a massive shift in user experience, he says. While a year ago first-time users accounted for three-quarters of sales, second-time users now buy the majority of Compaq micros.

Compaq's overall performance gathers some kudos from dealers — an unusual occurrence in the dog-eat-dog market. The supplier "has consistently demonstrated commitment and understanding and flexibility in dealing with the dealer network," Entre's Rodenberg says. "We like to deal with Compaq."

Meeting all expectations

Despite the bleak industry headlines, sales of business personal computers grew about 30% this year, Preston estimates, noting "the outlook for the industry and Compaq next year is even better. Compaq has met or exceeded all our financial expectations. Confidence in Compaq has increased significantly on Wall Street.

"If something goes wrong, it will be executive failure," Preston augurs. "There's not a whole lot of room for error but probably a little more than there was a year ago."

"We are still very small relative to the competitors: IBM, AT&T and Apple," Ellington notes. "We have to show agility and a keen understanding of the market and provide what the market needs without compromising." Any mistake could cost the company dearly, he says. "We couldn't afford a PCjr. . . . We don't have that deep a pocket. Our products have to be right."

But if Compaq continues on course, Rosen says, its potential is huge. "The business personal computer is only about five years old, and the market is far from saturation," he maintains.

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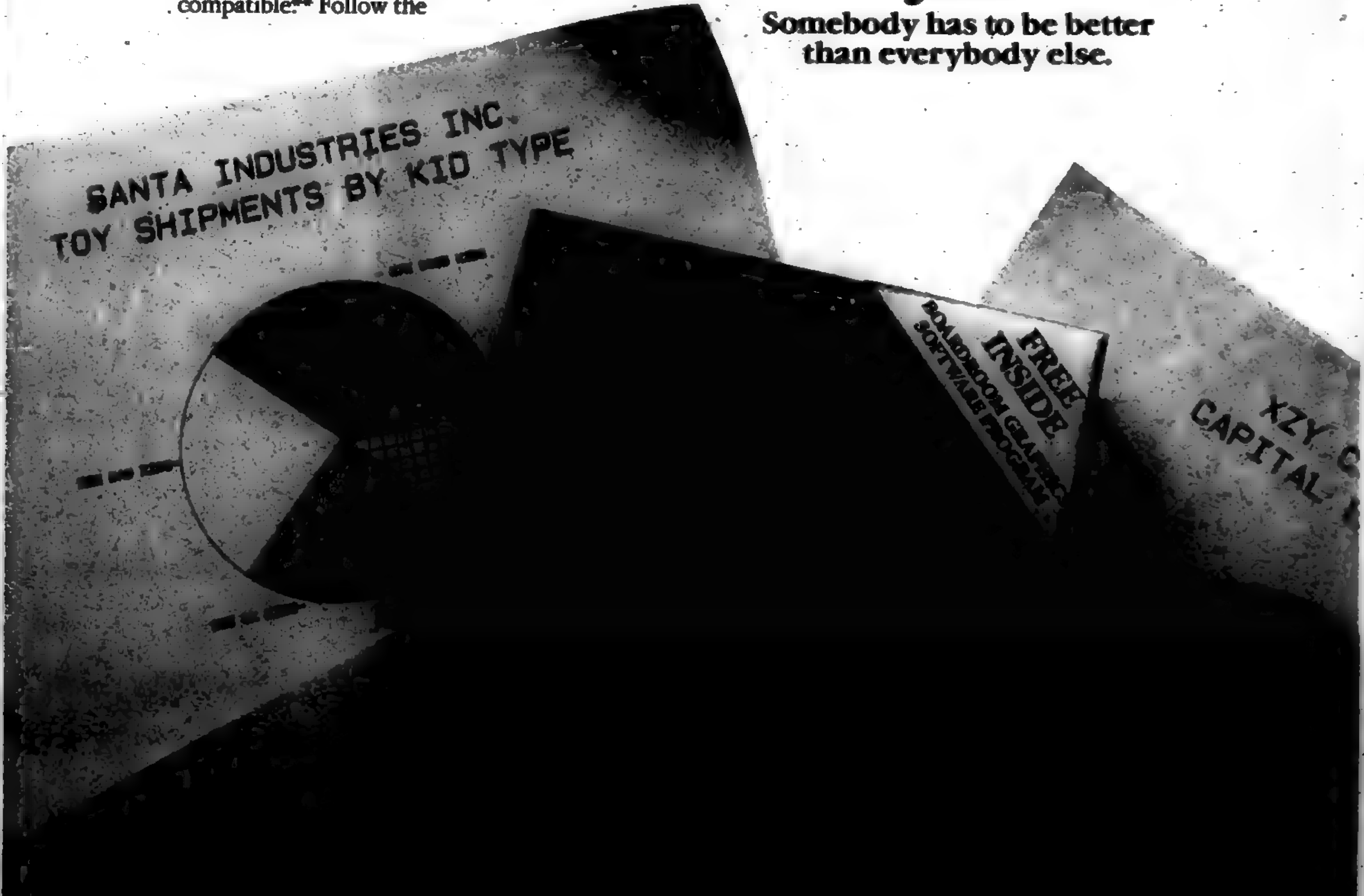
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do. So it may be a long time before they approach that barrier.

The PC2, whatever it is and whenever it is, has got to come sooner or later. But even after it comes, I don't think it will be the end of the Personal Computer XT architecture; I think that's going to be around for a long time.

Along with open architecture?

There have been some recent announcements that say a lot about what IBM is intending. Also, look at it from a business-sense standpoint for IBM.

Nobody expected IBM to do as well as it did. It chose a path in order to overcome all the barriers and become a leader in the market. That path was the open architecture approach. This was the right decision, because it worked. It got to the 60% or 70% market share, and I guarantee you that nobody thought it could get that high that quick.

But in doing that, IBM also locked itself in because it was so successful. If it tried to cut [the open architecture] off, it would have great difficulty getting the users out there to follow it into this incompatible path because there would be a lot of people like Compaq giving the users a way to keep going down this compatible path. From a business decision standpoint, it's almost inconceivable that IBM would try to cut off compatibility with the standard.

IBM doesn't want the industry to be nervous and to be taking actions to prepare for this eventual cutoff, because this would hurt it. It's the right thing for IBM, but it's also good for everybody else in the industry. It sets a stable path that's going to be good for the end users.

To some degree, this is theory. A year ago, it was a lot more theory than it is now, because the pieces keep falling in place. If IBM were ever going to make this cutoff move, the [Personal Computer AT] was the last possible time they could have done it. They started a new generation, another six years of architecture, that was open and compatible, so there was no turning back.

Who is your brain trust, and how does Compaq make decisions?

The brain trust is the management team of Compaq. We use a process that is very much like consensus. It's sort of consensus with a leader.

All the hard decisions, all the long-term, far-reaching implications kind of decisions we put a lot of time into. We don't put the burden on any one individual to have to be right.

What we do is bring the right set of people who have different views, different backgrounds, different sets of experience, different expertise in on the process. Whenever you get people like that together on a critical issue, there are always disagreements. And it's in those disagreements where you find the answers to what you really need to know. You don't just argue until somebody wins.

We use this consensus process to find out where there's a disagreement, on what assumption or fact is there a disagreement. When you tear a top-level argument down to its basic level and you get agreement there, then you almost always end up agreeing on the thing you disagreed on before.

How did that approach come about?

It sort of started back when Jim [Harris] and Bill [Murto] and I began to work on a strategy on how to get Texas Instruments into the disk business.

There were no taboos. We

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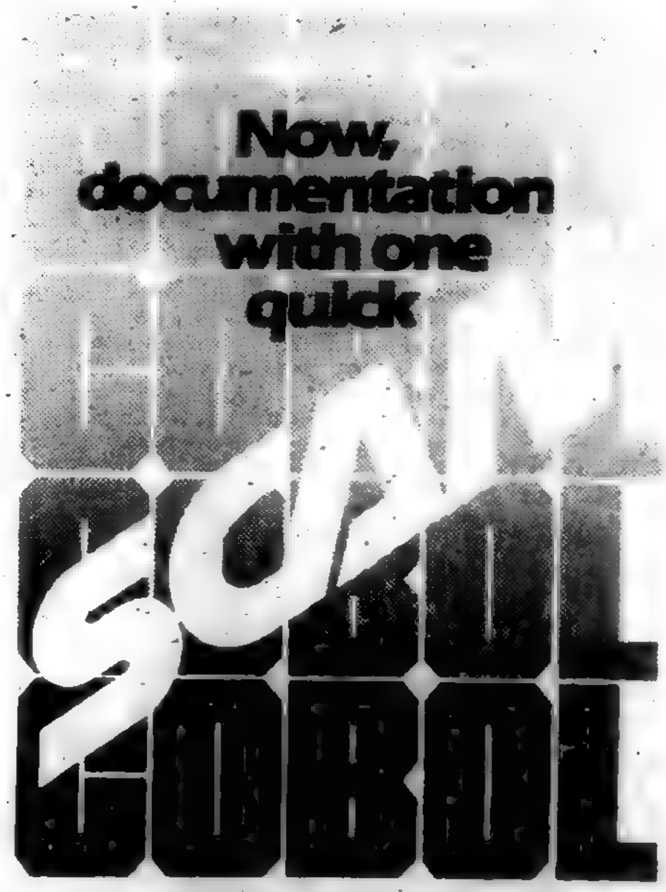
> *If IBM were ever going to make this cutoff move [from open architecture], the [Personal Computer AT] was the last possible time they could have done it. They started a new generation . . . so there was no turning back.*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> *One of the real underlying values of being in a small company is that you have a sense of what's going on. Communications happen very quickly; if something happens over in sales, you know over in manufacturing real quick. So we work hard to keep all the people in the company generally informed about what's going on.*

went in any direction — anybody could ask any question — and we kept working at a problem until we knew we had the answer. When you get to the right answer, the beauty of it is that you know you've got the answer because all the significant questions have been taken care of.

We evolved into that [process], and it made sense. It was never a theory, we never sat down and figured out that was the right way, it just felt like that worked.

Then, as we began bringing new managers into the company and [the process] was not familiar to them, they would ask questions about it and wonder about it. It was frustrating to a degree during the process because it takes some time.

The spirit of the process is that if anybody on the team isn't satisfied yet, then you have enough respect for that guy to work with him until he either learns what you know or he convinces you the other way. That's why the process works so well.

There's no reason that the process can't work as the company gets bigger, except for communicating and educating the people in that process. It makes good sense to people after they know it and especially after they've seen it operate.

No matter how good you are, you're going to make a mistake from time to time. And in some areas, like in manufacturing or operations, where you're making day-to-day decisions, you have to make quick decisions.

[But in cases where] if you make a decision today it's going to affect you for the next 10 years, you have to take the time, even though it seems like it's all over tomorrow if you don't.

How do you keep people motivated as Compaq climbs toward the half-billion-dollar mark?

It's certainly a challenge, because if you don't, you lose a lot of what the company has; we've been consciously working on that for two or three years at least. We grew out of the real start-up phase quickly.

For a long time now, we've been facing the problems a company has as it grows and worries about losing the spirit and about bureaucracy infiltrating. It's a natural phenomenon.

There's no one thing [that motivates people]. If there's one general way of describing it, I think it's communication; it's keeping people feeling like they're part of this company.

One of the underlying values of being in a small company is that you have a sense of what's going on. Communications happen very quickly; if something happens over in sales, you know over in manufacturing real quick. So we work hard to keep all the people in the company generally informed about what's going on.

Will that job get difficult as Compaq's growth slows?

I think [motivation] is less dependent on expanding a person's job than it is on the person's knowing that job is important. People are looking for satisfaction, and a lot of people believe that their satisfaction is going to come from getting that promotion or getting that bigger job. But people can be very happy in the same basic job for a long time if they really know it's worthwhile.

That's the key underlying principle in the company, even for the people in the production line. We switch the mix on them during the middle of the month; they go work hard, and they make it happen. Then we end up with a good quarter, and they see the results. They know they're part of that; they know if they hadn't stretched to make it happen, we wouldn't have been able to deliver those results.

That's something you can't buy with money, with stock, with promotions. It's artificial to try to keep growing and keep promoting people because you can't keep that up indefinitely.

Do you wake up in the morning and say, here I am, chief executive officer of the fastest growing company in history?

No, not really. [Laughs.] I wonder why.

I wake up in the morning impressed at how far Compaq has come. At any given point in time, when you've got good tight control, you know what's going on and you know why you're doing things, you don't have this feeling of wonder. It makes good sense to you.

You've got to look back over a long period of time and say, "Gee whiz, we really have come a long way." But whenever I look forward, I feel no wonder or fear because, for however far out we can see, we have things planned and identified.

For all of that planning, there's also an underlying element of constant openness to change. We've got to plan for what we're going to be doing nine months from now. But everybody knows that's the wrong plan. It's just the best thing we know right now. ■

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Compaq's telecom approach bold but conservative

Compaq is as closemouthed about specific product plans as any other major vendor, but one word crops up much more often than laptops or 32-bit chips — communications.

While communications is "a relatively small driving force in personal computing today, we are about to see an information access revolution," President Rod Canion predicted earlier this year at Comdex/Spring.

"Communications is in its infancy and fogged with skepticism because of all the babble about E-mail, local-area networks and new technology," Canion said. "But the reason a personal computer user can live without communications today is because in the general business market, one's competition isn't using communications either."

Compaq Telecommunications Corp. began to take form two years ago at a neighborhood Christmas party in a conversation between Canion and Max Jensen, who became the subsidiary's vice-president of marketing. Early in 1984, Canion recruited Texas Instruments alumnus C. Murray Francois to head the firm.

Why did the start-up end up in Dallas? Two reasons, according to Francois. First, he observes, Dallas is rapidly becoming the center of telecommunications in the U.S. Second, he notes, "We wouldn't really have the independence we have if we were located at Compaq center."

Last March, the firm launched the Telecompaq, which combines a Deskpro personal computer with several tightly integrated telephone functions. The device began shipping in July to resellers from the telecommunications industry.

Classic approach

As Canion describes it, the approach has been a classic Compaq mix of boldness and conservatism — boldness in entering the desktop voice/data workstation market where so many products have died; conservatism in downplaying expectations of skyrocketing sales and in keeping a lid on the parent company's financial exposure.

In his office in a leased building on the outskirts of Dallas, Francois describes the start-up slightly differently. "It's high risk; it's a brand new market," he said. "You think you have to be insane to get involved with something like this. You either make it big, or you fail.

"We are pioneering market development. It's a little easier for us because of the Compaq name, but it's not an easy task. The market's not going to explode tomorrow."

Among the early users of Telecompaq are top management at Compaq itself. "We did not know how powerful E-mail was until we started using it internally," Francois says. For most dealings with his counterparts in Houston, he notes, "we don't even make voice calls anymore. We just send messages back and forth."

Industry analysts generally maintain a wait-and-see attitude on the Telecompaq's chances. Chris Christiansen of the Boston-based Yankee Group consulting firm comments that the machine looks good but notes that users "get confused when you add something." Compaq will have to "seed it in a few accounts," he suggests. "It is going to take a large amount of education to convince people that [Telecompaq] is really an effective business tool and to explain to them exactly what it is.

"Once again, [Compaq] has adopted a distribution strategy and a sales/marketing strategy, and they have stuck to them," he adds. "They haven't let anything change their mind, and they have given those strategies enough time to come to fruition."

Compaq Telecommunications has signed reseller agreements with Bell Atlantic Corp., GTE Corp., Pacific Telesis Group, Tel Plus Communications, United Technologies Communications Co., Mitel, Inc. and others.

"If you add up the revenues of our channels, they are at about $60 billion a year, with 2,500 to 3,000 field sales people that sell data products," Francois estimates. That will help to give Compaq good market position before the big guys — IBM and AT&T — jump in.

"I'm very pleased, but frankly the whole process of closing these channels has taken much longer than we anticipated," he remarks. However, he adds, the company will avoid conflict by sticking with the telecommunication channels. "We could find supply houses and pure retail stores, fill up that pipeline and have some immediate success. But what do you do after the pipeline is frozen?"

Sales forces are still being trained, so the product is just now reaching end users. "For this kind of product, it's less difficult to train a voice sales force on how to sell the data part than vice versa," Francois notes.

Like the parent firm, Compaq Telecommunications is planning for the long haul. One key ingredient is managers, who average about 20 years of experience.

"Everyone has had training at a large company, but everyone has had a start-up in between the large company and this company," Francois says. "[And they know] that when the truck pulls up at the back dock to unload the first load of furniture, you stop your strategic planning, and you go unload the truck."

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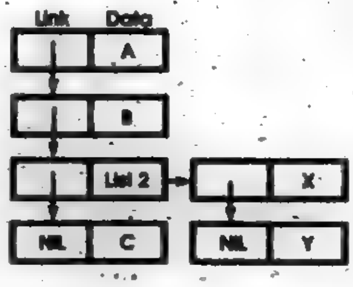
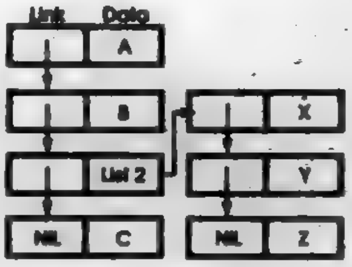


Artificial intelligence languages such as LISP, Forth and Prolog improve as they are supplied with more data. Someday, expert systems will go beyond determining "true" vs. "unknown" and register degrees of belief and confidence, but not without new memory technology.



By David Wyland

To design artificial intelligence hardware today means to design a computer to support an AI language such as LISP, Forth or Prolog. LISP is the premiere AI language, and the terms "AI hardware" and "LISP machine" are practically synonymous.

Forth is similar to LISP and in some ways bridges the gulf between LISP and conventional programming. Forth has begun to be used for some applications-oriented AI work and has also begun to receive hardware support.

Prolog is a relatively recent invention in the AI field and is well suited to the design of expert systems. It is intended to be the core language of the Japanese fifth-generation effort and is also the subject of hardware development effort.

The simplest definition of AI is "software that learns." A conventional program, such as a payroll program, is like a machine with constant, reliable characteristics. The way the payroll is calculated this week must be exactly the same as it was calculated last week. Such programs are specified, designed, coded, tested, installed and maintained like hardware.

But AI programs learn. This means that their performance improves with time as they are supplied with more information. AI programs often look like a prototype of a conventional program in the midst of debugging. For this reason, AI program development and environments tend to be oriented toward prototyping and interactive debugging.

When a development problem is not well understood, a prototype can be used to explore and understand the problem. For example, in designing an expert system for medical diagnosis, the first task is to acquire the medical knowledge from the experts and build it into the expert system in the form of rules.

But this knowledge is often imprecise and contradictory. Not only do experts disagree, but they may include conflicts within their own stated rules. The rule they they think they use is often different from the unstated rule they actually use.

Conflicts can be resolved by building an AI system, trying it out on case histories and refining the rules with the help of the experts until the diagnoses come out right. Then the software will have "learned" to diagnose properly. In this way, prototyping and debugging are actually the tools for writing the program.

The LISP difference

LISP is the primary AI language and has a long and rich history of development. Many people are not aware that LISP and Fortran were created at approximately the same time in the early days of computing during the late 1950s. Whereas Fortran was put forward by a business machines company to make writing programs for computers easier for people, LISP was created by a university professor as a notation for advanced problems in mathematical logic. This very different orientation led to a very different language.

LISP has four major features that make it radically different from Fortran:

- Its primary variables are symbol structures

David Wyland is a senior research engineer at SRI International in Menlo Park, Calif. The information in this article was originally prepared for presentation in the Professional Program at the Wescon/85 show.

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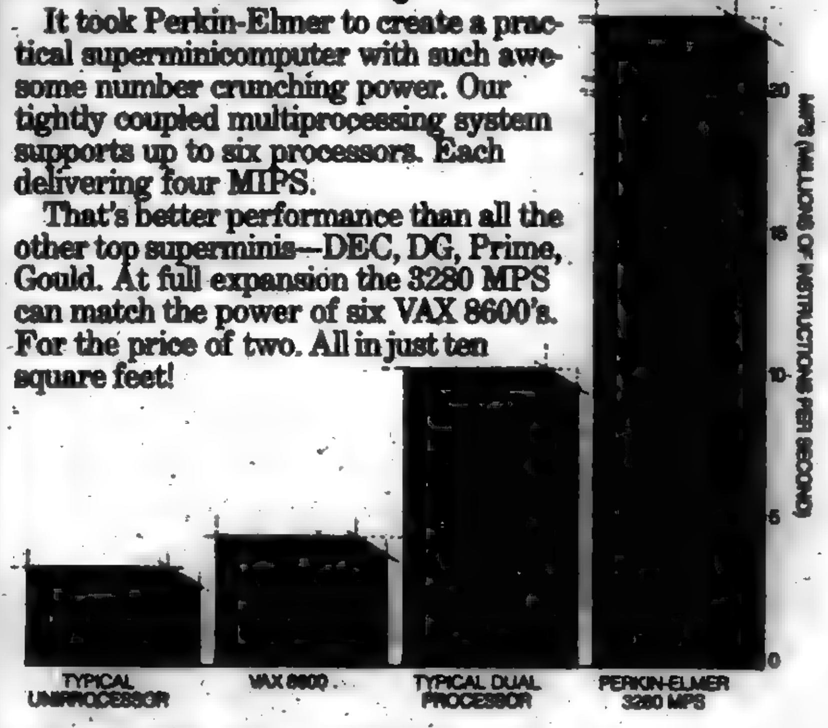

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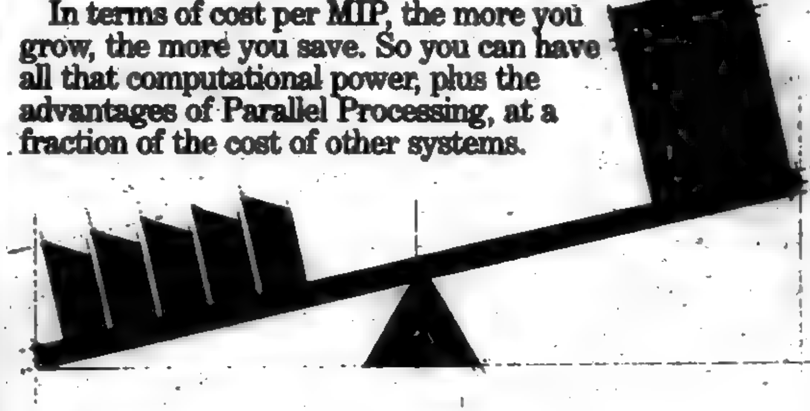

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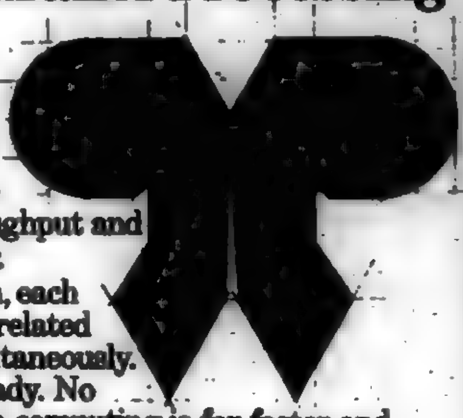

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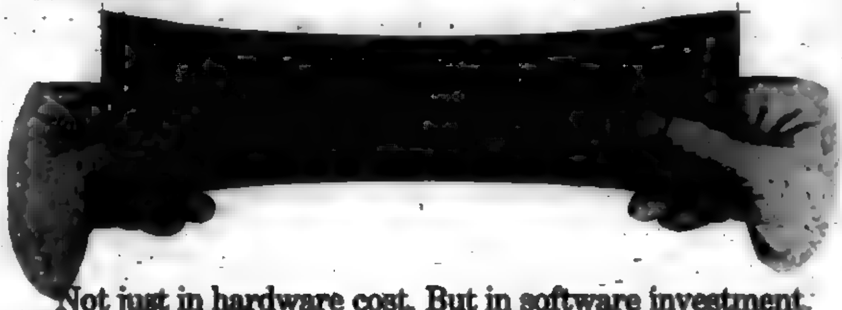

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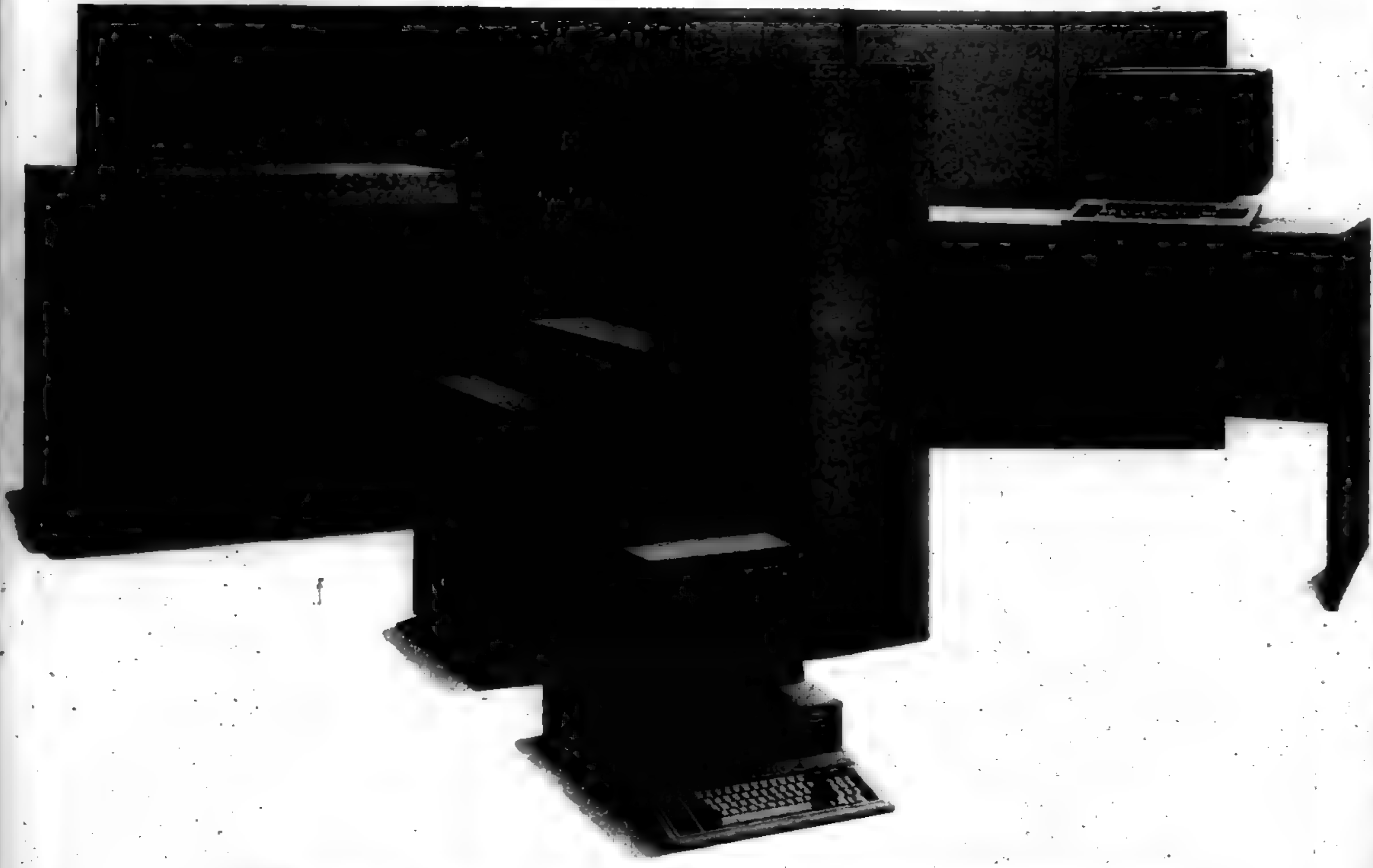

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rather than numbers.

- LISP uses a heap memory based on dynamic allocation, as opposed to the linear-array memory that underlies conventional languages.
- Programs are written by defining functions that build up a language rather than by writing a list of instructions in a fixed language.
- LISP is interactive, not compiled.

LISP deals with symbol structures as its variables. An example of symbol structures are hierarchial file directories such as those used in AT&T Unix and Microsoft Corp.'s MS-DOS. A path name can refer to a file, a directory of files or a directory containing a mixture of files and other directories. What is of interest is not the content of the files but the structure of the directories.

In LISP, the bottom elements are "atoms" instead of files, and users deal with lists of atom names in the same way they deal with directories of files. The lists in LISP, such as hierarchial file directories, can be any combination of atoms and lists, from a single atom to an arbitrarily large nested structure.

LISP represents list structures by lists of pointers, in the same sense that Fortran represents numbers as patterns of bits in a word. LISP's basic functions allow creating, modifying, taking apart and testing these structures. This is important to AI work because one of the methods of representing knowledge is to build a structure of relationships among various concrete facts.

The heap memory of LISP is radically different from the linear **radically different** from the linear memory concept underlying conventional programming languages. In LISP's heap memory, words in memory are not part of a large, contiguous block of memory but are individually assignable and may be linked together to form lists. Each list becomes, in effect, its own memory, independent of other lists in the system. There is no global memory address, only the position of a word within a list.

Heap memory is built from conventional memory. Each element of the heap memory consists of a data word and a link pointer, called a pointer pair. The link pointer points to the next element in the list or to a terminator element, "nil." Memory assignment in LISP begins with the "free" list, or heap — the list of unused memory elements.

Creating a new list is done by taking elements from the free list and linking them together to form the new list. When a portion of the list is discarded, its elements are returned to the free list.

The heap approach to memory has one major, necessary advantage for LISP: With this system, any list can expand or contract independently of any other list. This is essential, since the list structures grow and change as a result of program manipulation, and it is impossible to predict beforehand the amount of space to be allotted to any given list.

Although it is unconventional and requires perhaps twice as much physical memory space because of the link pointer, the heap approach completely solves the memory allocation problem that often plagues conventional systems. Any part of this system can expand or contract as needed without requiring that data in memory be moved around to make room for the change.

> ❞
>
> *Although it is unconventional, . . . the heap approach solves the memory allocation problem that often plagues conventional systems. Any part of this system can expand or contract as needed without requiring that data in memory be moved around to make room for the change.*

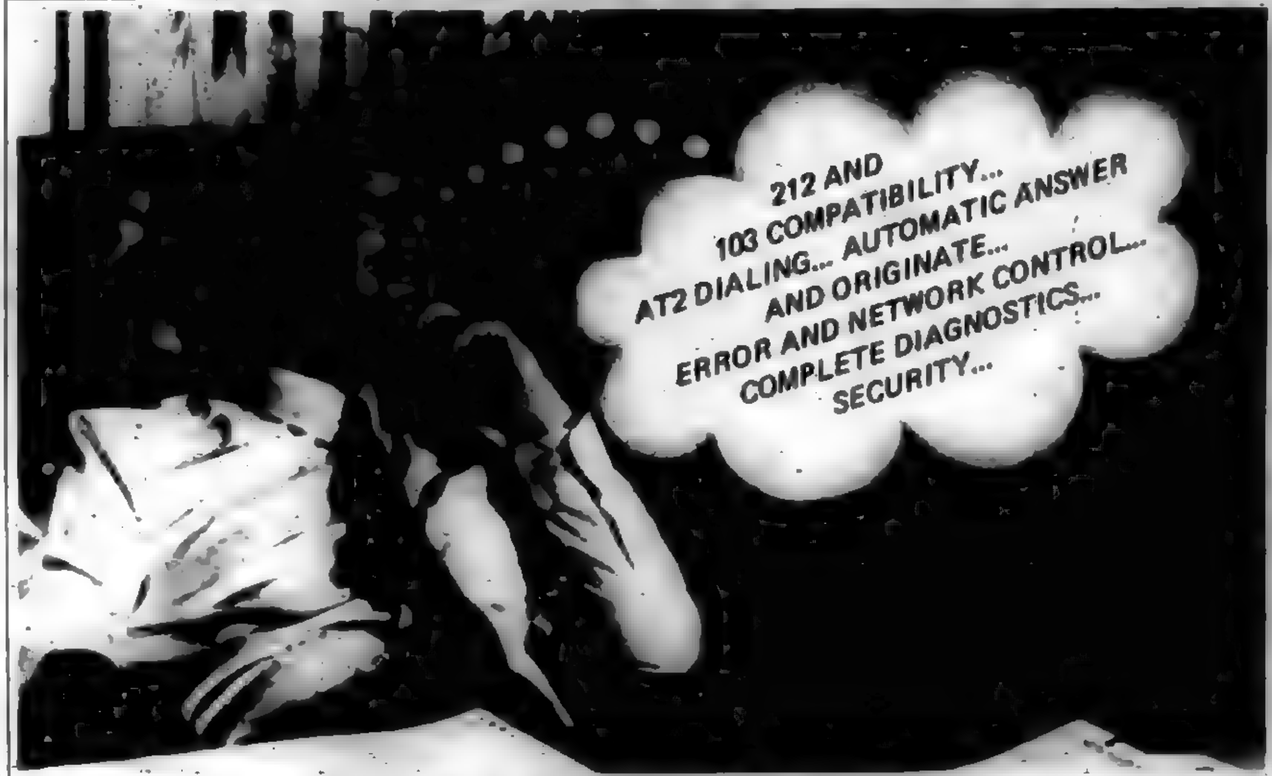
Programming in LISP is done by defining functions in terms of previously defined functions or primitive machine code. Once defined, a new function is indistinguishable from any other previously defined function, including the original set supplied with the language. A primitive function is invoked in the same manner as an extensive procedure or program.

In LISP, users write a program by extending the language and creating a new vocabulary for the current problem.

The function approach to programming derives in part from the discovery that programs can be defined by a list structure of the same type as the data structures manipulated by LISP. The program is a structure of primitive operations, in effect similar to a set of nested subroutine calls, where the atoms of the list are the primitive operations of the machine.

This concept was given theoretical backing by the development of the signal flow graph concepts that provided the basis for structured programming.

Finally, LISP is interactive. This means that the functions defined in LISP, including the ability to define new functions, can be invoked immediately from the keyboard. The interactive quality supports prototyping and debugging by allowing the programmer to create, modify and test functions quickly and to build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Also, because of this interactive character, very powerful debugging support is available to the programmer, since the full power of the language, including all recently defined functions, is available to the programmer for debugging use. Because the program is expressed as a structure of primitive operations of the same kind as the other structures in LISP, the features that support structure manipulation are also available for program analysis during debugging.

LISP: implementation

Symbol structures in LISP are made up of lists of pointers. In one example there are two lists: the free list and a set of atoms. The lists can be described in tree structure form, in the pointer-pair form and as they are implemented in physical memory. Increasing the list of atoms in size by one atom illustrates the transfer of a memory element from the free list to this list.

Note that the free list includes the list of atoms as one of its elements. Here, we come to our first problem. There is nothing obvious to distinguish a pointer to an atom from a pointer to a list.

This implies that we will need some additional information to distinguish atoms from lists, since one of the basic operations is to find an atom in a list and compare it with another atom. This is often done by dividing the physical memory address space into two sections, one for atoms and one for lists, and using the physical address of the pointer-pair element to distinguish between an atom and a list.

Atoms are interesting in another sense: They can have values and can also be the names of functions. An atom, in fact, is just a name or word. A list structure defines the relationship among the atoms in the same sense as a sentence defines the relationship among the words it contains.

An atom in LISP can either have no intrinsic meaning (to the program, only the programmer), or it can be the name of a list structure or the name of a function. This allows one unit, the atom, to be used for all three functions.

The value and the function of a list atom are identified by pointers to a value list and a function list, respectively. Two atoms can have the same list as their value has. This is allowed in part because list structures can be arbitrarily large, and copying them to provide each atom with its own copy of a list would be impractical.

This leads to our next problem. If an atom has its value pointer changed from one list to another, it is not clear whether the elements of the old list can be returned to the free list because it may still be the value of another atom.

In LISP, this is handled in the traditional manner: Ignore the problem until a crisis results, specifically when the free list is empty. Not just traditional, this is also the most practical method. At this point, an activity known as garbage collection begins.

Garbage collection

Garbage collection retrieves all the memory elements in discarded lists and pieces of lists and returns them to the free list. Garbage collection relies on the idea that every valid list is the value of some atom. In a simplified explanation, the list is pointed to by the value or function pointer of some atom, and every memory element in use must be a member of such a list.

> ”
>
> *In LISP, the problem of changing pointers is handled in the traditional manner: Ignore the problem until a crisis results.*

Garbage collection is done in two passes. In the first pass, each value and function list for each atom is scanned, and each element in the list is marked. In the second pass, the whole physical memory is scanned, and unmarked memory elements are returned to the free list.

This brings up our second problem: Users need some method of marking memory elements without disturbing the pointers the elements contain.

Programs in LISP have the same form as any other list structure. The only difference is that the atoms on the list point to primitive functions, which are executed as machine code. Executing a function means going to the list point indicated by the function pointer of an atom and executing each atom in that list in sequence.

Considering the function list as a tree structure, execution of the list involves going from the root to each of the leaves on the tree in succession until the last leaf has been reached.

The evaluation rule is that the first item of each list is assumed to be a function, and the following items are assumed to be arguments. An example of a LISP function is shown in Figure 1.

This brings up the third problem: identifying primitive functions. Not only must we be able to tell the difference between an atom and a list, but we also must be able to tell the difference between a primitive function atom and a regular atom. The evaluation scanner must scan through the nested lists of functions until a primitive function atom

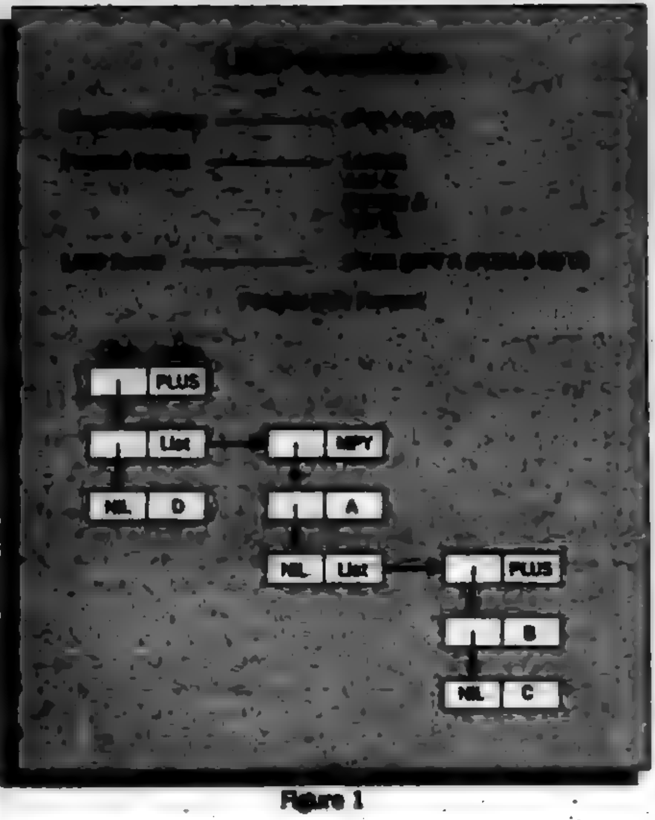

Figure 1

is found and executed as machine code.

LISP: hardware design

The problems of identification described above are generally solved by adding identification bits to the pointers in the memory elements. These identification bits are used to identify atoms and primitive functions and as a flag bit for garbage collection. The physical memory word that holds the pointer is therefore divided into two sections: the pointer itself and the additional flag bits.

Once tag bits have been included in the design, their functions can be expanded beyond those described above. One of the most important of these functions is type checking. This is an extension of the concept of identification, which allows the programmer to differentiate between different classes of data structure — data types — by setting the tag bits.

This is an important debugging function, since it allows the programmer to catch a function in the midst of attempting to use the wrong data type at the time it happens.

Another hardware feature characteristic of LISP machines is the availability of microcode to the programmer. Microcode provides direct programming of the internal hardware of the machine and results in the fastest program execution. Since LISP programming is done by creating functions, it is uniquely suited to make use of microcoded routines.

Microcode can be used to speed up the execution of heavily used functions to achieve an overall performance improvement in a program. LISP has the advantage of allowing this conversion to microcode to be done incrementally. Functions can be converted to microcode without disturbing the rest of the program by simply changing the function pointers on the associated function atoms.

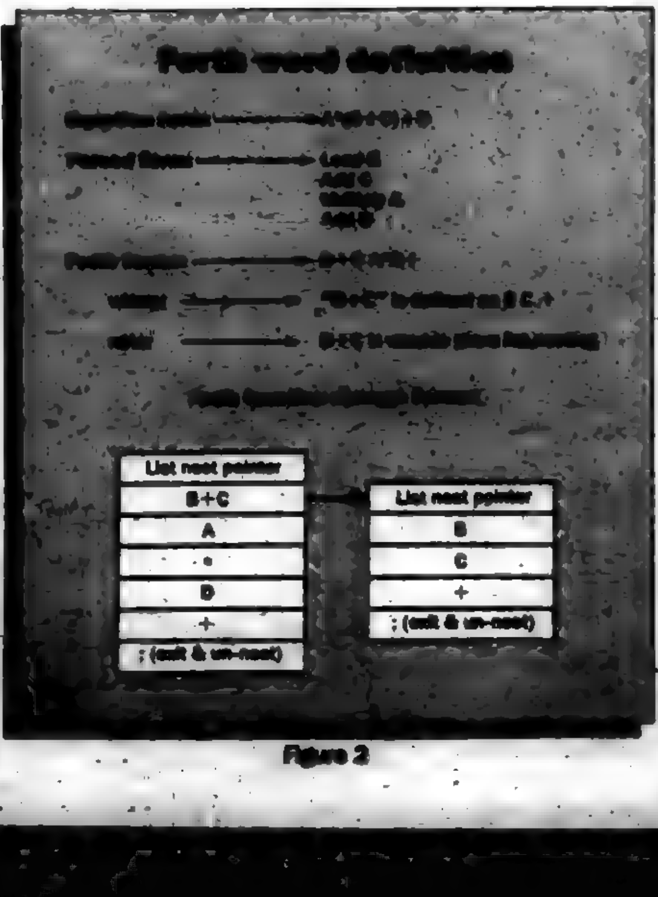

Figure 2

A third valuable hardware feature in LISP machine design is a large virtual memory. A large virtual memory allows users successfully to run programs that build very large pointer structures. There are programs that take the better part of a gigabyte of memory to run to completion.

Virtual memory also provides speed indirectly. Garbage collection, although occasionally necessary, is time consuming. It may take one machine cycle to execute a primitive function, eight machine cycles to allocate a new memory cell from the free list and 35 cycles per element to return it to the free list as a result of garbage collection. If the virtual memory is large enough, the program may never exhaust the free list, making garbage collection unnecessary.

The problems described above were addressed by a group at MIT in 1979 and resulted in the design of a LISP machine and the design of a LISP chip called Scheme 79. The MIT LISP machine design is in the public domain and serves as the foundation for most of the LISP machines in production today.

Some of these include the LM2 by Lisp Machines, Inc.; the Symbolics, Inc. machines; and the Texas Instruments, Inc. Explorer. Xerox Corp. also has been an active developer of LISP machines, notably its 1100 D series machines based on its work with Interlisp-D.

In retrospect, tag bits used as identifiers represent the principle design difference between LISP machines and standard computers. They provide a performance advantage by performing the heavily used identification functions in hardware rather than in software, as had been done in the past.

There is some potential for trade-off in this area. Some companies are investigating the middle ground using a fast conventional machine in conjunction with less ambitious methods of identification.

Forth: implementation

Forth is an interesting blend of the features of LISP and those of conventional languages. It has the functional approach to programming and the highly interactive character of LISP, but it uses conventional variables instead of structured variables and conventional memory instead of the linked-list, heap memory of LISP.

Use of conventional memory addressing and variable storage allows direct access to the hardware features of most machines. Because of this combination of conventional memory usage with interactive prototyping, Forth has become popular with people doing prototype hardware development.

Forth's recognition as an AI language came when a team at General Electric Co. used it to create an expert system for locomotive maintainence. It is also used in robotics research, an application field of AI.

Forth uses the same type of functional approach as LISP. Functions are defined in terms of other functions or as primitives in assembly language code. The difference is that Forth uses lists in the conventional sense, as a set of contiguous memory locations. An example of a Forth function is shown in Figure 2.

Forth avoids the identification problems of LISP, since there is no need to identify the difference between a list and an atom for data manipulations and there is no garbage collection. Also, the distinction between a list of functions and a primitive function in the program is handled differently, by providing an extra pointer at the head of each list to provide this identification.

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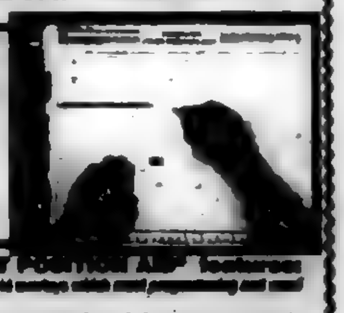

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Forth uses conventional variables for data storage. It also uses a data stack and reverse polish notation as the basis for accessing and manipulating these variables, in a manner similar to a reverse polish notation calculator. The reverse polish notation provides a uniform method of parameter passing among the various functions.

> *Forth's recognition as an AI language came when a team at General Electric Co. used it to create an expert system for locomotive maintenance. It is also used in robotics research, an application field of AI.*

Forth: hardware design

Because of the simple structure of Forth and its use of conventional memory without requirements for tag bits, the design of a Forth machine can be relatively straightforward.

Forth uses a small list scanner, called the inner interpreter, to scan through nested lists and execute primitive operations. Implementing this inner interpreter in hardware yields a major improvement in Forth execution speed. This is usually implemented within a small amount of microcode — three additional instructions in a conventional instruction set, for example.

Because Forth uses a return stack and a data stack in its basic operation, speed can also be gained by making these true hardware stacks capable of operating in parallel with memory accesses.

Traditionally, Forth has been associated with computer system hardware development, so the concept of Forth hardware has focused on chips capable of being used as components in a hardware system using Forth. Rockwell International Corp. pioneered in this area by bringing out the 65F11 Forth chip — essentially a 6502 microprocessor with the Forth interpreter in an on-board read-only memory. Also, Zilog, Inc. has introduced a version of the Z8 microprocessor chip with the operations of the internal interpreter of Forth built into the chip instruction set for speed.

Recently, Novix has created a good deal of interest by making a Forth chip out of a gate array. This chip directly executes Forth primitives and is capable of 8 million instructions per second (Mips) performance, as measured in Forth instructions.

Prolog: logic programming

Prolog, a relatively new language in the AI world, is based on the concept of logic programming. Logic programming eliminates a direct dependence on program sequencing. A Prolog program is a set of rules that perform "this fact is true if these facts are true" operations.

In this kind of inference, the program uses a rule to infer that some fact is valid based on other facts being valid. A newly valid fact can also be used in other rules to infer yet more things.

Prolog is exciting because it allows users to create and add to a set of rules and then have the machine deduce things from those rules that may not have been obvious before.

Although logic programming sounds very exotic, a practical example of logic programming hardware has been in use in the factory for years — the programmable controller. A programmable controller contains statements such as "If switch 7 is on and switch 9 is off and switch 13 is off, turn on pump 3." This might be shown as follows:

SW7/SW9 SW13
PUMP3
—

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> *The advantage of backward chaining is that when the program has inferred a fact to be true, users have a path for tracing the specific rules that made it true. This allows users to ask why that particular statement is true and to get an answer in terms of the rules that proved it true.*

the logic statements are scanned every few milliseconds — much faster than the reaction time of the relays and other components being controlled — so it appears to users that all the statements are being evaluated simultaneously. Also, each logic statement is independent of all the logic equations: It does not matter when it is evaluated, relative to the other equations.

Prolog uses a similar approach, with its rules being scanned continuously.

Prolog: implementation

Prolog uses a method called backward chaining to evaluate its rules. This method contrasts with the programmable controller, which uses forward chaining.

In the programmable controller, a logic statement may set a flag that will cause another logic statement to be validated. The results of the first logic statement propagate forward, in a sense, to make some higher level statement true.

In backward chaining, the result of the high-level statement is taken as a starting point; the interpreter checks each element of the statement to see if it is true. To process the statement, or rule, the Prolog interpreter goes to each fact in the rule in turn. When it encounters a fact, it scans all the other rules in the list, looking for rules that generate that fact.

Rules can be of the form that "this fact is true." If the interpreter finds one of these, it records the fact in the rule it is evaluating as true, and moves to the next one. If all the facts stated in the rule are true, its result is true.

If, in processing the statement, the interpreter finds a rule that states that its resultant fact is true only if another set of facts are true, the interpreter then evaluates this new rule in an attempt to prove its result and so prove the original rule.

This new rule is evaluated in the same manner as the original one: by attempting to find out whether its required facts are true. The process continues until it terminates on a known true fact or until no rule can be found to prove the fact.

If the no-rule-found case is encountered while attempting to prove a particular rule, the process quits that rule, moves on to the next one and attempts to prove it (Figure 3).

The advantage of backward chaining is that when the program has inferred a fact to be true, users have a path for tracing the specific rules that made it true. This allows users to ask why that particular statement is true and to get an answer in terms of the rules that proved it true.

The question "Why?" can be asked all the way back to the primitive facts given as true. This is why Prolog is good for designing expert systems: An expert system is a decision system that needs to explain its decision in terms of the rules that caused it, and this is exactly the capability that Prolog provides.

Prolog has an additional important feature called logical variables. Logical variables allow the programmer to state general rules, such as "A is the brother of B if A is the son of X and B is the son of X." In this case, A, B and X are all logical variables. This would be shown in Prolog, Horn clause form as follows:

```
(brother A B)
(son A X) (son B X)
```

Logical variables are temporary variables used during rule evaluation. One example of their use would be trying to prove that Jim is the

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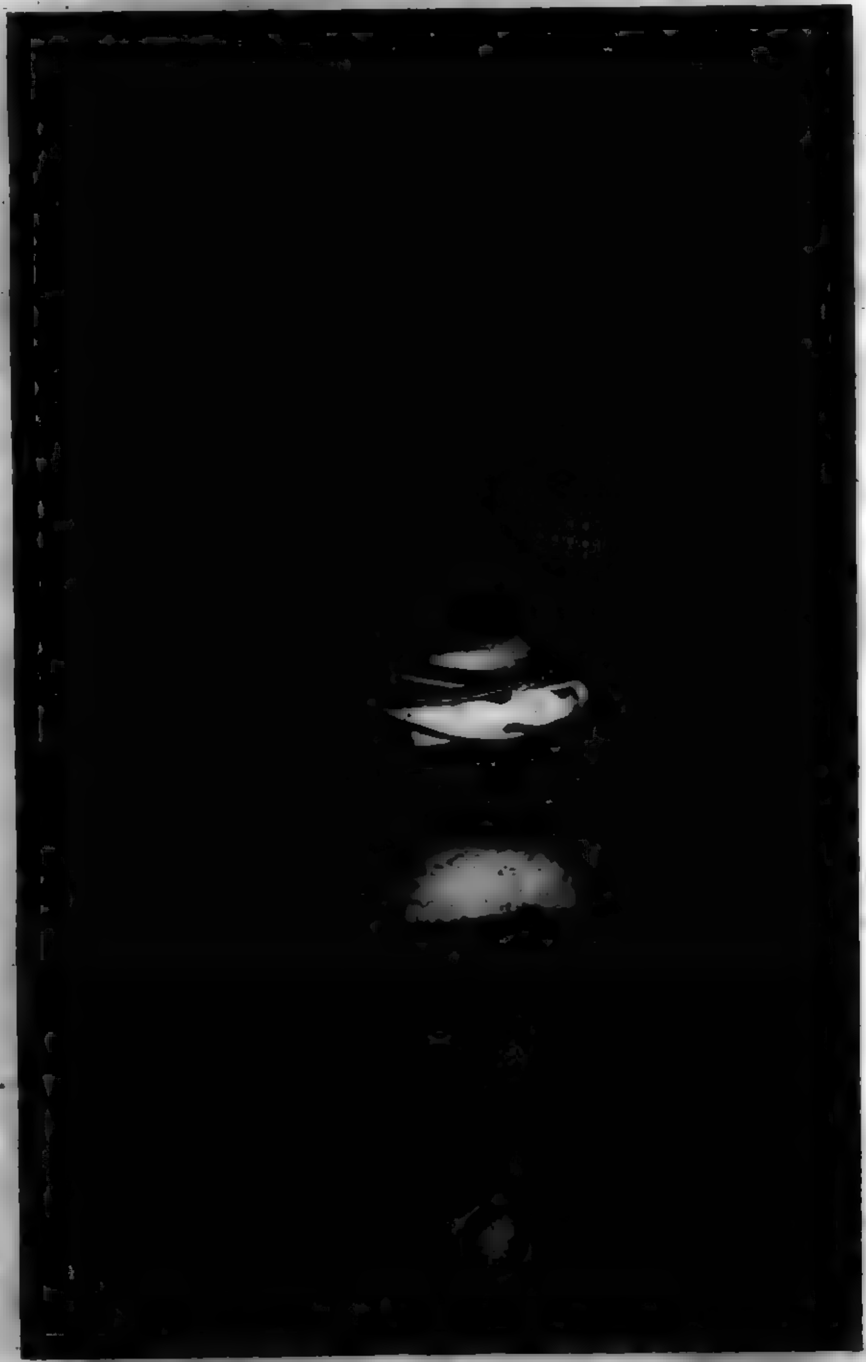

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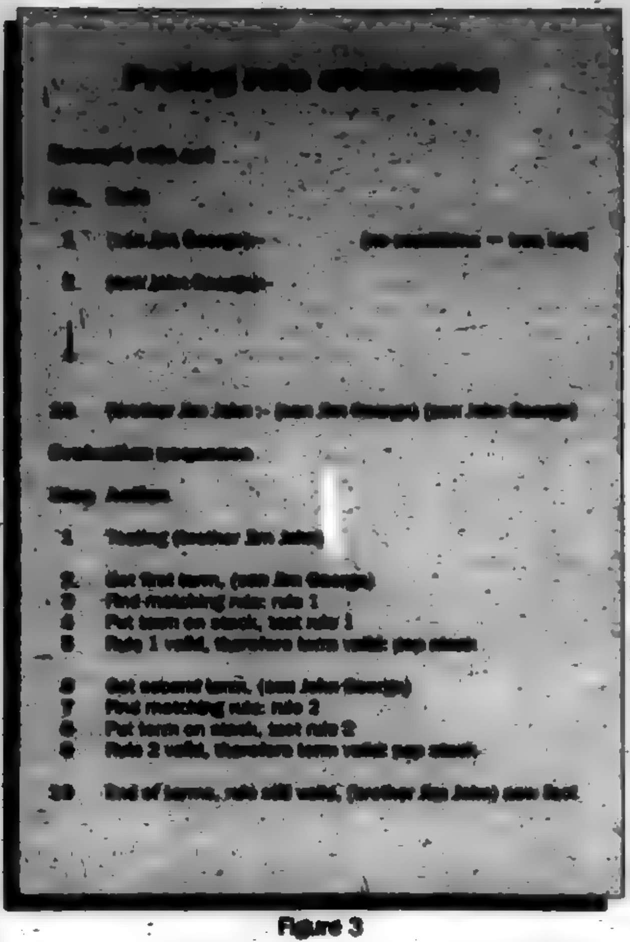


Prolog rule evaluation

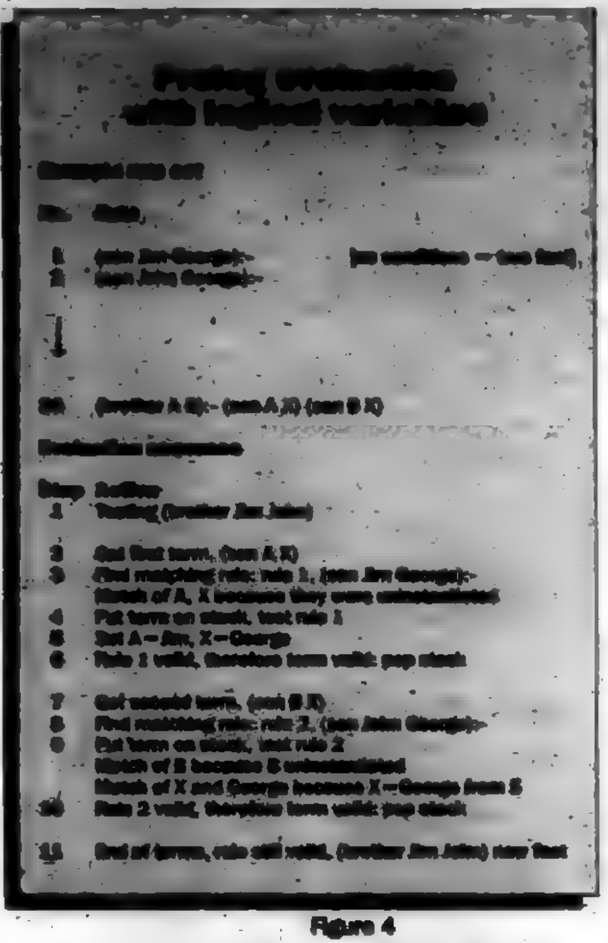
Example rule set

No.	Rule	
1	(son Jim George):-	(no conditions — true fact)
2	(son John George):-	
↓		
20	(brother Jim John):- (son Jim George) (son John George)	

Evaluation sequence

Step	Action
1	Testing (brother Jim John)
2	Get first term, (son Jim George)
3	Find matching rule: rule 1
4	Put term on stack, test rule 1
5	Rule 1 valid, therefore term valid: pop stack
6	Get second term, (son John George)
7	Find matching rule: rule 2
8	Put term on stack, test rule 2
9	Rule 2 valid, therefore term valid: pop stack
10	End of terms, rule still valid, (brother Jim John) now fact

Figure 3



Prolog evaluation with logical variables

Example rule set

No.	Rule	
1	(son Jim George):-	(no conditions — true fact)
2	(son John George):-	
↓		
20	(brother A B):- (son A X) (son B X)	

Evaluation sequence

Step	Action
1	Testing (brother Jim John)
2	Get first term, (son A X)
3	Find matching rule: rule 1, (son Jim George):- Match of A, X because they were uninstantiated
4	Put term on stack, test rule 1
5	Set A = Jim, X = George
6	Rule 1 valid, therefore term valid: pop stack
7	Get second term, (son B X)
8	Find matching rule: rule 2, (son John George):-
9	Put term on stack, test rule 2 Match of B because B uninstantiated Match of X and George because X = George from 5
10	Rule 2 valid, therefore term valid: pop stack
11	End of terms, rule still valid, (brother Jim John) now fact

Figure 4

brother of John, as shown in Figure 4. This might be expressed as (brother Jim John). In attempting to prove this, the machine will encounter (brother A B), where A and B are logical variables.

Upon first encounter, A and B are uninstantiated: They have no assigned value (have not been represented by anything concrete). When searching rules for a match, uninstantiated variables will match anything. Therefore, (brother Jim John) matches (brother A B).

When the match is made, however, the variables A and B are instantiated to Jim and John until that statement is proven or disproven for the case of the match. Thus, the rest of the statement would read: (son Jim X) and (son John X).

Evaluation proceeds further with a search for a match with (son Jim X). In this case, (son Jim X) matches (son Jim George). When the match is made, X is instantiated to George. The next fact to be proven is (son John George), since X has been instantiated to George.

We find (son John George) and the second, concluding fact is proven. As a result, the whole rule (brother Jim John) is proven.

Prolog is usually built from or in conjunction with LISP, where LISP provides functions and actions complementary to Prolog. This is because pure Prolog deals only with logical statements and does not perform any operations. LISP machines therefore served as the first Prolog machines.

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> *Prolog is usually built from or in conjunction with LISP, where LISP provides functions complementary to Prolog.*

Prolog can execute at high speeds by taking advantage of the opportunities for parallelism suggested by the method of evaluation of its rules. One method is to evaluate all the facts of the rule in parallel. This is called AND parallelism.

Another method involves attempting to prove a given fact by trying to prove all the related rules in parallel. This is called OR parallelism. This method is complicated by the assignment of logical variables.

There is a great deal of ferment in the area of developing Prolog hardware, and it is early yet to see how it will all turn out. Some Prolog machines have been developed to the prototype stage, and work is proceeding on others.

For AI hardware in the near term, we will undoubtedly see more of the same: faster LISP machines, LISP and Forth chips and perhaps Prolog chips. There is also some interest in taking expert systems hardware beyond the binary evaluation of a "true" or "unknown" and into degrees of belief and confidence based on techniques such as the Dempster-Shaeffer method.

Optical disks may provide an interesting adjunct to large LISP systems. Optical disks have the potential to provide gigabytes of storage at low cost. If programmers can assume gigabytes of write-once storage, they may have the basis for a system with no garbage collector.

The essence of all computers is memory. Computers can be considered, to a great extent, as memory controllers. They function by moving bits around in memory, and the memory's nature has a lot to do with the nature of the machine.

Radical change in AI hardware is likely to come from new types of memory. AI machines, while unusual

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> *The essence of AI is learning; the industry is investigating other techniques of memory and memory organization to serve this learning function. . . . If this kind of memory can be translated into hardware, it can provide a method of dealing with approximates, of teaching the computer to understand "similar to" rather than "same as."*

in certain features, are still recognizable as relatively conventional computers. They use the same kind of electronic memory and have the same kinds of components arranged in approximately the same ways as most other conventional computers.

Expanding the learning function

The essence of AI is learning; the industry is investigating other techniques of memory and memory organization to serve this learning function. We know that the brain remembers in a different manner than computer memory does. Information in the brain is distributed rather than localized, as is information in a bit on a chip.

Various approaches to this problem are being pursued, including connectionist machine concepts, patterns stored in nets and pattern memory-based associative concepts.

Work has been done on associative pattern memory — with some tantalizing results. It not only appears possible to make a pattern memory with memory being distributed, but this kind of memory also appears to be a basis for a general approach to pattern recognition.

Pattern storage is distributed in memory, and it can be recalled by a partial and imperfect version of the pattern. It turns out that the pattern recalled is closest, in the Euclidian distance sense, to the proper pattern.

If this kind of memory can be translated into hardware, it can provide a method of dealing with approximates, of teaching the computer to understand "similar to" rather than "same as."

AI hardware is based on AI languages. AI languages — such as LISP, Forth, and Prolog — are very different from conventional languages such as Fortran, Pascal and C. However, current AI machines are similar in many ways to conventional machines in design, with some additions to accommodate the special features of AI languages, and with marketing features targeted for AI use. Since the design of computers depends on the nature of the memory used, future AI machines may be quite different if new types of memory are developed. ■

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DRESSING UP SNA

Heavier communications demands are driving IBM to enhance SNA. Features such as APPC, DCA and DIA link remote resources for cohesive distributed processing.

By Donald Czubek

Systems Network Architecture (SNA) has been the cornerstone of IBM's communications strategy for more than 10 years. During that period, SNA technology has evolved in every way except one — it has not really affected the way applications are designed.

However, over the last year or two, IBM has introduced changes to SNA and other communications architectures that allow the creation of true distributed applications with formal architectural interfaces.

The driving force in IBM's marketplace is the migration from dumb terminals to intelligent workstations, such as the IBM Personal Computer, configured in large networks. IBM and most other workstation manufacturers modeled early implementations of SNA after IBM's old terminal products, most notably the 3270. These products were designed to do one thing — to communicate with mainframe-based applications.

IBM's new workstations and multiuser systems, such as the System/36 and 5520 Administrative System, are designed to bring computing power directly to the user, who no longer relies solely on mainframe-based applications. These workstations have completely different communications requirements from those of their predecessors. In addition to mainframe access, the workstations require direct peer-to-peer communications between themselves and a standard applications program interface to the network. IBM enhanced SNA to meet

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Donald Czubek is vice-president of Communications Solutions, Inc. (CSI) in San Jose, Calif., where he is responsible for new product development. He publishes CSI's "SNA Perspectives" newsletter.

these new networking requirements.

Distributed networks

Even though SNA was originally designed to support communication between intelligent systems, early SNA networks also supported the connection of dumb terminals to IBM mainframes.

The main reason for this was to maintain compatibility with existing bisynchronous communications products such as the interactive 3270 and the 2780/3780 batch workstations. There was, and still is, a large installed base of these dumb terminals that IBM had to protect.

Most of the early SNA workstation products were really just SNA versions of the bisynchronous products. The bisynchronous 3270 was replaced with a functionally equivalent SNA 3270, and the 2780/3780 workstations were succeeded by the 3770 batch workstation.

The resulting early SNA networks were hierarchical structures that relied heavily on an IBM mainframe for both network control and applications processing power. The various SNA workstation products also used incompatible subsets of SNA protocols, which meant that dissimilar products such as the 3270 and 3770 could not communicate with each other.

Changing requirements

The widespread use of intelligent workstations is changing both the structure of the SNA networks and the way that the networks are used. Now, each workstation is capable of performing local processing and does not have to rely on a mainframe computer. This leads to a new set of communications requirements:

- Compatible protocols between all types of workstations.
- Standard application program interfaces to the network.
- Direct peer-to-peer communication between workstations in addition to mainframe access.

These requirements are addressed by a set of enhancements to the original SNA architecture that are known as Advanced Program to Program Communication (APPC). APPC is now being supported by a wide range of IBM products such as Displaywriter, Scanmaster, 5520 Administrative System, the System/36 and 38, CICS/VS, the 8100 series and Series/1.

- In addition to enhancing SNA, IBM has developed two architectures that are aimed at the office automation marketplace. These architectures, Document Interchange Architecture (DIA) and Document Content Architecture (DCA), coexist with SNA and provide services that are required for document distribution and retrieval.

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> *IBM and other workstation manufacturers modeled early SNA implementations after IBM's old terminal products . . . [which] were designed to do one thing — to communicate with mainframe-based applications.*

While most IBM products that support DIA and DCA also use SNA as their underlying transport protocol, DIA and DCA are separate architectures and do not require the use of SNA.

Document Interchange Architecture defines data structures and protocols that support such office communications functions as electonic mail, document retrieval and library searches. DIA provides services in four major categories:

- Document distribution.
- Library.
- Application processing.
- File transfer.

DIA defines protocols for distributing documents to one or multiple recipients; SNA alone would require multiple transmissions by the sender to accomplish this. DIA also supports functions such as the retrieval of messages from "mail boxes"

and confirmation of the receipt of documents.

The library functions of DIA allow a user to store a document along with a description of the document in libraries. It also defines protocols for searching document descriptions in libraries and then retrieving the appropriate documents. A user could, for example, ask to see all documents written by Smith during July on the subject of data communications.

The application processing facilities of DIA allow a user at one workstation to invoke the execution of a program at a remote workstation. The file transfer services define architectural protocols for moving files to and from file servers.

Document Content Architecture describes the data streams that represent documents. DCA usually describes text documents but can also be used to represent other types of data such as graphics and user-defined bit streams.

There are two types of text data streams that are currently supported by DCA: Revisable Form and Final Form. Revisable Form DCA conveys all of the original intent of the document's author. This is similar to the internal data forms used by word processing systems. Revisable Form documents can be created at one workstation and then sent to another workstation for revision.

Final Form DCA documents are data streams that are in a format for final display or printing; they cannot be revised in a meaningful way. Final Form is typically used when sending documents to a printer for output.

The use of DCA within IBM's diverse product line ensures that documents created on one type of workstation can be sent to a different type of workstation for further revision or display. This provides document compatibility across IBM and IBM-compatible products.

The current host-based applications that are designed to support dumb terminals such as the 3270 will not be immediately and directly affected by these new technologies. There is no real migration path for these applications because they were not designed with distributed transaction processing in mind.

Technology impact

Over a longer period of time, many of these applications will probably be redesigned to take advantage of these new technologies.

These new technologies will affect two categories of user applications. The first category is office automation applications that are designed to support intelligent, distributed workstations. These applications are already available from IBM in its DISOSS and Personal Services software packages. Other manufacturers such as Digital Equipment Corp. and Data General Corp. have also announced products that support APPC, DIA and DCA.

The second category affected is the next generation of user-designed and -written applications that are designed from the beginning as distributed applications. These applications will almost certainly use APPC as their base.

Several IBM products, including the System/36 and 38 and CICS/VS already support "open box" interfaces that allow users to write their own distributed applications. These applications will use APPC to tie together remote resources such as data bases, I/O devices and processing power into cohesive distributed applications.

These distributed applications will not replace host-oriented, 3270-based applications in the near term. To make use of these technologies, users will have to redesign applications, meaning that 3270 compatibility will coexist with these newer technologies for many years to come.

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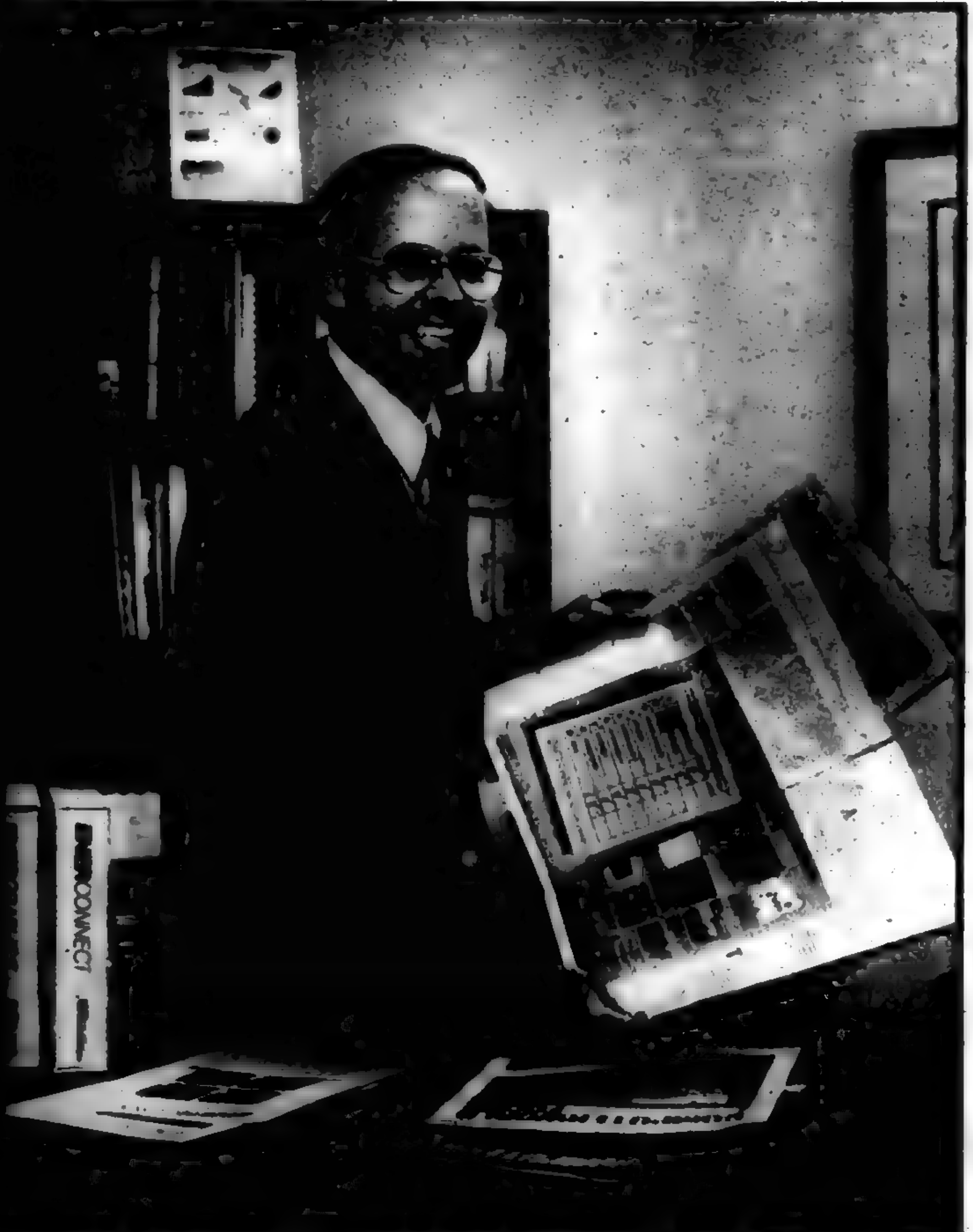

EnerConnect is the second major micro product from Enertronics, developers of the successful EnerGraphics package. As the ad for EnerConnect says, it is “. . . the first software package that puts mainframe graphics capability into the hands of anyone with an IBM PC . . . or 3270 PC.”

When it came time to announce EnerConnect, Randy Andes decided to use *Information Week*, *Business Week*, and *Computerworld Focus*. As Randy puts it, “. . . we knew *Computerworld* reached the people we need to talk to from past ads for EnerGraphics, and we decided to test *Focus* because, as the name says, each issue focuses on a topic. So, we could select an appropriate editorial environment.”

The results? “*Computerworld Focus* has produced the most response of any of the publications used and, by far, the best response. In fact, total response (via the 800 number) has far exceeded expectations. We further intend to continue to tie into *Computerworld's* editorial calendar where appropriate.”

The moral? Well focused advertising in a well focused medium will produce the best results every time.

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NEW PRODUCTS

IBM users get hand-held terminal

Users can access an IBM mainframe from up to a mile away with a new wireless hand-held terminal and communications system that obviates the need for the usual dedicated coaxial cable or telephone line and modem.

The wireless communications system is the product of a joint development effort between Motorola, Inc., which provides the terminal and radio communications gear, and Natick, Mass.-based Pathway Design, Inc., which contributes an IBM gateway.

The wireless system is intended for use in field applications, such as in warehouses and factories. For example, a forklift operator could use the system to query a data base and determine what equipment is to be picked up and where to drop it off.

A Motorola hand-held terminal, the KDT 800, contains a two-way FM radio; an internal antenna; a two-line by 54-char. screen; 160K bytes of read-only memory, of which 96K bytes can be used for customer programs; and up to 80K bytes of random-access memory. The terminal can reportedly run applications while transmitting or receiving.

The hand-held terminals communicate with a Motorola base transmitter in full-duplex mode at speeds of up to 4.8K bit/sec. at distances up to one mile. The base transmitter, which sits next to an NCP 500 network controller, translates radio frequency waves into asynchronous characters.

The NCP 500 can support up to three base transmitters. It emulates an IBM 3274 controller, provides the conversion from asynchronous communications to IBM's Synchronous Data Link Control and supports up to 32 Systems Network Architecture sessions. The NCP 500 controls network processes and features error checking and message queuing capabilities.

The price of a system ranges from $50,000 to $60,000, depending on the number of terminals and controllers required.

Tandem disk, tape units bow

High-end storage subsystems boost Nonstop line

Tandem Computers, Inc. of Cupertino, Calif., in an attempt to improve its Nonstop superminicomputer system performance in transaction processing, has announced high-end disk and tape storage subsystems.

The products are the XL8 Disk Storage Facility, the 5130/31 Tape subsystem and very large-scale integration (VLSI)-based controllers for each.

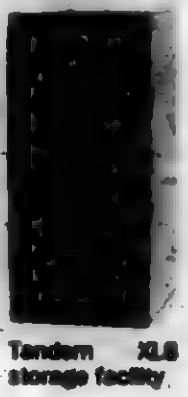
The XL8 Disk Storage Facility features up to eight 9-in. sealed Winchester 520M-byte drives. It is capable of storing up to 4.2G bytes of data and has a seek time of 15 msec per access arm, according to the vendor.

It incorporates the 3108 VLSI-based controller and the company's parallel data access architecture that uses multiple disk modules to minimize queuing, to optimize disk space use and to allow concurrent access to multiple data files to enhance throughput, the vendor said.

The XL8 was designed for use with Tandem's TXP and Nonstop II systems. The minimum configuration, which includes a cabinet with 2.1G bytes, costs $90,000.

Additional 520M-byte sealed Winchester modules can be added in increments of two, up to a maximum of eight per cabinet. They cost $40,000 per pair.

The maximum XL8 configuration, including a cabinet with 4.2G bytes, costs $168,000.


Tandem XL8 storage facility.

The 5130/31 Tape Subsystem uses a new controller that enhances data integrity by incorporating high-density VLSI gate array technology to provide error checking, fault detection and recovery and faster data rates. It has a tape speed of 200 in./sec., and it reads and records data at densities of ANSI-compatible 6250 and 1,600 bit/in.

The tape subsystem offers automatic tape threading, power windows, tape quality monitoring and automatic cleaner. The tape path was designed to minimize tape friction and wear, the vendor said.

The 5130 subsystem with cabinet, one tape drive and a formatter that supports up to four tape drives costs $58,000. Additional drives are priced at $29,500 each.

INSIDE
Price Reductions/112
Software & Services/112
Microcomputers/129
Communications/142
Systems & Peripherals/146

Project/2 out for Microvax II

Project Software & Development, Inc. of Cambridge, Mass., has announced Project/2, a turnkey project management system for Digital Equipment Corp.'s Microvax II.

Project/2 integrates project planning, scheduling and cost-control functions with graphics and relational data base capabilities that enhance information management productivity.

An entry-level single-user system includes the Project/2 Schedule Manager, the Microvax II with 3M bytes of memory, a 142M-byte disk, a 95M-byte tape unit and a data entry workstation. It costs $93,300.

The system can be expanded by adding one or more software interface keys. The keys permit an additional Microvax II user to access the Project/2 software. Each key costs $13,200 per user and includes a data entry workstation.

Users who already have the appropriate hardware can purchase the Project/2 software alone. A single-user entry-level price is $76,000. For additional users, the software-only interface keys are available for $12,000 per user.

Software options available for the system include the Project/2 Graphics Manager, Cost Manager and the Relational Database Manager. A range of hardware options are also available, including color graphics plotters and terminals, printers, memory expansion and disk drives.

NCR offers IBM-compatible PC4I personal computer

NCR Corp.'s Personal Computer Division of Dayton, Ohio, has introduced a version of its IBM-compatible NCR PC4 personal computer.

Called the PC4I, this version is compatible with the IBM Personal Computer and the Personal Computer XT. According to a spokesman, it will run IBM PC-DOS-based software without modification.

The PC4I provides 640- by 400-pixel resolution on both monochrome and color versions. It features eight expansion slots and has boards mounted on a pullout drawer to facilitate servicing and upgrading.

It contains a 16-bit Intel Corp. 8088 processor and, in the basic configuration, comes with 256K bytes of internal memory that can be expanded to 640K bytes on the main board.

A parallel printer interface and an asynchronous communications interface are standard.

Other features include a detachable keyboard that has separate cursor keys, 10 programmable function keys and a numeric keypad; either a monochrome or color 12-in., 80-char. by 25-line monitor; software, including NCR DOS and on-line Help; a random-access memory disk; and the Basic programming language.

The PC4I can be configured with one or two 5¼-in., 48 track/in. 360K-byte disk drives or one flex drive and one 5¼-in. 10M-byte hard disk drive.

The PC4I costs $2,485.

IBM micros get Intersol TSM

Intersol, Inc. of Braintree, Mass., has announced an on-line transaction-oriented customer service and support management system that runs on IBM Personal Computers and compatibles.

Telephone Support Manager (TSM) was designed for manufacturing, distribution, service and sales organizations. It allows the collection of marketing and technical information, which is then available to the user via function keys. Users can keep service histories and generate credit card slips, cash receipts, invoices, mailing lists and labels. Management reports available include customer usage, open calls/pending action, employee productivity and revenue by day or month.

TSM contains eight user-definable Help screens, 99 user-definable problem codes, 99 user-definable product codes, 99 user-definable service codes and two miscellaneous information codes.

TSM is available in single-user and multiuser versions. System requirements are an IBM Personal Computer, Personal Computer XT, AT or compatibles with between 256K and 640K bytes of memory.

One-time licenses for TSM cost from $1,200 for a single-user to $5,000 for a multiuser system. Additional one-time licenses cost $500.

Information appearing in the New Products section has been provided by manufacturers and has not been independently validated by Computerworld.

PRICE REDUCTIONS

Microsoft Corp. has offered a $40 rebate to any qualified owner of Borland International's Turbo Pascal who buys Microsoft Pascal. The offer is valid through February 1986.

Microsoft is also offering owners of any version of Lattice, Inc.'s Lattice C a $100 upgrade to the Microsoft C compiler Version 3. Owners of IBM macro assembler can upgrade to Microsoft's macro assembler Version 3 for $75.

Microsoft, 10700 Northrup Way, Bellevue, Wash. 98009.

SOFTWARE

Systems Software

Integrated Systems, Inc. has released **Version 2** of its **Applications Level Security Package (ALSP).**

ALSP is a host access-control package for all models of Digital Equipment Corp.'s VAX/VMS computers. It provides security at the menu level or for a specific application program. Security is based on defining secured applications at installation and assigning ALSP user identifications, passwords and application-related permissions to users of the secured applications.

The cost for a single-site, single-CPU license is $650. For a single-site, multiple-CPU license, the cost is $900. The source code is available for $2,000. The cost for an unrestricted license, including source code, is $3,500.

Integrated Systems, P.O. Box D, 170 Algonquin Pkwy., Whippany, N.J. 07981.

Signal Technology, Inc. has ported its **Smartstar** applications development and information management system software to Digital Equipment Corp.'s Microvax II.

Smartstar comes in two configurations. Smartstar/Office gives visual programming tools for developing and using applications. Multiple integrated applications on a single screen can be created with up to 31 windows.

Smartstar/Toolkit components work with the office components to provide support for developing complex programming applications via a structured coding environment.
Prices for full Smartstar range from $9,000 to $30,000. For Smartstar/Office, prices range from $4,000 to $16,000. For Smartstar/Toolkit, they range from $4,000 to $19,000.

Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

■

Professional Software Programmers, Inc. has added two versions to its Project Control and Accounting System (PROCAS), **PROCAS-100** and **PROCAS-45**.

PROCAS-100 was downsized to accommodate firms with up to 100 active employees in a multioffice environment. PROCAS-45 is geared to companies with a maximum of 45 active employees and offers the ability to budget projects by individual staff position within departments.

All PROCAS systems provide project control, payroll, accounts payable, accounts receivable and general ledger/financial reporting. Prices are $10,000 for PROCAS-100 and $3,500 for PROCAS-45.

Professional Software Programmers, Suite 200, 618 U.S. Highway 1, North Palm Beach, Fla. 33408.

■

Safeword Unix-Safe, a security system for computers supporting the AT&T Unix operating system, has bowed from **Enigma Logic, Inc.**

The system protects dial-up lines and local terminals by controlling access to mainframes, minicomputers and microcomputers and their programs and data bases.

Safeword Unix-Safe software is compiled into the protected computer's operating system. Users requesting access must provide a Safeword password that changes with each request and must be generated by the decoder and key. Communication between the decoder and the software is logical through the protected computer's terminal keyboards.

Software prices start at $3,500. The decoder and key typically sell for $150 per user, depending on functionality and volume.

Enigma Logic, Suite 301, 2151 Salvio, Concord, Calif. 94520.

■

An off-line memory system diagnostic package, **DIA780**, for Digital Equipment Corp. VAX-11/780 and 11/785 systems is available from **EMC Corp.**

The software diagnoses all memory system components including the synchronous backplan interconnect interface, card memory controllers and individual memory arrays.

DIA780 is compatible with VAX-11/780 and 11/785 interleaved memory systems that use either 64K-byte random-access memory (RAM)-based arrays or 256K-byte RAM-based memory. DIA780 sells for $750.

EMC, 12 Mercer Road, Natick, Mass. 01760.

■

Voyager Systems Corp. is offering **Exlist Processing**, a package that emulates Wang Laboratories, Inc. Office Information System (OIS) List Processing on Wang VS systems.

Exlist Processing was designed for Wang users who are converting from OIS to VS systems. The $1,200 tool comes with Exlist software, OIS-to-VS List Processing file conversion utility, user and supervisor manuals and an installation/conversion guide.

Voyager Systems, P.O. Box 701, Burlington, Mass. 01803.

See SOFTWARE on page 114

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NEW PRODUCTS

SOFTWARE from page 112

Optigraphics Corp. has announced its **Opti/Cadam Input Processor (O/CIP)** software product reportedly designed to provide a means for transferring drawing data from the Optigraphics 3000 scanning and conversion system to Cadam, Inc.'s Cadam.

O/CIP allows a Cadam user to re-create drawing files from the output data tapes generated by the Optigraphics 3000 scanning and conversion system.

The product executes on the user's Cadam system under IBM's VM or MVS operating systems.

In addition, it uses the Cadam Geometry Interface Module.

Cadam Release 19 and later is supported, according to the vendor.

O/CIP costs $7,500 per mainframe.

Optigraphics, 9339 Carroll Park Drive, San Diego, Calif. 92121.

Cosmic Computer Service Annex has announced **IGES 2 test file** for use by computer-aided design systems designers.

The data file contains CAD data formatted according to the National Bureau of Standards Initial Graphics Exchange Specification (IGES). Each CAD system must convert the IGES format data to and from its native internal formats.

IGES 2 contains 28 different IGES entities defining the geometric, annotation and display formatting information that is important in CAD information transfer.

Documentation costs $8.50. The program costs $175.

Cosmic, University of Georgia, Athens, Ga. 30602.

■

BMC Software, Inc. has released **Prefix Resolution Plus**, software designed to reduce the time of reorganizing logically related IBM IMS data bases.

Resolution Plus breaks the prefix resolution task into several logical subsets that can run concurrently. If a system failure occurs during this process, only those subsets incomplete at the time of the failure would need to be rerun.

A perpetual license on the first CPU costs $12,500 until Jan. 1, when the price will rise to $14,750.

BMC Software, P.O. Box 2002, Sugar Land, Texas 77478.

■

American Research Corp. has released **Version 1 of Intrface**, a file interface program that links Tandem Computer, Inc.'s report generator, Enform, with the Tandem version of SPSS, Inc.'s SPSS data management, data analysis, statistical and report generator package.

The program uses the data dictionaries users develop in Enform and other Tandem software to create an SPSS instruction file that can be edited and modified.

A first-year license for Intrface costs $4,500 for up to 16 Tandem CPUs.

American Research, Suite 20, 2885 E. Aurora Ave., Boulder, Colo. 80303.

■

M. Bryce & Associates, Inc. has released an **interface** between its Pride Information Resource Manager (IRM) and Pansophic Systems, Inc.'s Easytrieve Plus, an information retrieval and data management system.

IRM is a data dictionary/directory that catalogs and cross-references components during system design.

Available to Pride-ASDM and Pride-ARM users, the interface costs $7,000.

M. Bryce & Associates, 777 Alderman Road, Palm Harbor, Fla. 33563.

■

Business Information Systems, Inc. has announced an Information Management System (IMS) version of **Screens Made Easy (SME)**, its interactive screen design tool for IBM's CICS and IMS users.

SME-IMS develops message format service code for IMS users and produces copy books for applications programmers.

With the package, users can prototype applications once screens are defined but before code is written or generated.

Fully documented screen definitions can be used on either CICS or IMS, according to the vendor.

Business Information Systems, 3442 Stellhorn Road, Fort Wayne, Ind. 46815.

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Application packages

Para Research, Inc. has released its **Accounts Payable Version 2** financial software.

The product, for IBM System/34 and 36 computers, processes invoices from one-time vendors, automatically deleting the vendor and master file when all invoices are paid. It handles manual check information, does intercompany transfers and distributes items in one invoice to as many as 99 general-ledger accounts.

Accounts Payable Version 2 is priced at $3,000. Current users of earlier versions can upgrade for $500.

Para Research has also announced that all of its software products are now available on 5¼-in. diskettes for the IBM System/36 Model 5364 personal computer.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01730.

■

MDS Qantel, Inc. has announced **Release 6.1 of QMRP-Plus** and **Release 1.2 of QMRP-28**, new versions of its QMRP manufacturing software systems.

Release 6.1 of QMRP-Plus supports single and multiple distribution entities from one manufacturing location. It has the ability to link with Q-Auto, the electronic business data interchange system.

Release 1.2 of QMRP-28 handles single manufacturing locations as well as fractional inventory to account for cut sheets or partial containers of ingredients. It offers larger field sizes for parts description and security controls.

Enhancements common to both include improved inventory handling, improved bill of materials handling, expanded labor reporting, enhanced financial functions and order entry improvements.

The basic QMRP-Plus software ranges in price from $5,000 to $10,000, depending on the MDS Qantel processor in use.

QMRP-28 ranges in price from $10,000 to $20,000.

MDS Qantel, 4142 Point Eden Way, Hayward, Calif. 94545.

Phase Linear Systems, Inc. has released **PLsort**, a VM/CMS sort/merge system for IBM mainframes.

PLsort is available in two versions, PLsort VM and PLsort VMX. Both versions feature VSAM support plus data management and report writing capabilities, the ability to use all control statements with high-level language calls, Cobol sort/merge verbs, PL/I sort calls, Fortran sort/merge calls and 13 user exits written in Cobol, Fortran and Rexx languages.

The one-year license for PLsort VM costs $1,975 and for PLsort VMX is $3,500.

Phase Linear Systems, International Sq., 1850 K St. N.W., Washington, D.C. 20006.

■

Britz Publishing, Inc. has announced **Bpay**, an accounts payable system for IBM System/34 and 36 computers.

The package is said to offer selective payment by vendor or invoice, check writing, history reports, multicompany processing, variable interval pay cycles, general ledger interface and vendor labels.

Bpay, written in RPG-II, costs $199.

Brits Publishing, 1814 Capital Towers, Jackson, Miss. 39201.

■

Raxco, Inc. has announced **Rabbit-1 Release 4.1**, an upgraded version of its Rabbit-1 resource accounting and billing software for Digital Equipment Corp. VAX/VMS computers. The upgrade handles cluster, network and site computer billing and reporting.

Release 4.1 accommodates different rates and discounts applied to each VAX CPU. Pricing variables are said to include environment usage of network, detached, interactive and multibatch queue processing.

Other functions include a shift monitor, electronic mail billing and report pack. The shift monitor allocates VMS resources that occur across shift boundaries. Electronic mail billing places a copy of the user's bill in his electronic mailbox on a daily, weekly or monthly basis. A menu-driven report pack produces 10 standard system status reports, including Shift Utilization Recap, Profile Recap and Environment Recap.

Rabbit-1 Release 4.1 costs $995 for VAX and Microvax versions.

Raxco, 1370 Piccard Drive, Rockville, Md. 20850.

■

An enhanced version of **Spectrum/Estimator** that allows users to perform "what-if" studies while simulating budget and time resources for system development projects is available from **Spectrum International, Inc.**

This latest release provides the ability to change parameters according to the assumed scope and environment of the system. It operates under TSO and CMS environments on an IBM mainframe.

The enhanced version price is approximately $23,400, depending on implementation and training.

Spectrum International, Suite 150, 6101 W. Centinela Ave., Culver City, Calif. 90230.

■

Uccel Corp. has enhanced its **Fixed Assets Manager** software.

The upgrades let users maintain asset information, inquire and search, perform "what-if" analysis and plan activities. Formatted screens prompt users for the information necessary to execute tasks.

Fixed Assets Manager provides project accounting, tax reporting, multiple book processing, forecasting and simulation and general ledger interfacing in compliance with requirements established by the Internal Revenue Service, Securities and Exchange Commission and Financial Accounting Standards Board.

The enhancement costs from $14,000, depending on the environment. The total software package price starts at $39,500.

Uccel, Uccel Tower, Exchange Park, Dallas, Texas 75235.

■

Soft Solutions Corp. has released

Continued on page 120

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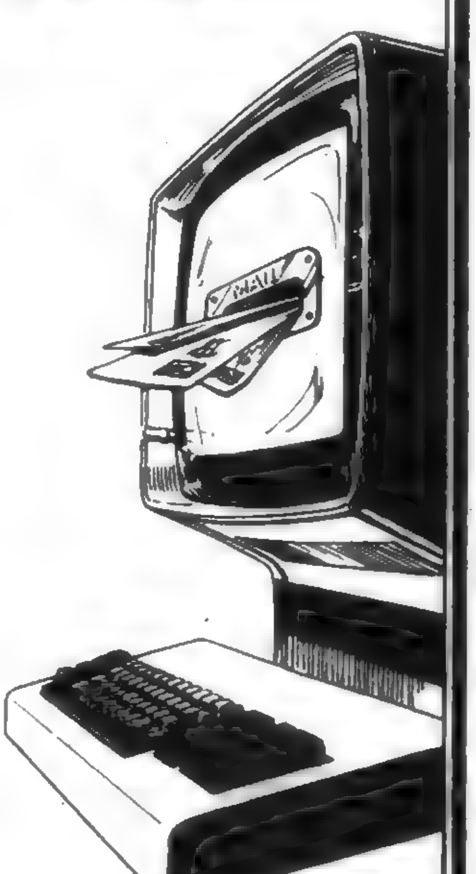

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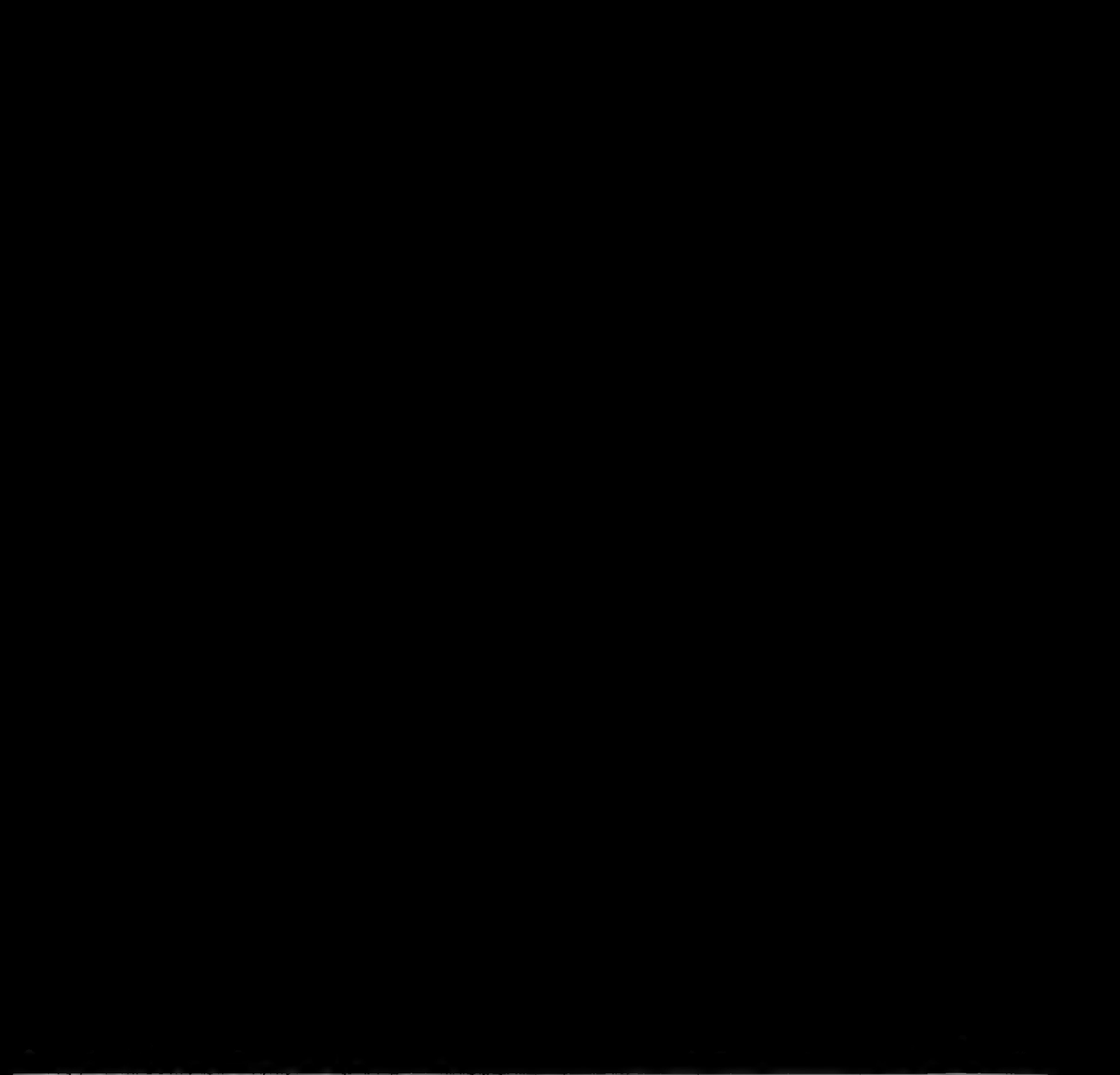

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Graham Magnetics: making sure that high-quality permanent magnetic media never becomes an endangered species.

NEW PRODUCTS

Continued from page 118

Fieldfacts, a field service management system for IBM System/34 and 36 computers.

The program functions as a computerized dispatcher for remote field service centers within a single company or multiple-company operation. Users can also input and access the program with the IBM Personal Computer.

Features include call and message handling, call escalation, performance reporting, logistics management and purchase and parts order handling.

A report writer gives users the ability to design individualized reports for one-time or repeated use.

The package costs $49,500.

Soft Solutions, 3470 Hamilton Ave., Wayzata, Minn. 55391.

Data base management systems

Esvel has ported its **Stellar/DB** data base management system to Digital Equipment Corp. VAX computers operating under VMS, AT&T Unix System V or University of California at Berkeley 4.2.

Stellar/DB is implemented as three tiers of software. It supports enhancements such as outer joins, a complete set of indexes, temporary tables and indexes, bulk row data transfer, parent-child relationships and dynamic storage allocation.

Prices for VAX versions range from $28,000 to $55,000.

Esvel, Suite 200, 2005 De La Cruz Blvd., Santa Clara, Calif. 95050.

Methodologies

Technology Information Products Corp. has announced both the **TIP Plan Starter Kit** as well as a software product for entity relationship modeling that provides automated support for the vendor's **TIP Plan Business Information Planning** methodology.

The interactive graphics tool offers organizations performing data modeling a capability for on-line graphics support of diagrams. It allows users to build an entity model by identifying primary and secondary entities.

The TIP Plan Starter Kit includes a project case study that demonstrates how to start and complete an information systems plan. The kit includes information on project organization and provides generic business models and generic data models as starting points in the analysis process.

TIP Plan, which includes both enterprise business modeling and information modeling methodologies as well as the entity relationship modeling software, is available for any IBM OS mainframe environment for a license fee of $60,000. The software tool may be purchased separately for $40,000. The TIP Plan Starter Kit, a component in TIP Plan training free to current users, is available for $95.

Technology Information Products, 12 New England Executive Park, Burlington, Mass. 01803.

■

Spectrum International, Inc. has added three capabilities to its project development methodologies — **Conventional Design Process, Structured Analysis and Design** and the **Productivity Life Cycle.**

One capability provides guidelines for breaking large projects into subprojects and implementing them in a distributed environment.

A second ability outlines shortcuts that can be taken in the development cycle when packaged software is used, while the third implements quality assurance techniques.

Enhanced versions of the Conventional Design Process, Structured Design and Analysis and the Productivity Life Cycle each sell for $30,000.

Spectrum International, Suite 150, 6101 W. Centinela Ave., Culver City, Calif. 90230.

Training

Hayden Book Co. has introduced a self-paced self-training package developed by **National Training Systems, Inc.** called **Inside Dbase III**, designed to teach anyone how to use Ashton-Tate's Dbase III.

Inside Dbase III enables users to learn how to create and modify files, reports and labels; calculate records; sort and index and use Dbase III as a calculator.

System requirements are an IBM Personal Computer, Personal Computer XT or compatible.

Inside Dbase III costs $49.95.

Hayden Book, 10 Mulholland Drive, Hasbrouck Heights, N.J. 07604.

MICROCOMPUTERS

Software

Communications Sciences, Inc. has released **Explain**, a system for accessing on-line reference and training software.

The package can be used for end-user applications, systems documentation and as an on-line reference library for computer-aided design and drafting and for documenting manufacturing systems.

The microcomputer version, for the IBM Personal Computer, Personal Computer XT or AT running IBM's PC-DOS operating system, costs $399.

The software has a writer module that needs 256K bytes of memory and a hard disk and a reader module that requires 56K bytes and the disk space needed to contain the manuals.

The mainframe version runs under IBM's CICS on IBM's 3000 and 4300 series under either the OS/MVS or DOS/VSE operating systems.

Communications Sciences, 112 N. Third St., Minneapolis, Minn. 55401.

NEW PRODUCTS

Softkey Software Products, Inc. has announced a **Keychart driver** for its Keychart Presentation Graphics software package for use with the Hewlett-Packard Co. 7550 and Nicolet Computer Graphics Co. Zeta-8 plotters.

The Keychart driver for the HP 7550 and the Zeta-8 plotters reportedly provides batch processing of graphics presentations. This allows a list of predefined charts, multiple copies of a chart or any combination of the two possibilities to be plotted while the plotter is left unattended, Softkey Software Products maintained.

The Keychart batch processing module costs $275, the vendor reported.

Softkey Software Products, Suite 404, 260 Richmond St. W., Toronto, Ont., Canada M5V 1W5.

Cygnet Technologies, Inc. has added **The Little Black Book Label Maker and File Converter** to its Little Black Book family of IBM Personal Computer software.

The Little Black Book Label Maker uses the entries in The Little Black Book — a telephone/address book system — to print mailing labels, index cards and envelopes.

The Little Black Book File Converter automatically transforms data base entries from other software programs containing names, telephone numbers and addresses into entries in The Little Black Book, and vice versa.

The Little Black Book Label Maker costs $29.95, and The File Converter sells for $19.95.

Cygnet Technologies, 1296 Lawrence Station Road, Sunnyvale, Calif. 94089.

Syscom Software has released **C Windows**, a windowing utility for use with C Ware Corp.'s Desmet C and all memory models of Lattice, Inc.'s Lattice C; Computer Innovations, Inc.'s CI-C86; and Microsoft Corp.'s C.

C Windows allows C programmers to incorporate on-line Help, pop-up windows or pull-down menus in new or existing applications. It is written in assembly language and includes modules for every C compiler, complete source code, documentation and a tutorial on windowing. C Windows costs $99.95.

Syscom Software, 320 W. Oak St., El Segundo, Calif. 90245.

■

Marketools, Inc. has unveiled **Gruntworks**, a marketing software system designed to be used with Lotus Development Corp.'s 1-2-3 on IBM Personal Computers and compatibles.

Gruntworks finds the price/volume relationship for products or lines, enabling the marketer to set the price where maximum profits exist. Gruntworks then assists in evaluating promotions used to match a changing demand to the steady output of the factory. Finally, Gruntworks combines historical data with current management inputs to forecast future demand.

The complete Gruntworks software system costs $395.

Marketools, P.O. Box 1178, Barrington, Ill. 60010.

■

Santa Barbara Software Products has announced **Indexaid**, a software program designed for use in preparing indexes to books, business publications and instruction manuals.

Indexaid contains an editor designed for writing index entries. It can import word processor files or phrases, automate the frequent task of producing transposed forms and handle three levels of subentries. Other features include automatic capitalization and the ability to deal automatically with indexing rules.

Indexaid runs on any IBM Personal Computer or compatible with at least 256K bytes of memory, IBM PC-DOS 2 or 3, an 80-col. monitor and a printer. The program can handle up to 6,000 index entries if the Personal Computer has 640K bytes of memory and a dual-sided floppy or hard disk drive. Indexaid is priced at $89.

Santa Barbara Software Products, 1400 Dover Road, Santa Barbara, Calif. 93103.

■

Recognition Equipment, Inc. has announced **Tartan PC Data Entry** software, a tool designed to increase data entry productivity.

The package is for use with Recognition Equipment's Tartan Personal Computer, IBM's Personal Computer and compatibles. It allows data entry to be distributed to virtually any location. An operator can key data batches on a personal computer in a stand-alone mode without requiring connection to a Tartan system. The batches are stored on floppy disks in a Tartan-compatible format. The cost for Tartan PC Data Entry is $1,500 for the first fully paid license and $750 for additional licenses.

Recognition Equipment, P.O. Box 660204, Dallas, Texas 75266.

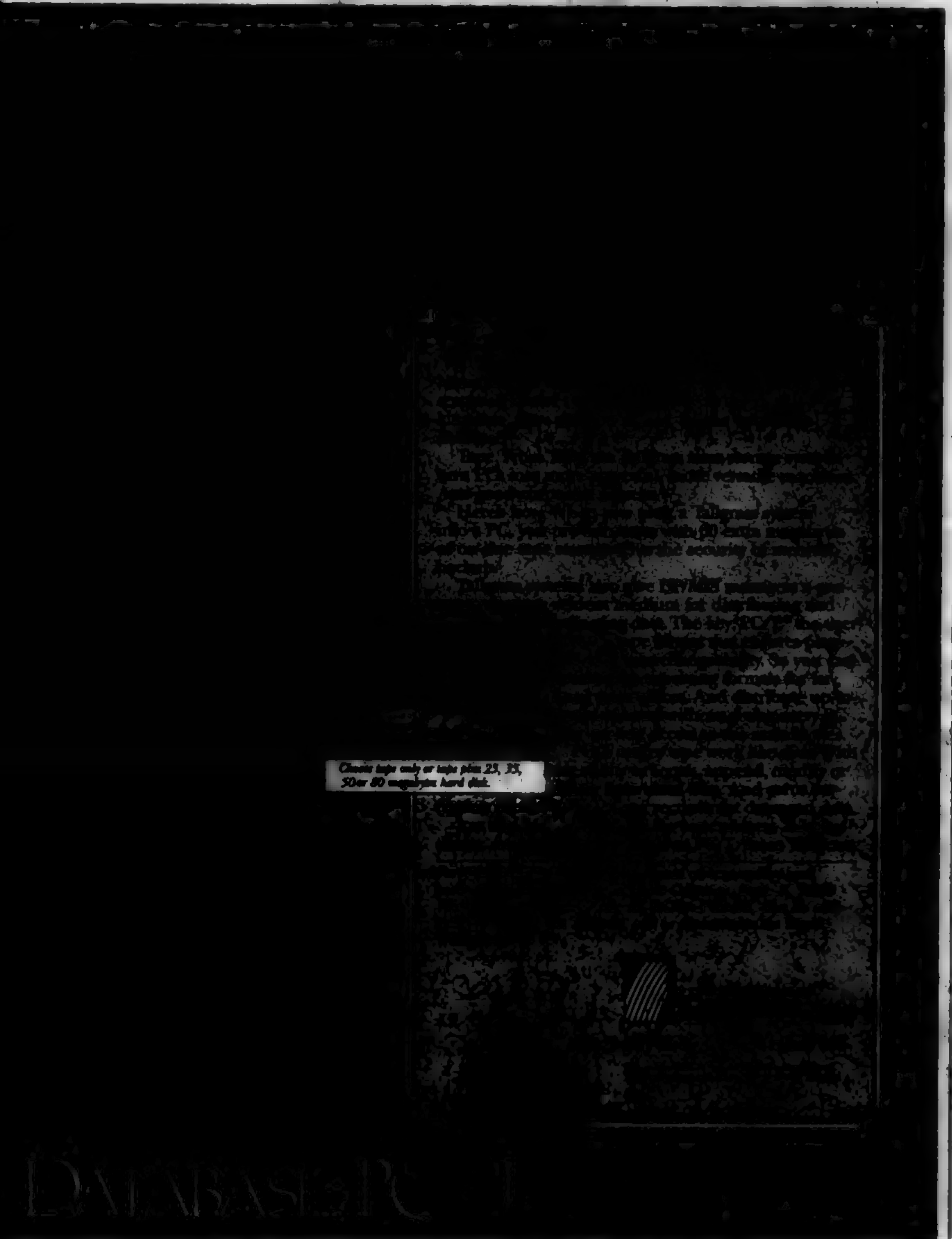
■

Applied Micro Business Systems, Inc. has released **Version 4 of Stock-Master**, its inventory management system.

Stock-Master 4 runs on the IBM Personal Computer, Personal Computer XT and AT and Altos Computer Systems, Inc.'s 586/986 series running under Microsoft Corp.'s Xenix. It contains 143 programs subdivided into several major sections, including transaction entry/editing, stock status reporting, transaction history detail analysis, trend analysis and purchase order tracking. It costs $995.

Applied Micro Business Systems, 177-F Riverside Ave., Newport Beach, Calif. 92663.

See [illegible] on page 122


Choose tape only or tape plus 25, 35, 50or 80 megabyte hard disk.
DATABASE/PC

NEW PRODUCTS

[illegible] from page 121

Q Management, Inc. has unwrapped **Drawmate**, a keyboard-based graphics software system for IBM Personal Computers and compatibles.

Drawmate requires 128K bytes of random-access memory.

Output of graphics images may be written to disk or printed to printers, video recorders or to 35mm camera equipment.

It costs $49.95.

Q Management, 3015-P Cottage Place, Greensboro, N.C. 27405.

■

I-Bus Systems has introduced **Promdisk**, a package that enables users to put any code, including IBM PC-DOS, in the erasable programmable read-only memory (EPROM) on a single-board computer.

Promdisk permits the use of any compiler to produce read-only memory code. It will create one to four personal computer look-alike disk drives in EPROM, from 32K bytes up to 256K bytes of memory, using the I-Bus Y88 Personal Computer-compatible board-level computer. The user can also load additional random-access memory disks into memory from the EPROM disk drive.

Promdisk costs $1,995.

I-Bus, 9235 Chesapeake Drive, San Diego, Calif. 92123.

North Edge Software Corp. has announced **Timeslips**, a time tracking system that includes its own reporting, billing and business graphics generators.

Timeslips was designed for use in tracking time-related costs for specific projects, measuring employee productivity and producing business usage logs for Internal Revenue Service claims.

It consists of three modules: the setup program, the timer program and a data base/report generator.

Timeslips costs $99.95.

North Edge Software, P.O. Box 286, Hamilton, Mass. 01936.

■

Lemma Systems has released **Point**, a mouse-based screen editor for the IBM Personal Computer.

Point features overlapped windows. Twenty files of unlimited size can be edited simultaneously in 20 windows. Editing features include flexible copy and moving between windows, undoing up to 200 previous edits and redoing the last edit.

Point is priced at $125.

Lemma Systems, 312 Sierra Place NE, Albuquerque, N.M. 87108.

■

Cadd Resources Corp. has introduced **Graphics File Translator** (GFX), a software package designed to transfer drawing files between a Calcomp, Inc. System 25 computer-aided design system and a microcomputer running Autocad drafting software from Autodesk, Inc.

GFX consists of four software modules. The first two are the translation modules that reside in the Calcomp system, and the other two are the drawing transfer modules resident on the personal computer running Autocad. The transfer process is bidirectional.

The Calcomp System 25 must be Version 5, and the personal computer needs to be an IBM Personal Computer, Personal Computer XT, AT or compatible running IBM PC-DOS.

GFX costs $9,500 for the first Calcomp system and $5,700 for each additional CPU. For more translation and drawing transfer modules, the price is $2,500.

Cadd Resources, 35th Floor, 1600 Smith St., Houston, Texas 77002.

■

Sourceview Software International has announced **PCmailer** and **PCscreen** for personal computers running Microsoft Corp.'s MS-DOS.

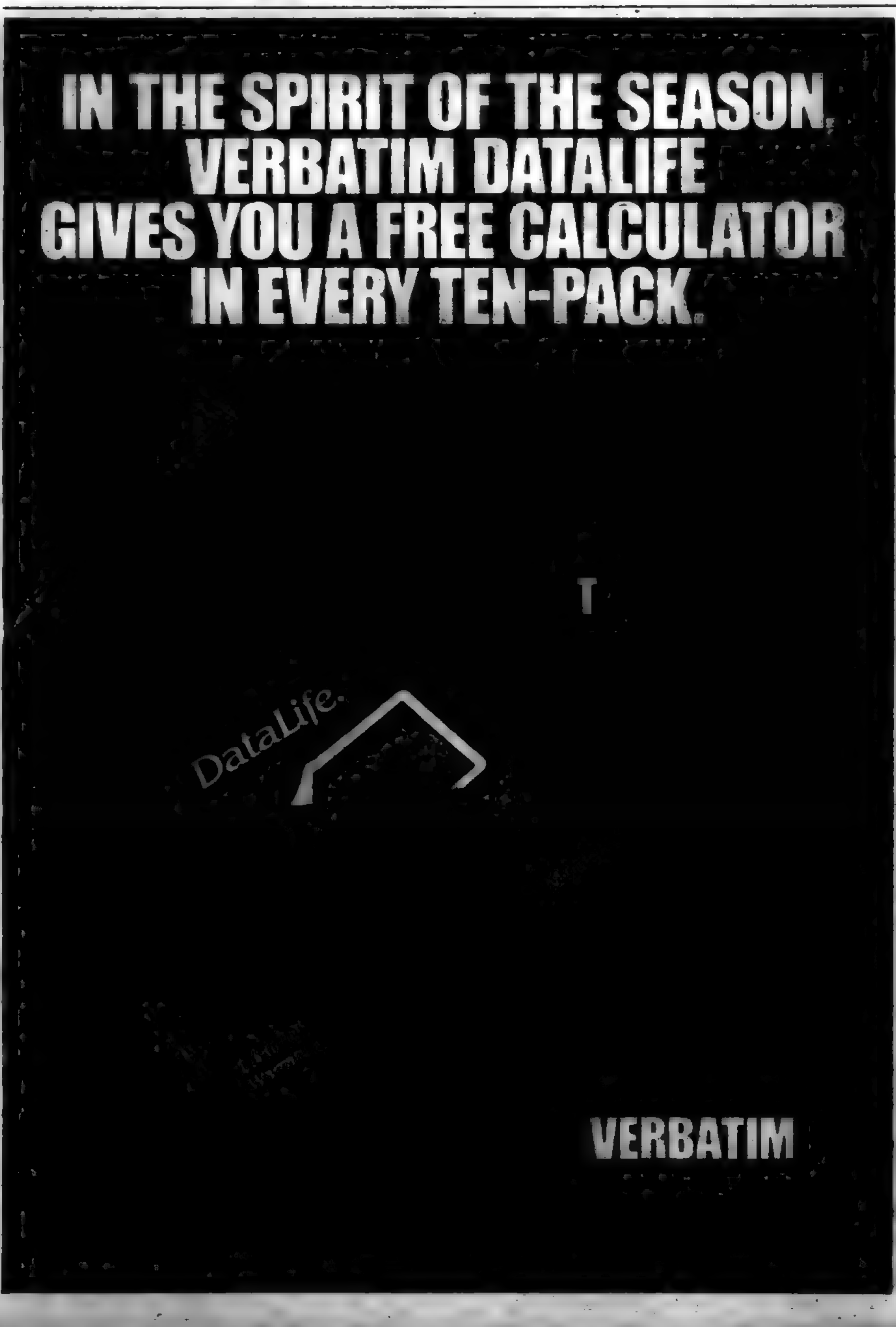
PCmailer is an address book program designed to allow users to store, find, change and display telephone and address data. It also prints a telephone directory and mailing labels.

PCscreen enables users to design input screens for inclusion in programs. Nine field type formats are allowed. PCscreen converts completed screens into a ready-to-run Basic program segment.

PCmailer and PCscreen cost $49.95.

Sourceview Software International, 895 Castro St., Martinez, Calif. 94553.

See [illegible] on page 127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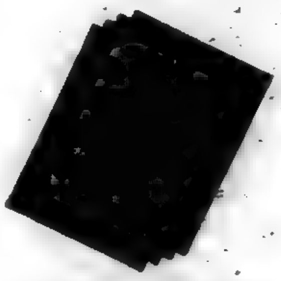

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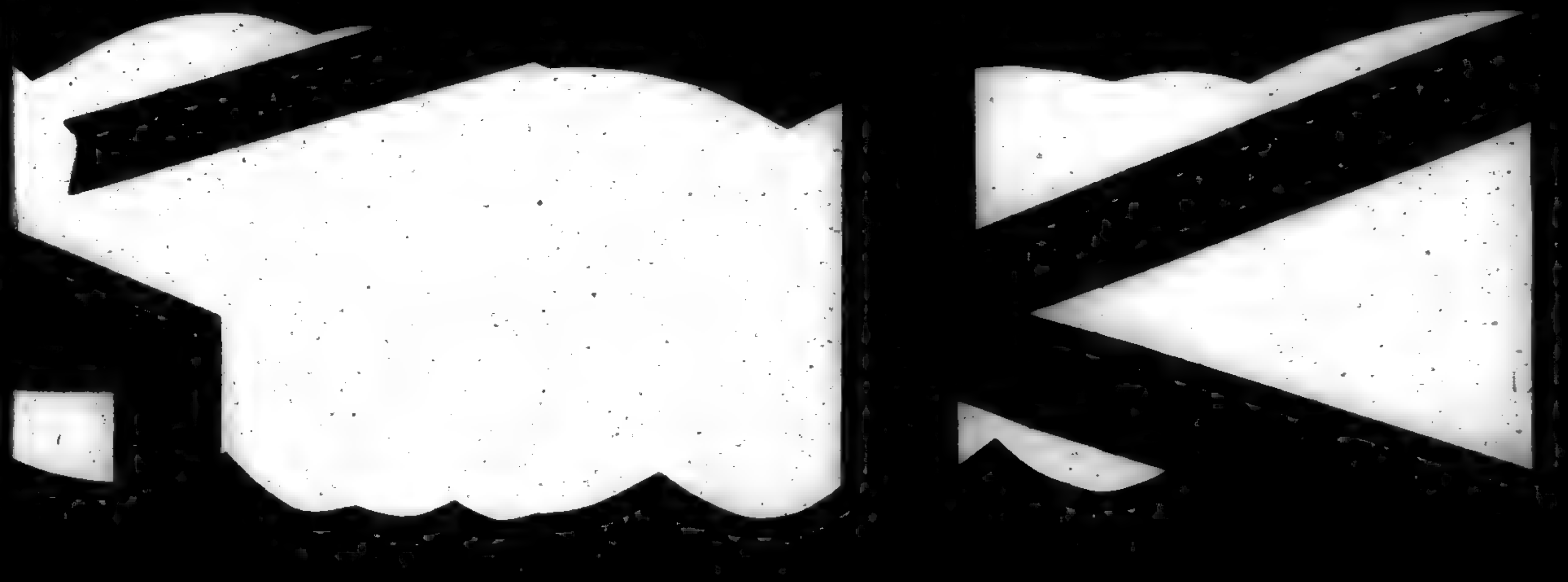

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MICROS from page 122

Fox & Geller, Inc. has announced **Quickcode**, an enhancement for Lotus Development Corp.'s 1-2-3 Release 2, to help users create Lotus Symphony-like data entry forms and data bases.

Quickcode contains a learn mode, which creates keyboard macros from user keystrokes; a macro library for storing up to 100 macros; a menu builder; a programming language with a pop-up text editor; and a debugger. System requirements are an IBM Personal Computer, Personal Computer XT, AT or compatible, 348K bytes of random-access memory and Lotus 1-2-3 Release 2.

Quickcode is priced at $199.

Fox and Geller, 604 Market St., Elmwood Park, N.J. 07407.

■

Lahey Computer Systems, Inc. has released Version 2 of its **F77L**, an implementation of the ANSI Fortran 77 standard for IBM Personal Computers and compatibles.

New features include completion of source on-line debugger, new user manual, unlimited size of commons and arrays and unlimited name length.

System requirements are a personal computer with an IBM PC-DOS or Microsoft Corp. MS-DOS operating system, 256K bytes of memory and an Intel Corp. 8087/80287 math coprocessor.

F77L is priced at $477.

Lahey Computer Systems, Suite 243, 31244 Palos Verdes Drive W., Rancho Palos Verdes, Calif. 90274.

■

Sourceview Software International has released **Micromind Knowledge Engineering Tool** software for creating knowledge-based expert systems on the Apple Computer, Inc. Macintosh.

Micromind is an interpreter that operates on a rule base and a data base containing true/false premises and conclusions. The format of the rules is an IF-THEN-DO construction. Micromind contains a full screen editor.

Micromind is priced at $495.

Sourceview Software International, 835 Castro St., Martinez, Calif. 94553.

■

Intelligent Choice Software has introduced **Micro Log**, the first in a series of timekeeping, reporting and costing aids.

Micro Log permits timekeeping of microcomputer usage. It generates a log that can be used to obtain statistical reports.

System requirements are an IBM Personal Computer or compatible with 256K bytes of random-access memory and one minifloppy disk drive. It is priced at $29.95.

Intelligent Choice Software, 12 Back River Road, Merrimack, N.H. 03054.

■

Geocomp Corp. has released Version 3 of its **Geograf** graphics software library utility for the IBM Personal Computer and compatibles.

Geograf prepares customized graphs of any type from within the user's program. It is available for Microsoft Corp. Fortran, IBM Professional Fortran, IBM Basic and Summit Software Technology, Inc. Betterbasic.

New capabilities allow flexible formatting of axis labels, addition of grids to plotted data, windowing, scaling and 12 optional character fonts. Geograf costs $275.

Geocomp, 342 Sudbury Road, Concord, Mass. 01742.

■

Mouse Word, a word processing package for Apple Computer, Inc. Apple II personal computers that includes an integrated communications function and Apple Macintosh-like mouse-driven interface, is available from **International Solutions, Inc.**

The package contains mail-merge and mathematical functions plus offers the capability to combine documents with spreadsheets created on Mouse Calc, a companion product. The mouse controls all commands such as cut, copy, paste, emphasize in boldface, center and underline.

The communications function operates with Hayes Microcomputer Products, Inc.-compatible modems at 300 or 1,200 bit/sec.

Mouse Word requires 128K bytes of memory and a peripheral mouse. A second disk drive is recommended.

The package costs $129.95.

International Solutions, 910 W. Maude Ave., Sunnyvale, Calif. 94086.

■

Help Technologies has enhanced **Helpdos**, its Help system for IBM PC-DOS- and Microsoft Corp. MS-DOS-based computers, by adding the ability to select a Help menu or item when the program has started.

Version 2 of Helpdos allows users to expand its Hints feature, which lists MS-DOS or PC-DOS commands by category of activity. Helpdos Version 2 provides Help files and menus for MS-DOS or PC-DOS 3.1 as well as MS-DOS or PC-DOS 2 and 3.

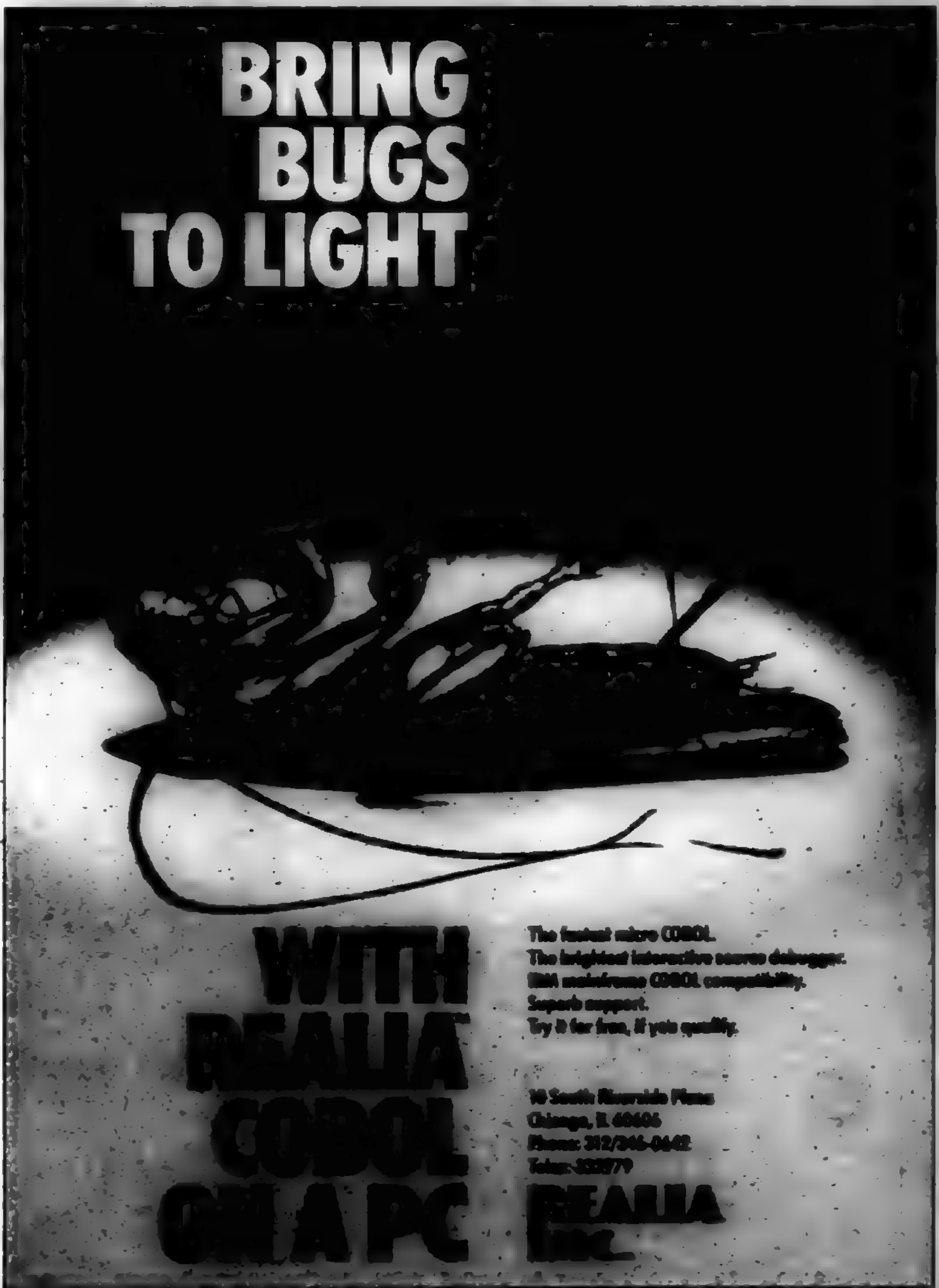
Helpdos Version 2 costs $49.95. Existing users can upgrade to this release for $7.50.

Help Technologies, Suite O, P.O. Box 50834, 4274 Wilkie Way, Palo Alto, Calif. 94303.

Systems

Executive Presentation Systems, Inc. has released the **EPS-2000**, a presentation graphics system designed to produce graphics on all media in-

Continued on page 128



NEW PRODUCTS

Continued from page 127

cluding 35mm slides and plotted and film overhead transparencies, plotted paper copy up to 36 by 48 in., ink-jet copy and video output.

The system processor is a 16-bit Intel Corp. 8086 along with an 8087 math coprocessor running at a clock rate of 8 MHz. There is 640K bytes of available random-access memory, and standard storage is a 10M-byte hard disk and a 360K-byte, 5¼-in. IBM Personal Computer-compatible floppy drive. There are seven serial and three parallel ports.

The software is written in the C language and runs under Microsoft Corp. MS-DOS. There are 13 fonts available.

The standard EPS-2000 system is priced starting at $9,995.

EPS, 5854A Peachtree Corners E., Norcross, Ga. 30092.

Telesensory Systems, Inc. has announced the **Vista System**, which enables the visually impaired to use an IBM Personal Computer by producing enlarged characters and images on the monitor.

The Vista System consists of a printed circuit board, a software program and a standard mouse with three buttons. The size of the screen enlargement can be adjusted from three to 15 times.

The system works with a monochrome or full-color monitor, shows all attributes such as highlighting, blinking and underlining, works with data transfers over the phone and with terminal emulators and enlarges graphics as well as text.

The Vista System costs $1,700.

Telesensory Systems, P.O. Box 7455, 455 N. Bernardo Ave., Mountain View, Calif. 94039.

Sun Microsystems, Inc. has announced two programming environments, **Sunpro** and **Sun Visual/Integrated Environment for Workstations** (SunVIEW), which offer programming utilities and a user interface for developing Sun-2 and Sun-3 workstation software.

Based on the AT&T Unix operating system, Sunpro supports rapid prototyping, a program development methodology based on repeated testing of quickly constructed prototype software. Users can then use Sunpro utilities to performance test and tune the prototype into a finished product. An integrated interface is provided.

SunVIEW lets software engineers create interfaces that use windows, scroll bars, pull-down menus and pointing devices.

Sunpro and SunVIEW come bundled with Sun's workstations and Unix-based operating system. These systems range in price from $8,900 to $50,000.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043.

■

Support Technologies, Inc. has announced the **ST3000** test system for electronic systems and printed circuit boards.

The ST3000 contains a Motorola, Inc. MC68010 microprocessor running at 10 MHz and comes standard with 1M byte of system random-access memory plus 256K bytes of read-only memory.

Two built-in disk drives provide mass storage for test programs and measurement data bases. A detachable display/keyboard console can be positioned up to 6 ft from the test unit.

The ST3000 operating system offers a line-oriented editor, pop-up menus and softkey selectable functions. Three modules can be used with the test system: a select emulation system for software-selectable microprocessor emulation, a bus emulation system for testing industry-standard bus-based products and a measurement system that integrates six instruments.

The system has two RS-232C ports and an IEEE 488 port.

The ST3000 costs approximately $20,000.

Support Technologies, 7105 S.W. Varns Ave., Tigard, Ore. 97223.

Communications

Phoenix Computer Products Corp. has enhanced its **Ptel** communications package.

New features include an on-line software update capacity and support, a line-oriented script language and forward and backward scrolling.

Ptel runs on IBM Personal Computers, Personal Computer XTs and ATs and compatibles running under Microsoft Corp. MS-DOS 2 or higher.

Ptel is priced at $195.

Phoenix Computer Products, 320 Norwood Park S., Norwood, Mass. 02062.

■

CXI, Inc. has announced a family of coaxial and remote micro-to-mainframe local-area net gateway connections called **3270 Pcox/Gateway**.

The gateway family includes the Pcox/Gateway Coax connection, which is a gateway between a local net and an IBM 3274 cluster controller; the Pcox/Gateway-16 and Pcox/Gateway-64 remote connections, which emulate 3274 units; and the Pcox/Gateway WS workstation software that provides emulation of IBM's 3278 and 3279 terminals, 3287 printers and 3270 Personal Computers. The workstation software also includes the Pcox/File Transfer Capability, which enables users to upload and download data to and from CMS and TSO host systems.

The price for the Pcox/Gateway Coax, the Pcox/Gateway-16 and the Pcox/Gateway-64 are $2,995, $2,595 and $4,595, respectively. Pcox/Gateway WS software kits cost $275 and the Pcox/Gateway Coax upgrade for Irma costs $2,100.

CXI, 3606 W. Bayshore Road, Palo Alto, Calif. 94303.

See MICROS on page 133

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NEW PRODUCTS

MICROS from page 120

Hammer Computer Systems, Inc. and **Advanced Telecomputer Systems** have announced **Ultralink II**, a voice and communications system that incorporates concurrent processing, allowing users to partition memory and work on more than one task at a time.

Ultralink II allows users to run three additional applications at the same time. It provides a full-featured personal and business telephone directory plus the ability to exchange screens with another user even if the other user is running a different program.

The Ultralink II system costs $99.95.

Hammer Computer Systems, Suite 250, 900 Larkspur Landing Circle, Larkspur, Calif. 94939.

■

RAD Data Communications, Inc. has added **Model MIC-P/S** and **Model MIC-S/P** to its family of serial/parallel converters for personal computers.

Model MIC-P/S is used to connect a printer with a serial interface to an IBM Personal Computer. The Model MIC-S/P is used to connect a printer, with a Centronics Data Computer Corp.-compatible parallel interface, to an Apple Computer, Inc. machine or to another personal computer with a serial interface.

The interface converters operate without ac power, and they come with a 6-ft cable.

Each model costs $89.

RAD Data Communications, 40 N. Van Brunt St., Englewood, N.J. 07631.

■

Fox Research, Inc. has introduced **10-Server**, a file server designed for its 10-Net local-area network.

The product features an 8-MHz Intel Corp. 80186 processor, 512K bytes of random-access memory and an integral 60M-byte streaming tape. It offers an IBM Personal Computer AT-compatible bus with six IBM-compatible expansion sockets and on-board serial, parallel and keyboard ports. It works with all IBM Personal Computer-compatible local-area network hardware and software.

The 10-Server, with built-in 10-Net board, is available with a 45M-byte hard disk for $8,995.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

■

Network Research Corp. has ported its **Fusion** software to support XNS and TCP/IP protocols running simultaneously on 3Com Corp.'s Model 3C505 intelligent board Ethernet controller for the IBM Personal Computer, Personal Computer XT and AT.

Fusion for the 3C505 is priced at $750.

Network Research, 2380 N. Rose Ave., Oxnard, Calif. 93030.

■

Polygon Associates, Inc. has ported its **Poly-Com** software package to the Data General Corp. Data General/One portable personal computer.

The Poly-Com program allows the user to use a laptop as a Digital Equipment Corp. VT100 or VT102 terminal and to transfer ASCII or binary files between the complete line of DEC minicomputers.

The program supports all DEC full screen editors. It operates at speeds up to 9.6K bit/sec. through the RS-232 port or through the internal modem port.

Poly-Com for the DG/One comes in a 3½-in. diskette format and costs $200.

Polygon Associates, 1024 Executive Pkwy., St. Louis, Mo. 63141.

■

An intelligent modem, the **Mercury 1200 Intelligent Modem**, that continually searches for the cleanest part of the telephone line's center track is out from **Mercury Modems**.

The Mercury 1200 Intelligent Modem reportedly has less noise and other line problems than modems that use a preset center-line location. The Mercury 1200 works with modem software from AT&T and Hayes Microcomputer Products, Inc. and is compatible with most computers, including the IBM Personal Computer.

Internal software provides commands, a Help feature, telephone line access, dial tone, number called and busy or received status on the computer monitor screen.

The Mercury 1200 Intelligent Modem costs $300.

Mercury Modems, Building N-2, Spokane Industrial Park, Spokane, Wash. 99216.

Storage

Ideassociates, Inc. has announced **Diskit**, a series of internal disk drives for the IBM Personal Computer XT and Personal Computer AT.

The Diskit product line includes an upgrade policy that allows users to trade up as their storage requirements increase.

Diskit drives for the Personal Computer AT range in price from $1,595 for 20M-byte capacity to $8,995 for 120M bytes. Personal Computer XT models range from $1,495 for 10M bytes to $9,595 for 120M bytes.

Ideassociates, 35 Dunham Road, Billerica, Mass. 01821.

■

Pacific Micro Systems has introduced the **Pelican 3.3**, a mass storage system for IBM Personal Computers and compatibles running IBM PC-

Continued on page 124

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Or call 1 800 44KODAK (1 800 445-6325), Ext 358.

Eastman Kodak Company, Business Imaging Systems Division, Dept. DP5480, Rochester, NY 14650

I'd like to know more about Kodak's lowest-cost retrieval with the IMT-350 microimage terminal (A-1997) and the Starvue II reader-printer (A-1867).

☐ Have your representative contact me.
☐ Send more information.

We retrieve ____________ documents per day.

Name ____________

Company ____________

Address ____________

City ____________ State ____________ ZIP ____________

Telephone ____________

Plain-paper printing now with image-length selection.

© Eastman Kodak Company, 1985

NEW PRODUCTS

Continued from page 133

DOS Version 2 or higher.

The Pelican 3.3 incorporates Eastman Kodak Co.'s 3.3M-byte half-height drive in an anodized aluminum housing. The system packs 2.78M bytes of formatted data on a 5¼-in. diskette. It includes a half-slot controller card and cache software to decrease data access time. Conventional single- or double-sided diskettes can also be read.

The Pelican 3.3 costs $795. A pack of five Kodak high-density diskettes costs $65.

Pacific Micro Systems, 160 Gate 5 Road, Sausalito, Calif. 94965.

■

CMS, Inc. has added two 60M-byte models, **T-160-EXT** and **T-160-C**, which are compatible with the Compaq Computer Corp. 286 personal computers, to its family of ¼-in. tape backup subsystems.

Model T-160-EXT, in an external cabinet, can be used with the Compaq Deskpro 286 or the Portable 286. Model T-160-C is a half-height internal subsystem available for the Deskpro 286 computer system.

Model T-160-C and Model T-160-EXT are priced at $1,495 and $1,795, respectively.

CMS, 401-B W. Dyer Road, Santa Ana, Calif. 92707.

■

Data Electronics, Inc. has introduced **Microtape 1000** and **Microtape 2000**, ¼-in. tape cartridges designed for 3½-in. tape backup systems.

Microtape 1000 can store 20M bytes of data on 12 recording tracks at a rate of 90 in./sec. It features a tape length of 185 ft and a recording density of 10,000 flux transition/in.

The Microtape 2000 can store 40M bytes on 24 tracks at a rate of 120 in./sec. It has a tape length of 205 ft and a recording density of 12,500 flux transition/in.

The Microtape 1000 costs $20. The Microtape 2000 is priced at $27.

Data Electronics, 10170 Sorrento Valley Road, San Diego, Calif. 92121.

Printers/plotters/peripherals

Key Solutions, Inc. has introduced the **KS 8300/AT**, a keyboard with the IBM Personal Computer AT layout designed for IBM Personal Computers and Personal Computer XTs.

The plug-compatible KS 8300/AT features IBM-type up/down encoding with ASCII and position encoding available as down-code options. The standard 19.2K bit/sec. serial transmission rate can be modified down to 1,200 bit/sec. There is self-diagnostic routing automatically initiated when the power is turned on. Output is transistor-transistor logic-compatible.

The list price is $125.

Key Solutions, 10800 Normandale Blvd., Minneapolis, Minn. 55437.

■

Micro Switch, a Honeywell, Inc. division, has added the **98ST13-4E Silent-Tactile** (ST) keyboard to its ST series of keyboards.

The keyboard is a plug-compatible enhancement to IBM's Personal Computer AT keyboard. A separate cursor control pad has been added, and the 10-key function pad has been relocated to a single row across the top of the keyboard.

The keyboard costs $264.10.

Micro Switch, 11 W. Spring St., Freeport, Ill. 61032.

■

Seiko Instruments U.S.A., Inc. has announced **CH-5201B**, a thermal transfer technology color copier for IBM's 3270-PC/G and 3270-PC/GX graphics workstations.

The CH-5201B was designed to produce images on plain paper or transparency film. It is equipped with the Adaptable Video Interface, which allows images to be downloaded to the frame buffer in less than 1 sec. Copies with a resolution of 152 dot/in. are produced in about 1 min.

The CH-5201B is priced at $12,650. The 3270-PC/G interface costs $775; the 3270-PC/GX interface costs $850.

Seiko Instruments, 1623 Buckeye Drive, Milpitas, Calif. 95035.

■

Texas Instruments, Inc. has added the **Model 857** color printer for personal computers to its family of Omni 800 printers.

The Model 857 provides letter-quality and graphics printing with a four-color ribbon that blends to seven colors. It features draft printing at 150 char./sec. and letter-quality printing at 35 char./sec. and offers interchangeable typeface fonts along with raster and mosaic graphics. The Model 857 comes standard with friction and tractor-feed mechanisms, parallel/serial interfaces, a Gothic font module and a screen-dump utility diskette. It costs $899.

TI, H-819, P.O. Box 809063, Dallas, Texas 75380.

■

Texas Instruments, Inc. has introduced a data processing version of its Omni 800 Model 880 printer called the **Omni Model 880 DP**.

The Model 880 DP throughput capability is affected by print-head movement, intelligent data handling, overhead and paper handling capabilities. An enhanced motor improves the paper-feed mechanism, increasing the form feed from 2 in./sec. to 8 in./sec.

The Model 880 DP prints 200 char./sec. bidirectionally in draft mode and 150 char./sec. in enhanced

Continued on page 136

A no-risk offer for IBM PC-to-VAX users!

How to turn life's little shortcomings into a $100 savings.

The PC to VAX world is populated with communications products that don't quite fill the bill. While each may have one nice feature or another, they also have their shortcomings. You've undoubtedly discovered a few yourself:

- VTERM's confusing setups.
- Crosstalk's missing printer port and delete key.
- SmarTerm 125's snail-paced screen repaint.
- XMODEM's unreliability.
- VTERM's part-time "hotkey."
- SmarTerm's misplaced keypad keys.

If you've found yourself frustrated by these deficiencies, or others, then it's time you move up to Polygon communications software. Because our terminal emulation and file-transfer products allow an IBM PC to perfectly emulate a wide variety of DEC terminals (including the VT240) and achieve easy, error-free data exchange.

$100 Discount. 100% Guarantee.

For a limited time, we've added two "enhancements" to our communications products that are sure to make them even more popular with PC to VAX users:

Trade-up to poly-COM/220 or poly-COM/240 before December 31, 1985 and qualify for a $100 discount from our regular prices. Plus get our Guarantee that if you're not completely satisfied, you can return your purchase within 30 days for a 100% refund.

Make sure you're not shortchanged on this no-risk offer. Call us today for Trade-Up details.

314-576-7709.

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polygon®
The difference is experience.

See us at COMDEX/FALL booth 2736.

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"Computers that work hard are great. But how do I get them to work together?"

"Work with us.

[illegible]
give you end to e
that works harde

The success of any computer system will depend as much on easy data access as on the quantity and quality of data.

With this in mind, AT&T now offers you an exceptionally powerful and flexible computer line based on two fundamental and related strengths:

1. Comprehensive communications and networking expertise.
2. Full commitment to the protection of your current and future investments.

We have products, not promises, to connect PCs at the local level; PCs, supermicros and minis at the departmental level; and the connectivity to mainframes at the corporate level.

Communications Starting at the Desktop

AT&T envisioned the ideal computer system as the one most responsive to the user's needs.

Since most people frequently have to do several tasks at once, we designed our communications-based equipment to give you that ability.

We offer the AT&T PC 6300 and the new AT&T Personal Computer Model 6300 PLUS (both with the optional Communications Manager), as well as the AT&T UNIX™ PC, Model 7300 or the new Model 3B1 with increased storage capacity—all of which let you connect a telephone directly to the computer for integrated voice and data capability.

For example, you're working on a spread sheet and the phone rings. No problem—your AT&T Computer "bookmarks" your place. You can answer the phone, record call notes on the computer, store them for reference and then go right back to your place on the spread sheet.

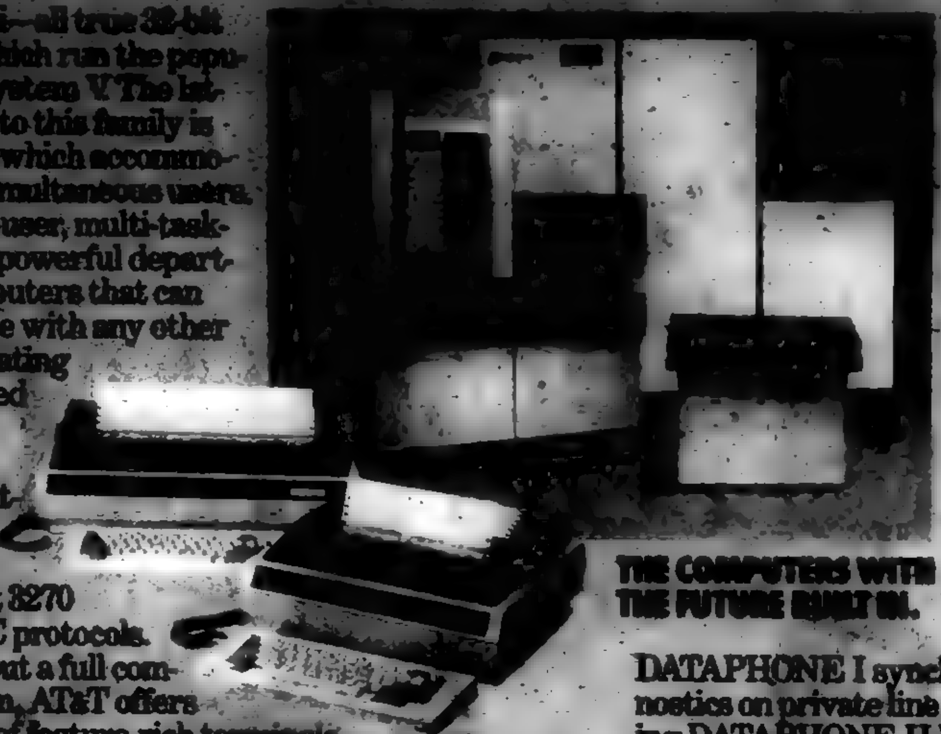
Pulling the Department Together

Our enhanced 3B Computer line stretches from supermicro

AT&T UNIX PC
AT&T PC6300
AT&T [illegible] Printer

© [illegible]

[illegible]-based computers connectivity for a system investment as a business tool.



AT&T 3B Computers
AT&T 5300 Teleprinters

THE COMPUTERS WITH THE FUTURE BUILT IN.

to supermini—all true 32-bit machines which run the popular UNIX System V. The latest addition to this family is the 3B2/310 which accommodates 6-14 simultaneous users.

The multi-user, multi-tasking 3B s are powerful departmental computers that can communicate with any other UNIX Operating System-based machine as well as personal computers and mainframes that support 3270 SNA or BSC protocols.

To round out a full computer system, AT&T offers a broad line of feature-rich terminals, printers and plotters.

Not to mention the 5300 line of teleprinters. Each one delivers high-performance dot matrix printing in a variety of input/output situations.

Based on accepted industry standards, AT&T Computer products work with what you have today, and will be enhanced and supported tomorrow. That's what we mean when we promise "The Computers With The Future Built In."

Local Networking

AT&T connectivity starts with a complete line of LAN s for both local and departmental environments.

Orderable now, networks like the AT&T STARLAN NETWORK and 3BNET can tie together computers, peripherals and terminals. With our Information Systems Network (ISN) you can even connect through digital PBX switches.

You can build and control the network best suited to corporate requirements without sacrificing local processing capabilities.

And when that network needs to reach beyond the departmental level, AT&T's connectivity puts your system in touch with any computer—mainframe or not—that supports industry standard protocols.

The Bigger Picture

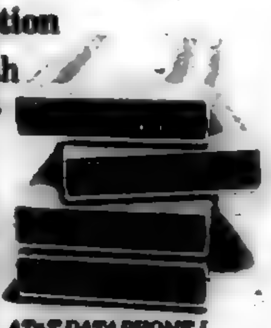
Add AT&T 3270/SNA or 3270/BSC Emulator + Software to your 3B Computer system, and you can access applications and features traditionally reserved for 3278 display station users. One desktop terminal can now give you the ability to perform multiple computer functions.

For larger networks, the AT&T Application Program Interface lets 3B users process mainframe data with 3B resident application programs.

The final link in the connectivity chain is data communications equipment, and AT&T has it all. From the low-cost Model 4000 asynchronous modem to our enhanced DATAPHONE® system family.

The DATAPHONE product family ranges from DATAPHONE I synchronous modems for basic diagnostics on private line networks right up to the evolving DATAPHONE II line of analog modems, DSUs and multiplexers for complete control of the most sophisticated networks.

Make the Right Connection



AT&T DATAPHONE I Modems

By designing "The Computers With The Future Built In", AT&T supports those industry standards that encourage open architecture, thus protecting your investment.

It makes good business sense to make computers work *together*. Old or new, our own or somebody else's.

As your needs grow and as technology changes, AT&T Computers will give you expansion without obsolescence.

Before you make your next purchase decision, let us show you what the future can hold for you. Call your AT&T Information Systems Account Executive, your authorised AT&T Supplier, or simply call 1 800 247-1212.

AT&T
The right choice.

NEW PRODUCTS

Continued from page 134

print mode. The adjustable tractors and bottom paper-feed mechanism allow handling of forms of up to five parts and between 3 and 15 in. wide.

The printer comes standard with an RS-232C serial interface and an industry-standard Centronics Data Computer Corp.-style parallel interface.

The Model 880 DP costs $2,195.

TI, P.O. Box 809063, H-8820, Dallas, Texas 75380.

■

The M-1509, a 136-col. dot matrix printer that prints at 180 char./sec. for drafts and 45 char./sec. for near-letter-quality output, is available from **Brother International Corp.**

It provides Centronics Data Computer Corp.-type parallel and RS-232C serial interfaces, plus it allows users to switch between IBM Personal Computer and Epson America, Inc. FX 100+ protocols and character sets.

Other character sets accommodate multilanguage, scientific and mathematical printing.

The printer can handle 5- to 16-in. fanfold paper and 4- to 16½-in. cut sheets. A bottom-feed push-up tractor allows printing on the first continuous form. An automatic-cut sheet feeder is available as an option.

Operating at a 55db noise level, the M-1509 sells for $499.

Brother International, 8 Corporate Place, Piscataway, N.J. 08854.

■

The **SG-1500**, a 12-in. monochrome green monitor for IBM Personal Computers and compatibles that provides 800- by 750-dot resolution, has bowed from **Sakata U.S.A. Corp.**

The monitor provides 80 columns by 25 lines of 5- by 7-dot characters. Horizontal frequency is 18.43 KHz and vertical frequency is 60 KHz. The SG-1500 will operate in temperatures ranging from -10 degrees Celsius to 40 degrees Celsius and in humidity levels between 10% and 80%.

The SG-1500 lists for $169.

Sakata U.S.A., 651 Bonnie Lane, Elk Grove Village, Ill. 60007.

■

Ultre-Setter, a laser raster imager for graphic arts, typesetting, medical imaging, computer-aided design and manufacturing and facsimile applications, has bowed from **Ultre Corp.**

Using a laser diode as its light source, it offers 2,400 dot/in. resolution for halftone photographs or typography.

Ultre-Setter can output a high-quality page in less than one minute or image-proof-quality pages at a rate of five per minute, according to the vendor.

Priced at approximately $5,000 in OEM quantities, Ultre-Setter is compatible with the IBM Personal Computer AT and certain dedicated typesetting workstations, Ultre said.

Ultre, No. 305, 900 Walt Whitman Road, Melville, N.Y. 11747.

Board-level devices

Adaptec, Inc. has announced **ACB-2070A**, a 2,7 run-length limited (RLL) encoding/decoding hard-disk controller board for the IBM Personal Computer, Personal Computer XT and compatibles.

The ACB-2070A plugs into a personal computer expansion slot or replaces the existing XT controller board, boosting disk-drive capacity by 50%.

The board supports a data transfer rate of 7.5M bit/sec. using 2,7 RLL and a 13-microsec step rate, according to the vendor.

Other features of the board include autoconfiguration, sector-level defect handling, large-disk logical partitioning and preprogrammed BIOS.

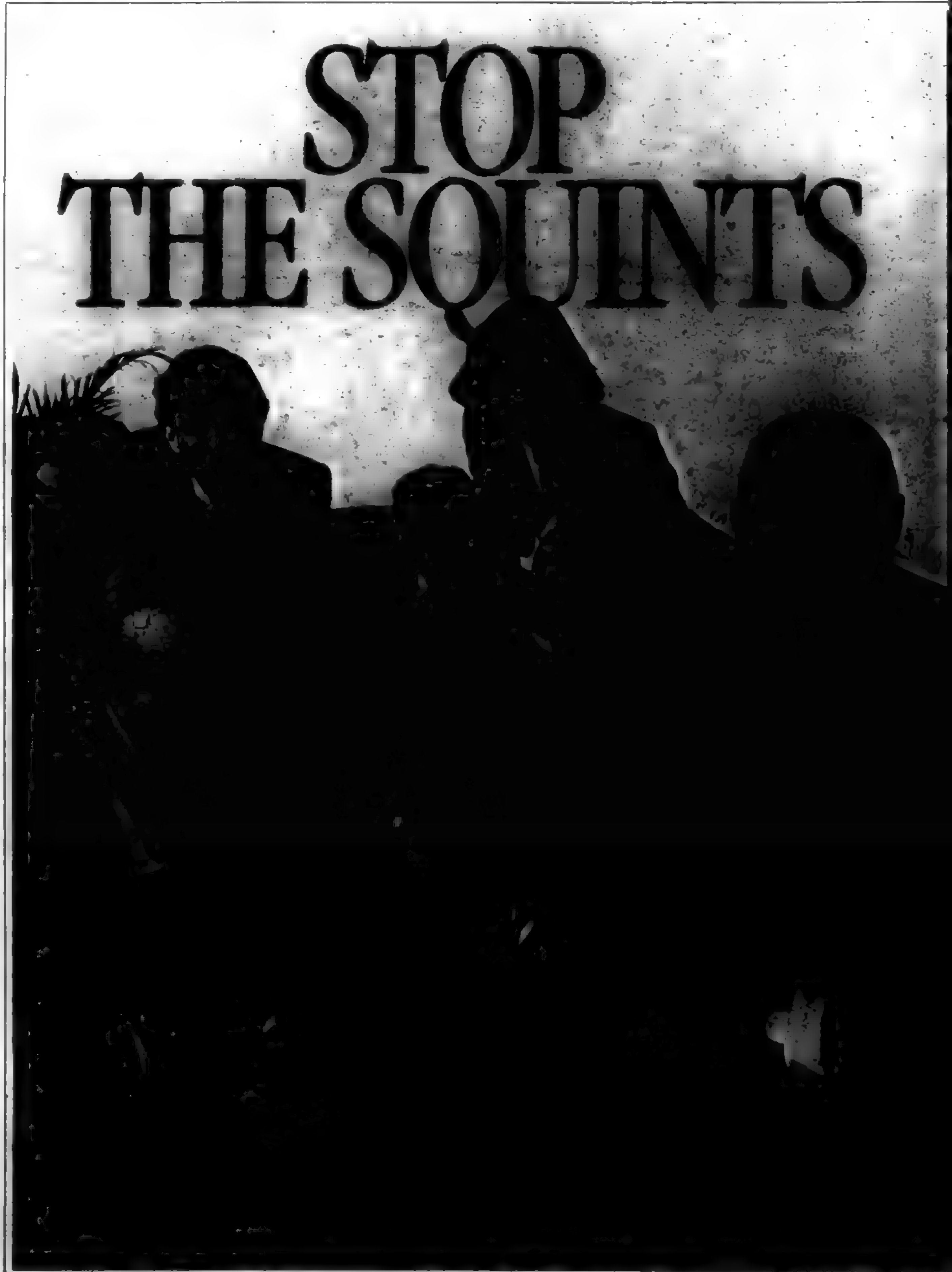
In 1,000-piece quantities the ACB-2070A boards are priced at $165 each.

Adaptec, 580 Cottonwood Drive, Milpitas, Calif. 95035.

EPD Engineering, Inc. has announced **Half Megaboard**, a multifunction board that offers up to 768K bytes of memory enhancement for personal computers.

The Half Megaboard uses the ½-card size, fitting all IBM Personal Computers, Personal Computer XT short slots and compatibles. The board offers 640K-byte capacity and gives an additional 128K bytes of extension memory.

The extended memory



area can be used as a print spooler or a random-access memory (RAM) disk.

More features include a clock/calendar, serial port and RAM disk software.

The Half Megaboard costs $249.

EPD Engineering, 2922 Dow Ave., Tustin, Calif. 92680.

■

HR-2, a monochrome graphics card for the IBM Personal Computer, Personal Computer XT and AT that offers Hercules graphics compatibility has debuted from **Applied Computer Products Corp.**

HR-2 supports personal computer business applications programs such as Lotus Development Corp.'s 1-2-3 and Symphony, Ashton-Tate's Framework and Microsoft Corp.'s Word.

Designed to replace the IBM Monochrome Display/Printing adapter, the HR-2 provides a graphics mode with 720- by 348-pixel resolution and a text mode with 7- by 9-pixel characters in a 9- by 14-pixel box.

The graphics card also supports flicker-free text mode scrolling plus such video attributes as blink, reverse and underline.

Priced at $199, the HR-2 comes with a 64K-byte dynamic random-access memory screen buffer and operates at the IBM Monochrome Display's synchronous frequency of 18.4 kHz/50Hz.

Applied Computer Products, 1633 Republic Road, Huntingdon Valley, Pa. 19006.

Auxiliary equipment

Omnium Corp. has released its **Mini-Static Pad** for protecting personal computers against static electricity.

Omnium's Mini-Static Pad is only 3 by 4½ in. in size, and it comes with an 8-ft grounding cord, according to the vendor.

It sits next to the personal computer keyboard. Static electricity is instantly and safely discharged with one touch, according to the vendor.

The Mini-Static Pad costs $13.95.

Omnium, P.O. Box 186, Stillwater, Minn. 55082.

■

American Power Conversion Corp. has added the **Model 330XT+** to its line of personal uninterruptible power source products.

The Model 330XT+ is a standby uninterruptible power source designed for use with IBM Personal Computer XTs and Compaq Computer Corp.'s Compaq portable computers.

It features phase-synchronous transfers and retransfers. Transfer time is typically 0.0002 of a second.

It is capable of powering a fully configured Compaq portable or IBM XT for 10 to 15 minutes during an outage.

It also provides surge protection and noise and interference filtering.

The 330XT+ is priced at $649.

American Power Conversion, 89 Cambridge St., Burlington, Mass. 01803.

■

Curtis Manufacturing Co. has introduced a tilt-and-swivel base, called UNI-2, for IBM and Compaq Computer Corp. portable personal computers.

The portable pedestal tilts 22 degrees and swivels a full 360 degrees, allowing the user to reposition the monitor to eliminate glare with changes in lighting.

The pedestal is priced at $64.95.

Curtis Manufacturing, 305 Union St., Peterborough, N.H. 03458.

■

Microscience Corp. has announced **Q-Net Resource Manager**, an intelligent switch that enables users to add workstations to saturated multiuser microcomputers.

The switch also interconnects dissimilar computers, operating systems, terminals, printers, modems, cash registers and other peripherals.

A basic system provides 32 stations — expandable to 128 — and makes all idle computer capacity available to all stations.

When the system operates at full capacity, the switch automatically queues additional service requests for first availability.

The 128-port configuration sells for $12,795.

Microscience, Suite 126, 8601 Dunwoody Place, Atlanta, Ga. 30338.

WITH A REAL EYE-OPENER

THE ELECTROHOME EDP-58 MONOCHROME COMPUTER PROJECTION SYSTEM.

As modern business continues to recognize the effectiveness of computer-projected data and images, The Squints continue to wreak havoc in boardrooms, classrooms, commodity exchanges, and trade shows. Wherever people are forced to view small CRT screens or dull and often fuzzy projected images, you'll find The Squints running rampant.

STOP THE SQUINTS BEFORE THEY START.

The Electrohome EDP-58 is a real eye-opener – in more ways than one. To begin with, it's easy to use and interfaces with virtually all computer terminals and PCs, making it the most versatile monochrome projector on the market. In performance, it's [illegible] the heads-up [illegible] winner.

DS58
desk stand

A super-bright P53 phosphor delivers an image that's up to 40 % brighter than any we've used before. (You get a maximum brightness rating of 500 lumens.) Its green projection image is comfort-engineered for complete viewing ease and exceptional readability on up to 10' diagonal curved, flat, or rear screens. The EDP-58 also delivers less than 4 % distortion from curved to flat screens – and no one else can match that.

The acknowledged leader in monochrome projection since 1980, Electrohome confidently offers a full year's warranty on parts and labor. (When it comes to the EDP-58's dependability, we put our warranty where our mouth is.)

MORE EYE-OPENERS.

Because its sturdy metal case is color coordinated to match other computer peripherals, the EDP-58 will blend in perfectly with your office decor. A selection of mounting methods allows easy ceiling or desktop mounting. In addition, a castered carriage-mount enables easy-rolling portability.

MY56
mounting yoke
PS56
pedestal base

But perhaps the biggest eye-opener of all is the price tag. At only $3,895 U.S., the best monochrome projector is also one of the least costly.

For more eye-opening information on how to Stop The Squints, simply send your business card to: Electrohome Limited, Advertising Department, Postal Station D, Box 10153, Buffalo, New York, 14210-0153.

U.S. customers call toll-free
1-800-265-2171

ELECTROHOME
Electrohome Limited, [illegible] Wellington Street North, Kitchener, Ontario, Canada, [illegible]
Telephone (519) 744-7111 Telex [illegible]

PERFECT FIT

THE NEW VECTRA PERSONAL COMPUTER

FROM HEWLETT-PACKARD.

In today's fast-moving business environment, you need a personal computer that has the flexibility to fit perfectly with changing business needs and opportunities. The new Hewlett-Packard Vectra PC is just such a computer: flexible and versatile.

You get the *performance* you need, because you can select the power, speed and memory capabilities that suit you best; the *software* you need, because it's compatible with the IBM PC/AT; and the *hardware flexibility* you need, because it's designed to access a full range of accessories and peripherals.

The HP Vectra PC is a high performance computer. It's 30% faster than the IBM PC/AT. And with the addition of the optional co-processor, it can run even faster.

And since the Vectra PC is compatible with the IBM PC/AT, it runs PC-DOS 3.1 programs—without alteration. Like Lotus® 1-2-3,® MultiMate,™ and R:BASE™ 5000, plus HP's new AdvanceWrite word processing series, TextCharts presentation graphics, and more.

There are several internal and external memory storage

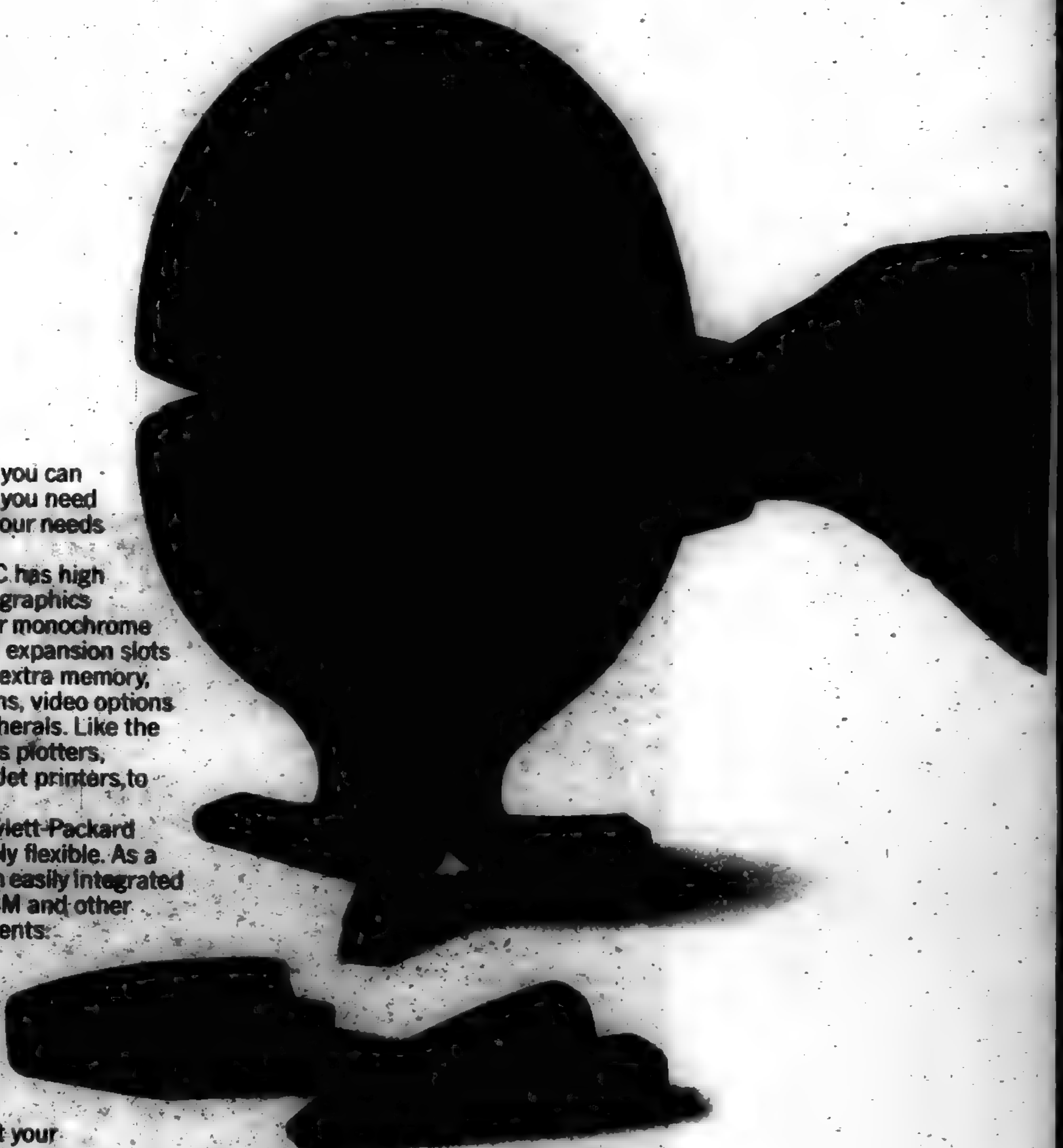
HP Vectra Specs

MEMORY
256K expandable to 3.6MB

MICROPROCESSOR
Intel 80286; runs at 8MHZ
Optional: Intel 80287; co-processor runs at 5.33 MHZ

OPERATING SYSTEM
MS-DOS 3.1 (compatible with PC-DOS 3.1)

DATA STORAGE
5¼" internal flexible discs (360K or 1.2MB capacity)
20MB internal hard discs
3½" stand-alone flexible discs; 20MB stand-alone hard disc.



options, as well. So you can choose the storage you need now. Or expand as your needs change.

The Vectra PC has high resolution text and graphics capabilities. Color or monochrome displays. And seven expansion slots to add accessories, extra memory, data communications, video options plus a host of peripherals. Like the popular HP graphics plotters, ThinkJet and LaserJet printers, to name a few.

In all, the Hewlett-Packard Vectra PC is superbly flexible. As a stand-alone, or as an easily integrated addition with HP, IBM and other computer environments. And, because it comes from Hewlett-Packard, you know you're getting a quality product.

Find out how the Vectra PC can fit your needs—whether technical, professional or secretarial. Call 1-800-FOR-HPPC, Dept. 282D, for the name of your local authorized Hewlett-Packard dealer, or Hewlett-Packard sales office. In Canada, call 1-800-387-3867. *Vectra*

HEWLETT PACKARD
Business Computing Systems

See Us At Comdex Booth #3616

Lotus 1-2-3 business graphics shown. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. MultiMate™ is a U.S. trademark of Multimate International. R:BASE™ is a U.S. trademark of Microrim Inc.

PG02513

NEW PRODUCTS

Controllers

Teleprocessing Products, Inc. is offering **TP-2/435**, an interface sharing unit that allows up to four terminals to share simultaneously one modem or interface.

Targeted for use in multidrop polled networks with CCITT V.35 interfaces, the TP-2/435 broadcasts polls to all terminals. The first terminal that raises Request to Send is selected and connected, eliminating access from other terminals until Request to Send is lowered.

The Model TP-2/435 costs $750.

Teleprocessing Products, Building 7K, 4565 E. Industrial St., Simi Valley, Calif. 93063.

Voice/data communications

Wang Laboratories, Inc. has announced that its **DVX voice mail service** has been integrated with **Northern Telecom, Inc.'s Meridian SL-1** private branch exchange.

Message waiting indications can be made on either a Northern Telecom SL-1 handset or standard 2500 series telephone using a lamp or interrupted dial tone.

The Meridian SL-1 automatically forwards a party's extension to the DVX, which then identifies the called party's extension to the person calling.

Integrating the DVX with the SL-1 requires hardware and software for both systems. Additional DVX costs will be $5,000. SL-1 costs depend on the system's configuration.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

■

Contel Networks & Systems has expanded its Mind-Pricer on-line circuit pricing system with a new module that reports for voice circuits. The **Voice Private Line Pricer** will complement its existing data circuit pricing system.

Mind-Pricer reports recurring costs such as channel mileage, termination charges, signaling charges and special access surcharges.

Contel Networks & Systems is a subsidiary of Continental Telecom, Inc. Its Mind-Pricer costs $500 per year on a time-sharing basis.

Contel Networks & Systems, 130 Steamboat Road, Great Neck, N.Y. 11024.

Protocol converters

Adapta, an interface converter that offers parallel-to-serial and serial-to-parallel data conversion, has debuted from **Performance Interconnect, Inc.**

Adapta comes with a switchable 2K-byte buffer and its own 9V ac adapter. Serial features include eight selectable bit/sec. rates from 110 to 19.2K bit/sec., seven or eight data bits, one or two stop bits and selectable control signal polarity.

The parallel interface uses ACK and BUSY to control the parallel port data stream. It uses a Centronics Data Computer Corp.-type parallel connector.

The Adapta interface converter costs $89.95.

Performance Interconnect, Suite 2133, 8950 Villa La Jolla Drive, La Jolla, Calif. 92037.

■

Serial-to-parallel and parallel-to-serial plug-in converters are available from **Inmac Corp.**

Offering a way to get serial and parallel signals in one computer system, the converters let users mix such devices as parallel dot matrix printers, letter-quality printers, serial X-Y plotters, line drivers and modems.

The devices are one-way converters with RS-232 25-pin female and Centronics Data Computer Corp.-type 36-pin male connectors. Providing transmission speeds from 50 to 38.4K bit/sec., the converters support XON/XOFF, ETX/ACK and DTR/DSR flow control handshaking.

A 16K-byte buffer model costs $149; a 64K-byte buffer unit sells for $229.

Inmac, 2465 Augustine Drive, Santa Clara, Calif. 95054.

Multiplexers/modems

Electronic Vaults, Inc. has added the **Fastcomm 96** series to its line of 9.6K bit/sec. asynchronous, dial-up modems.

Fastcomm 1296/S is a stand-alone model that oper-

Now business

NEW PRODUCTS

ates at 300/1,200 and 4.8K, 7.2K and 9.6K bit/sec. It has the company's ensured data integrity error-detection and error-correction protocol. It is AT&T 212A compatible and connects to the RS-232 port on a micro or mainframe. The Fastcomm 1296/I is an integral piggyback version of the 1296/S, designed for micro applications.

Fastcomm 2496/S is a stand-alone model that operates at 300/1,200, 2,460, 4.8K, 7.2K and 9.6K bit/sec. It also has ensured data integrity and is compatible with both AT&T 212A and CCITT V.22. The Fastcomm 2496/I is an integral piggyback card version of the 2496/S.

The Fastcomm 1296/I costs $1,095, and the 2496/I costs $1,295. The Fastcomm 1296/S and 2496/S cost $1,195 and $1,395, respectively.

Electronic Vaults, 12347-E Sunrise Valley Drive, Reston, Va. 22091.

Local-area networks

Nestar Systems, Inc. has bundled its Plan 3000 file server into a local-area network system called **Plan 3000B**.

The local-area net product supports up to 10 IBM Personal Computers and is compatible with Nestar's Plan 3000, 4000 and 5000 file servers.

The Plan 3000B bundles the file server with a CRT console, Nestar's Shadow software providing fault-tolerant features, Planpak multiuser application software, an integrated print server coprocessor, 10 token-passing network interface cards and a 16-port hub. The local network also includes a 45M-byte streaming tape drive backup.

The Plan 3000 file server provides 68M bytes of formatted disk storage capacity. It is priced at $16,995.

Nestar Systems, 2585 E. Bayshore Road, Palo Alto, Calif. 94303.

■

Telecom 1600, a local-area network processor system that lets IBM Personal Computer-compatible local-area networks interact with remote users or other local-area networks and systems over telephone lines has debuted from **J & L Information Systems, Inc.**

The system can be used unattended to host such functions as supporting remote personal computer workstations, permitting dumb terminals to act as remote network workstations and running electronic mail. Other functions include the ability to simulate an IBM 3270 cluster controller, function as a shared-modem server, work as a local-area network bridge or operate multiuser point-of-sale terminals.

A Telecom 1600 with Chatterbox User Cluster sells for $1,595 for the first user. Each additional user costs $995. A maximum of three users is allowed per box.

J & L Information Systems, 9238 Deering Ave., Chatsworth, Calif. 91311.

Test equipment

A hand-held device called **Twin-Tester** that analyzes twin-axial cable and cable assemblies for continuity, polarity and shorts is offered by **North American Computer Resources.**

The device can analyze cables that are already run in walls or ceilings and can analyze without a computer and terminal.

Functions are said to include an ability to check polarity and continuity of conductors, continuity of the shield and shorts between the conductors and the shield.

Twin-Tester sells for $219.

North American Computer Resources, 611 Hurley St., Houston, Texas 77022.

■

Telecommunications Techniques Corp. has unwrapped **T-Berd 105**, a T-Carrier monitor that tracks errors, alarm conditions and signal quality on operating T1 and T1C communications links.

The hand-held test set monitors and displays signals and alarm situations while simultaneously measuring 11 error parameters, the vendor said.

The unit supports framed (D4), extended super-frame (Fe) and clear channel (B8ZS) signal formats.

T-Berd 105 is priced at $1,895.

Telecommunications Techniques, P.O. Box 6027, 444 N. Frederick Ave., Gaithersburg, Md. 20877.

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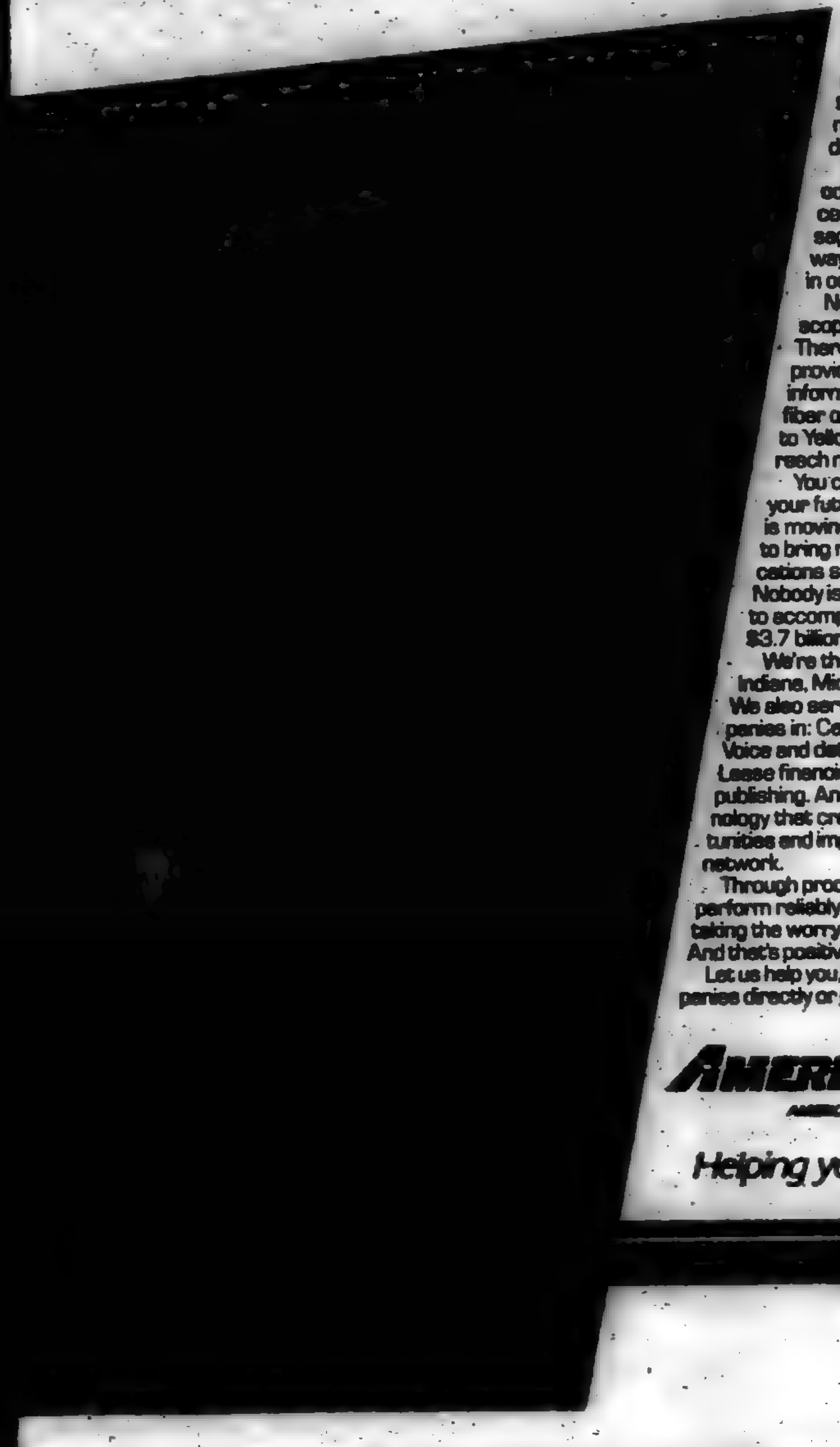

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And our optional [illegible] Graphics Ad[illegible] plays [illegible] on the [illegible] monochr[illegible] monitor [illegible]

Test equipment

An asynchronous interface line unit for connecting asynchronous ASCII-compatible terminals directly to a standard telephone jack is available from Northern Telecom, Inc.

The unit consists of a cable with a male or female RS-232C connection on one end and a standard RS-11 telephone connector on the other.

It was designed to connect asynchronous data terminals to the vendor's Meridian SL-100 integrated services network Lanstar data services. A circuit performs the necessary interface functions between the terminal and asynchronous interface line card in the Meridian SL-100. Terminals can be located up to 4,000 ft from the Meridian SL-100 and can communicate at speeds up to 19.2K bit/sec.

Other features include speed calling, autodialing and queuing on busy facilities such as computer ports and modem pools.

These facilities are accessible from the terminal keyboard through responses to menus and prompts.

The product is priced at $89 in single quantities.

Northern Telecom, 2100 Lakeside Blvd., Richardson, Texas 75081.

Turnkey systems

Compuscan, Inc. has introduced a family of laser data entry systems (LDES) that scan paper-based information and enter, validate, edit and process the data.

The systems are composed of the Laser III Formsreader scanner, a 32-bit superminicomputer with 2M to 4M bytes of memory, a system console, a 50M- or 80M-byte disk and a VDT.

The scanner electronically reads typed, machine-printed, numeric handprinted, mark sense and image data. It reads the data from paper documents ranging in size from 2.9 in. by 2.5 in. to 8½-in. by 14 in. and inputs it to computers at speeds up to 4,400 documents per hour.

Capabilities include the ability to correct unrecognized characters, capture field-of-image information such as signatures and support asynchronous, synchronous and bisynchronous protocols.

There are four models: LDES Model I through Model IV, each having a different number of input and editing stations.

The LDES Model I with a Laser III Formsreader, 32-bit CPU, 2M bytes of memory, a system console, 50M-byte disk, VDT and an audit printer starts at $155,000.

Compuscan, Building 2, 81 Two Bridges Road, Fairfield, N.J. 07006.

■

Arcad Co. has expanded its Architectural Interactive Design System to run on the Digital Equipment Corp. 32-bit Microvax II supermicrocomputer.

The Microvax II can be configured to operate up to eight graphics terminals simultaneously, a spokesman noted.

A complete system, including a Microvax II, graphics display terminal, pen plotter and Arcad software, sells for approximately $50,000, the vendor said.

Arcad, Suite 800, 311 W. Seventh St., Los Angeles, Calif. 90017.

Processors

Burr-Brown Corp. has upgraded its TM900 Transaction Processor for its distributed factory data collection systems.

Enhancements include the following features: the RS-422-compatible, factory multidrop network has been optically isolated; the removable termination assembly allows easy servicing; powerful conditional tests and transaction branching instruction have been added to the unit's command language; and a link port allows two TM900s to be connected to each other with automatic or host-commanded switch-over in case of failure.

The TM900 is available in two configurations: a four-line configuration supporting up to 64 microcomputer terminals and an eight-line configuration supporting up to 128 microcomputer terminals, according to the vendor.

Single-unit pricing is $7,500 for the four-line configuration and $10,000 for the eight-line configuration.

Burr-Brown, P.O. Box 11400, Tucson, Ariz. 85734.

Terminals

MSI Data Corp. has announced PDT III, a programmable, portable data terminal that offers storage capacities ranging from 16,000 to 256,000 alphabetic characters, the equivalent of 32,000 to 512,000 numeric digits.

Designed for applications such as order entry, hospital data collection, electronic ordering and price audits, the terminal comes with a 51-key color keyboard that includes 128 ASCII characters plus scanning peripherals that can read most bar codes.

The terminal transfers collected data to a host computer over standard telephone lines.

Other features include a Dual Tone Multi-Frequency circuit that enables the terminal to dial a predetermined phone number from memory automatically plus a real-time clock that enables the terminal to dial a phone number at a preset time. Accessories include a 24-col. integral printer and peripheral input ports that connect the terminal to the printer.

The PDT III can also be programmed to answer a call from a polling computer.

Users can develop terminal software in the vendor's UBasic language on the IBM Personal Computer XT or AT and on Digital Equipment Corp.'s VAX or Microvax computers.

Depending on how much memory the PDT III is configured with, the terminal ranges in price from $1,110 to $2,010.

MSI Data, 340 Fischer Ave., Costa Mesa, Calif. 92626.

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McCormack & Dodge

[illegible]

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760, 1-800-343-0325

Printers/plotters

BDT Products, Inc. has ported its **Lettermate** series of sheet feeders to the Diablo Systems, Inc. 630 printer; the NEC Information Systems, Inc. 8800 printer; and the Itoh Electronics, Inc. F10 printer.

For both the Diablo 630 and the Itoh F10, there are new models of the Lettermate III/A triple-bin sheet feeder. They have two paper or multipart forms bins that hold up to 230 sheets of paper and one envelope bin that holds up to 60 envelopes. They are both priced at $1,195.

For the NEC 8800 printers, there are Lettermate sheet feeders with a single bin, dual bin or dual tray with an envelope bin. Prices range from $495 for the single-tray, demand-feed Lettermate I to $1,195 for the triple-bin Lettermate III/A.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

■

Burroughs Corp. has introduced the **AP 9208 Laser Printer.**

The AP 9208 is a nonimpact, desktop laser printer that can reportedly print at a speed of 8 page/min. According to a company spokesman, it can print letter-quality documents, spreadsheets, transparencies and graphics. It operates with Burroughs workstations, terminals and entry-level and small systems.

The AP 9208 costs $3,395.

Burroughs, Burroughs Place, Detroit, Mich. 48232.

■

Standard Register Co. has added a **Slitter-Merger-Imprinter** for processing continuous-form checks and other documents needing post-computer handling to its Series 1300 forms handling equipment line.

This unit processes continuous forms at up to 500 ft/min. It performs check signing, slitting of forms processed two or more wide and merging of split forms into correct numerical sequence.

Forms are tractor fed through the unit, which weighs 255 lb and stands 45 in. high.

Prices range from $2,975 to $3,575, depending on options included.

Standard Register, P.O. Box 1167, Dayton, Ohio 45401.

■

BDT Products, Inc. has introduced the **Laserfeeder**, for use with laser printers that use the Canon U.S.A., Inc. laser print engine, such as the Hewlett-Packard Co. Model 2686.

The Laserfeeder is an automatic triple-bin sheet feeder featuring dual paper bins and an envelope bin. It plugs into the printer's manual paper-feed port. It can pull from any one of its bins as determined by commands from the computer terminal to the sheet feeder's interface system.

The Laserfeeder costs $1,695.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

■

Okidata Corp. has unveiled the **Microline 182 TTY**, a dot matrix printer that offers bit image graphics, utility mode printing and selectable intelligence levels that let one printer function in multiple applications.

Users can select several modes of operation including teletypewriter, CRT, basic printer and intelligent printer.

Prices are $349 for a parallel 120V model, $385 for parallel 220V and 240V models, $409 for a serial 120V model and $450 for serial 220V and 240V models.

Okidata, 532 Fellowship Road, Mount Laurel, N.J. 08054.

■

TGV Vitesse, an electronic composer/printer that lets users integrate graphics elements with text, has bowed from **Commercial Scientific Corp.**

The system combines word processing and page makeup with up to 16 computer-aided design workstations. Other components include an 8 page/min laser printer, networking capability and an optical scanner to convert photographs and other artwork to digital data.

TGV Vitesse can integrate text with halftone photographs, technical drawings, signatures and fingerprints.

Options are a multiuser mode, video slide function, plotters, electronic impact printers and remote communications. It costs less than $40,000.

Commercial Scientific, 165 University Ave., Palo Alto, Calif. 94301.

Graphics systems

Image Peripherals, Inc. has added **IDT2000**, a double-page model, to its Displayscan series of image display terminals.

The IDT2000 features 2,048- by 1,536-pixel display capability on a 19-in. monitor. This allows the use of the screen for full 11- by 17-in. page operation. Two 8½- by 11-in. pages can be displayed simultaneously as well.

Other features include a graphics controller with video frequency up to 200 MHz; programmable screen format; bit-map addressing capability to 16M bytes; cross hair, panning and scrolling in each individual window; and flicker-free display.

The price is $14,900.

Image Peripherals, 42 Nagog Park, Acton, Mass. 01720.

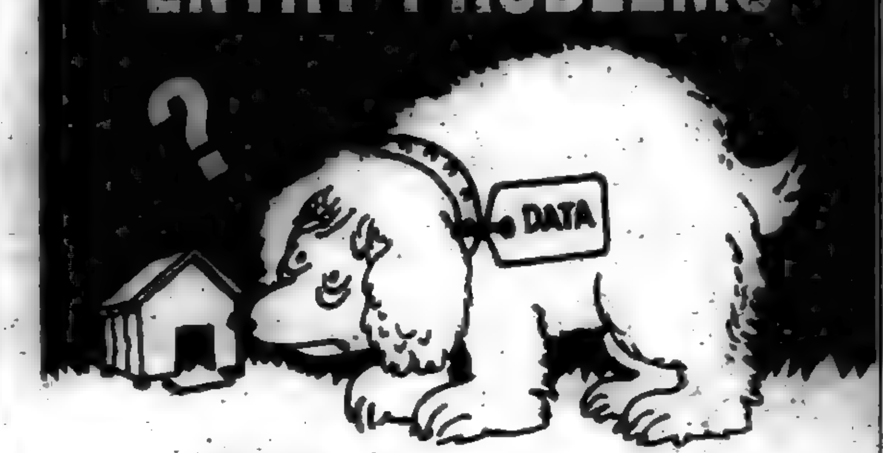
■

Lasergraphics, Inc. has introduced its own intelligent color printing system called the **CPS-300.**

The system consists of a Lasergraphics rasterizing computer and a high-resolution, high-speed color

Continued on page 149

ENTRY PROBLEMS



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Continued from page 147

thermal transfer printer. It connects to any color graphics-capable host computer through an RS-232C serial communications line and accepts graphical information in Lasergraphics Language, a high-level graphics communications protocol common to many graphics software packages, such as Issco Corp. Graphics; SAS Institute, Inc. Graph; IBM Graphic Display Data Manager; Precision Visuals, Inc. DI-3000; and Microsoft Corp. Chart 2.

The thermal transfer printer produces paper and overhead transparencies at 200 dot/in., in color or black and white, with more than a million possible halftone colors or 100 shades of gray. The printer uses cut-sheet stock fed through a cassette .

The system costs $14,950.

Lasergraphics, 17671 Cowan Ave., Irvine, Calif. 92714.

■

Southwest Technical Products Corp. has introduced **CAD Southwest**, a computer-aided drafting system.

CAD Southwest offers a CAD Zoom feature that allows users to zoom in to individual sections or view multiple sets of drawings on one screen. The system supports up to 255 overlays for the same drawing.

The drafting system runs on the Southwest line of computers operating under Uniflex, an AT&T Unix-like operating system, the vendor said.

A complete multiuser package costs $12,500 for CPU, digitizer, eight-color pen plotter and dot matrix printer plus the capability of adding up to 18 terminals.

Southwest Technical Products, 219 W. Rhapsody, San Antonio, Texas 78216.

Board-level devices

Emulex Corp. has announced the **QD01/D** disk controller for the Digital Equipment Corp. Q-bus.

The dual-height microprocessor-based controller is designed to interface any two ST506 5¼-in. Winchester disk drives to the DEC Q-bus. The QD01 emulates DEC's Mass Storage Control Protocol and is compatible with DEC's Microvax I and II, LSI-11 and Micro/PDP-11 products. It offers adaptive direct memory access, noninterleaved sectors, 22-bit addressing, nonvolatile static random-access memory, internal self-test, block-mode direct memory access and 48-bit error-correction code.

The 100-unit price for the QD01/D is $1,122.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

■

Emulex Corp. has introduced the **CS40** switch interface to connect Digital Equipment Corp.'s VAX Unibus systems to the Emulex Comm Xchange Data Private Automatic Branch Exchange.

The CS40 uses one cable to connect 48 asynchronous lines. It automatically routes up to 1,320 terminal and computer port lines in the same manner that a telephone private branch exchange switches telephone call connections. A standard model includes a central unit, a power supply and central board set.

The CS40 costs $7,500.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

Auxiliary equipment

Computer Stuff has announced the **Rightray** replacement output tray for use with the Hewlett-Packard Co. Laserjet printer and compatible printers using the Canon U.S.A., Inc. LBP-CX printing engine.

Rightray is designed to stack documents in the correct collated order. It installs between the printer and its support stand or table. It does not interfere with the input paper tray.

Rightray costs $39.95.

Computer Stuff, 1001A Windy Trail, Austin, Texas 78758.

■

Data Devices International, Inc. has announced the **Mark 300** portable tape cleaner.

The Mark 300 features the Intel Corp. 8749 microcontroller, speed of 350 in./sec., automatic marker placement detection, automatic unload feature, self-diagnostic tests and quick-release hubs, according to the vendor.

The Mark 300 costs $1,995.

Data Devices International, 20235 Bahama St., Chatsworth, Calif. 91311.

Flexstar Corp. is offering a phase-margining Winchester disk test system, the **FS8600 ESDI**, for enhanced small device interface (ESDI) drives.

The self-calibrating FS8600 ESDI Winchester Test System connects with specific test points on the drive between the read/write head amplifier and the data separator, and draws a picture of the recording media and head capabilities by probing between the head/disk assembly and data separator, the vendor said.

Winchester disk drives using ESDI single- or multiple-sector format, including margined testing on any encoding scheme at a data rate of up to 20M bit/sec., can be tested.

The FS8600 unit costs $15,000.

Flexstar, 606 Valley Way, Milpitas, Calif. 95035.

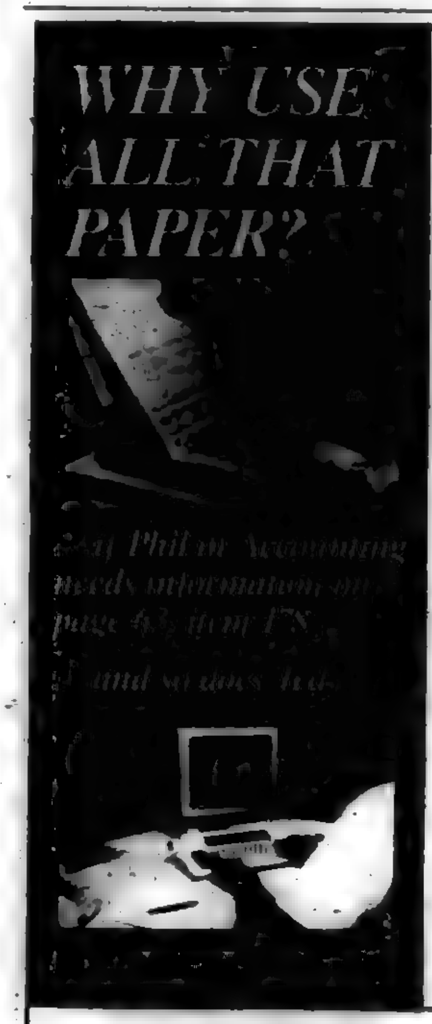
■

Dynapac Systems has unveiled the **Multi-Packet X.25 Load Simulator** for testing and calibrating X.25 circuits.

The simulator generates a variable rate of packets per second to measure the performance of packet-switched networks. Performance statistics are calculated by sending and measuring delays associated with packet data and displaying a roster of information for up to 256 virtual circuits or for the global aggregate.

A complete unit, including cabinet and amber video terminal, costs $6,995. An optional printer sells for $599.

Dynapac Systems, 5419 Backlick Road, Springfield, Va. 22151.



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COMPUTER INDUSTRY

INDUSTRY INSIGHT
Clinton Wilder
CW Senior Writer

Thomson bets on chip revival

How do you figure it? Intel Corp. is getting out of the memory chip business in the U.S. while Thomson S.A., the state-controlled French electronics giant, is getting in.

Thomson brought United Technologies Corp.'s Mostek Corp. semiconductor unit back from the dead within the last two weeks, confounding industry watchers and players both in the U.S. and in Europe. Why would the French folks want to do such a thing?

For starters, Mostek was undoubtedly picked up cheap — for just a few dimes on the dollar or centimes on the franc, as the case may be. And the Carrollton, Texas-based manufacturer gives Thomson the U.S. presence it had been seeking.

In the beginning, Thomson doesn't have to run around selling 256K-byte dynamic random-access memory chips to justify its investment. The French firm can roll them into captive electronics goods while it learns a thing or two about wafer steppers and CMOS technologies. Then, when the memory chip market rebounds, Thomson will be ready.

But there lies the rub, as any reader who just choked on that last line will agree. The issue is not when, but if. Intel didn't think the memory chip market would rebound — at least not soon enough to keep losing money on the things while they've got 80386s to keep them occupied. And United Technologies will go back to air conditioners, helicopters and defense contracts — areas in which, unlike chips,

See THOMSON on page 166

Intel announces plant closing

Third set of recent layoffs for semiconductor vendor

By Maura McEnaney

SANTA CLARA, Calif. — More bad news erupted from the semiconductor industry last week when Intel Corp. announced the closing of a 620-employee manufacturing plant in Hillsboro, Ore., and said the company is considering possible worldwide layoffs during the first quarter of next year.

The layoffs — Intel's third round this year — come less than a month after the company announced it was bailing out of the dynamic random-access memory market due to excessive losses and intense Japanese competition. Third-quarter losses at Intel were $3.6 million, the company reported last month.

Approximately 460 Hillsboro workers will be laid off as a result of the closing, with the remainder scheduled to be transferred to other jobs in the company, a spokeswoman reported.

In February, Intel laid off about 900 employees, and another 950 workers were laid off in June following the closing of its "Fab2" manufacturing facility in Santa Clara.

The soon dormant "Fab5" manufacturing plant has been operating since 1978 and is one of two facilities at the Hillsboro site. Work at the plant will be phased out through the rest of the year. However, the facility will continue to be used for manufacturing process development, a spokeswoman said.

Intel currently employs approximately 22,000 people worldwide.

[illegible]

News from the computer world

While everyone was waiting last week for Encore Computer Corp. to ship its first processor and to announce the fate of cofounder Gordon Bell, the company reached out Tuesday and appointed James R. Pompa, 48, president and chief operating officer, reporting to Chairman and Chief Executive Officer Kenneth G. Fisher.

Pompa jumped ship from Honeywell, Inc., where he was senior vice-president, marketing. Prior to his eight-year career with Honeywell's Information Systems business, Pompa had worked first with IBM and later

See NEWS on page 166

Drive maker posts profits

By Clinton Wilder

Computer Memories, Inc. continued to reap the benefits of its soon-to-expire IBM disk drive contract with a second-quarter profit gain of 90% over the year-earlier period.

Chatsworth, Calif.-based Computer Memories reported earnings of $2.8 million, or 25 cents per share, on $39.2 million in revenue, a sales gain of 30% over the quarter ended Sept. 30, 1984. A year ago, Computer Memories earned $1.5 million, or 13 cents per share, on sales of $30.2 million.

Computer Memories noted, however, that sales and earnings in the current quarter will be "substantially lower" because of scheduled fewer shipments of its 5¼-in. Winchester disk drives to IBM. The company's order backlog on Sept. 30 was approximately $25 million, with IBM ac-

See DRIVE on page 166

INSIDE

An independent laboratory staffed with psychologists opened in Washington recently with the goal of testing the usability of software/164

Tandem last week turned in a respectable fourth-quarter financial report/166

Data General unveiled a major reorganization intended to integrate its marketing efforts/166

INSTANT ANALYSIS

"IBM will be the major force in defining most systems standards. Apple, on the other hand, can be the leader in bringing together a superior human interface with real functionality in an IBM-defined systems world."

— John Sculley president and chief executive officer of Apple Computer

On takeovers and tumult: Sterling Software president tells all

Sterling Software, Inc.'s $146 million buy-out of Informatics General Corp. made headlines last summer not only because Informatics was 10 times the size of Sterling but also because the deal represented the software industry's first initially hostile takeover attempt. Recently, Sterling Software President Sterling L. Williams talked with Computerworld *Senior Writer Clinton Wilder about the software industry's largest acquisition to date, as well as Sterling's future goals and directions.*

How have you consolidated the two companies, in organizational terms?

We've aligned the Informatics divisions and the old Sterling Software companies into three main groups — a systems software group, an applications software group and a professional services group. We want to emphasize software products and professional services and start to phase out turnkey systems. So a Sterling Software company and an old Informatics division are not meshed together, but they're aligned alongside one another where they can take advantage of each other's presence in the market.

What type of synergy is there between Informatics and Sterling offerings in certain product areas?

INTERVIEW

Acquisition-minded Sterling L. Williams

Basically, the two companies will operate autonomously from the standpoint of their divisions. They won't share research and development. Sterling Software's philosophy from the outset was to maintain as much independence of the operating level as possible, particularly in the product development and support area, rather than the marketing area.

For example, Informatics has a system software group and Sterling software has a system software group. They both will now report to and fall under one head, the president of our systems group. The old Informatics Mark and Answer products complement beautifully our Dylakor products. As a matter of fact, that's what attracted us to Informatics in the first place — these kinds of common interests. Product development will be independent; the product planning and strategic direction will take place at the company in the group level.

So Informatics as a company still has an autonomy of its own?

No, the Informatics operating units do. Informatics is a wholly owned subsidiary of Sterling Software, but that's more of a legality than an actuality. Each of the divisions operate under their prior names. That may change, but as of today they have retained their identity at the operating level.

For two years, you have been out there targeting niche software companies and acquiring them. Now that you have something this big and have to pay off the cost of it, does it slow you down at all?

No, I would say a $200 million leap forward would speed us up. One of the reasons we were attracted to Informatics was because it is essentially a collection of companies addressing niche markets itself. So we just simply intend to continue our old

See TAKEOVERS on page 162

The data that can fit in your pocket today can have an impact on what goes into your pocket tomorrow.
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Pacts of nondisclosure protect confidentiality

OUTSIDE LINES
Richard Raysman

In the software industry, it is essential that proper steps are taken to maintain the confidentiality of technical advancements. Coupled with the rewards of advancement are the potential hazards of revealing confidential proprietary trade secrets and materials to the competition.

Therefore, confidential and nondisclosure agreements are an important factor to be considered in negotiating employment and consultant contracts.

In addition to the great demand for permanent employees, many firms find it necessary to hire independent computer consultants to develop new applications or reduce the work load of existing employees. Some data processing personnel enter into their own computer businesses after a period during which they were employed by others. These businesses often compete, directly or indirectly, with the former employer's business.

When employees or independent computer consultants leave their jobs for new ventures, it is not unusual for them to use information that their former employer considers proprietary and confidential trade secret information. Frequently, the former employer is particularly concerned with preserving valuable proprietary information and lead time gained through the development of new software technology.

A typical confidentiality agreement for an employee or consultant in the software industry acknowledges the confidentiality of the information. The consultant should recognize, in this agreement, that he is receiving confidential information concerning the company's business affairs, finances, methods of operation and other data.

The agreement should set forth that unauthorized disclosure of the confidential information would irreparably damage the company. This agreement should define all such information as confidential information.

With respect to nondisclosure, the agreement should specify that the consultant will not disclose any confidential information to anyone either during the term of the agreement or afterward. The nondisclosure provision should also require the consultant to turn over to the company, at the termination of the agreement, all documents in his possession relating to the confidential information.

To qualify as a trade secret, confidential information must give the employer a business advantage over competitors; the confidential information must be unique or not commonly known; and the employer must treat the confidential information as secret and must bind the employee either expressly or implicitly to preserve the trade secret status of the confidential information.

One of the greatest dangers to the owner of a trade secret is the employee/consultant who assisted in the development of the software or hardware technology, because he is familiar with new answers necessary in the operation of the particular system and can easily misappropriate the information.

Where the employee/consultant is given access to existing trade secrets, the law imposes a duty of nondisclosure regardless of the existence of confidentiality agreements. Where, however, the employee/consultant develops the trade secret on behalf of the employer, no such duty exists.

When the employer is a large organization and the employee or independent consultant is a lone individual, a restrictive agreement can severely limit the employment mobility of the individual. For such reasons, courts are reluctant to enforce restrictive agreements unless the employer can meet certain judicially imposed tests, including adequate consideration, limitations in time and restrictions in the geographical area or market.

Nevertheless, from the employer's perspective, confidentiality and noncompetition clauses are valuable means to prevent theft of trade secrets that may have taken many years to develop. It is easier for the employer to prove that an employee breached a written agreement than to prove that the employee used misappropriated trade secrets based on an oral understanding. From a practical point of

See PACTS on page 184

Raysman is an attorney with the New York law firm of Brown, Raysman & Millstein. He specializes in contract negotiation, litigation, protection of proprietary information and other aspects of computer law.

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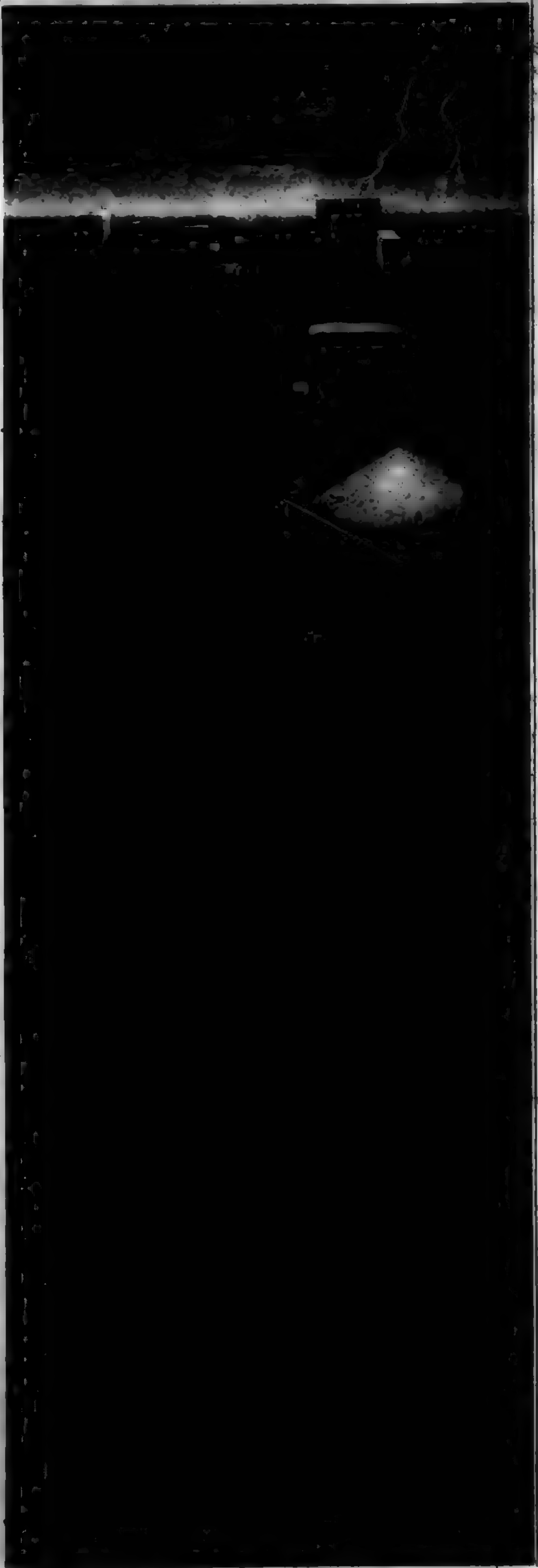


Lab puts usability to the test

Psychologists evaluate documentation, tools

By Mitch Betts

WASHINGTON, D.C. — Hoping to help software developers make their software products and manuals more user friendly, an independent laboratory opened on Nov. 1 with a staff of psychologists to test the usability of software, from the prototype to the finished product.

"This type of testing has far-reaching implications," according to Carol Mills, director of the American Institutes for Research (AIR) usability test laboratory. "Users are assured of products that work well. Manufacturers benefit by uncovering problems before products hit the market," she said.

Usability testing leads to improved computer documentation and software products that are accurate, easier to use and easier to sell, Mills said. Furthermore, by catching problems early, software companies can avoid costly revisions to software and manuals and reduce customer service calls.

The lab's competitors in independent software testing are National Software Testing Laboratories, Inc. in Philadelphia and International Bureau of Software Test, Inc. in Boston, a spokeswoman said.

AIR is a nonprofit organization that conducts research and development under negotiated contracts with clients, a spokeswoman said.

The lab is part of AIR's Document Design Center, which specializes in helping clients transform legal, technical and bureaucratic writing into plain English. Most documentation on the market today is not tested for usability, resulting in manuals that customers find disorganized and in language best understood by programmers, according to AIR.

A spokeswoman explained that AIR psychologists test manuals, tutorials and software by analyzing the behavior — such as facial expressions and body language — of 10 to 20 typical users as they work with the product. For example, they count the number of Help requests and errors, and they calculate the time taken to accomplish tasks.

All of this is recorded on videotape, which, along with the user's evaluation, is analyzed to identify problems and suggest corrections. The AIR lab has an evaluation room, where the user completes tasks using the manuals and software, and an observation room for trained observers to monitor user performance.

A one-way mirror allows the observers to watch test subjects and operate the remote-controlled video cameras, officials said.

The lab also can conduct studies that compare two or more alternative software packages or hardware devices as well as study whether users prefer to operate a mouse, touch screen or light pen, a spokeswoman said.

Pacts protect confidentiality

From page 153

view, a written agreement can also have a discouraging effect upon an employee who is considering entering into competition.

The case of Structural Dynamics Research Corp. vs. Engineering Mechanics Research Corp. provides a good example of trade secret protection of software where an insider misappropriates confidential information. The disputed programs involved an advanced analysis tool that was faster and more accurate than other systems.

The three defendants, while at Structural, developed and helped to market a sophisticated structural analysis program for sale to large automobile manufacturers. They resigned to enter into competition as principals and officers in Engineering Mechanics. The program being sold by Engineering Mechanics, although not identical, was substantially similar to that which was developed at Structural.

The court found that since the individual defendants used their own skills to develop the program without any appreciable assistance, expense or supervision of the employer, absent a written agreement they would have an unqualified privilege to sue and disclose the trade secret so developed. The court noted that an employee had an interest in the subject matter at least equal to that of the employer or, alternatively, such knowledge became part of the employee's skill and experience and, therefore, was not subject to the employer's control.

Fortunately for Structural, the three individual defendants had entered into confidential information agreements in which they agreed to refrain from divulging privileged or confidential information. The court concluded that the written agreements were valid and enforceable.

A typical confidentiality agreement should contain an acknowledgment that certain information is considered confidential. This would include all work developed, under development or to be developed by the employee/consultant during the course of the employee/consultant's engagement by the employer; all items of software and supporting documentation in the employer's possession; and all employer customer lists and supplier lists.

The agreement should also include an acknowledgment that the employee/consultant has had access to confidential and proprietary information belonging to the employer and will participate in the development of confidential and proprietary information on behalf of the employer and a commitment that the employee/consultant will not in any way disclose that information to others.

Confidentially and nondisclosure clauses should be structured to reflect the general purpose of protecting lead time and trade secrets. Because companies have invested so much of their resources, it is critical that serious efforts be made to protect such confidential information with written agreements.

Kodak launches campaign to win federal systems contracts

By Mitch Betts

ARLINGTON, Va. — Eastman Kodak Co. recently unveiled its plans to capture more of the U.S. government market for its information technology products with the opening of the Kodak Imaging Systems Center, a flashy office across the Potomac River from the federal agencies in Washington, D.C.

The new center, which serves both as a showcase for Kodak products and as headquarters for the firm's Government Systems Division, is the result of a company reorganization last January, according to Kodak officials.

Because government agencies are urging vendors to "speak with one voice" and offer integrated systems, Kodak abandoned its traditional, multifaceted sales effort in favor of a consolidated one, said John R. Robertson, vice-president and general manager of the new Government Systems Division.

"In the past, the same government agency might have seven or more Kodak representatives from our different market divisions calling with some regularity. Now, the single Government Systems Division is charged with total responsibility for an agency's needs," Robertson said.

Furthermore, Robertson hinted that Kodak may act more like a systems integrator in the future when responding to government bid solicitations.

The new division, he said, has the authority to "make quick decisions and start the wheels rolling immediately, whether the request involves special work within Kodak or purchasing something from a third-party supplier."

Among the products that Kodak will be marketing to the government sector are the Kodak Image Management System, which allows users to retrieve digitized microfilm images and other data at computer terminals; the Kodak Electronic Publishing System; computer-assisted microfilm retrieval systems; on-line processors that convert computer output into microfilm; data communications software from Kodak's Eastman Communications Division; and ink-jet printers from Diconix, Inc., a Kodak subsidiary.

At the Kodak Imaging Systems Center, these products are on display in working configurations for demonstration to government customers and other prospects.

The equipment is tied together by a local-area network developed by Kodak and Electronet Information Systems, Inc. of Washington, D.C., officials said.

The network, based on a private branch exchange with an open architecture, links the Kodak information systems with IBM hardware and Wang Laboratories, Inc. word processors. It also provides smart building functions, such as controlling the product demonstration rooms and maintaining a building inventory.

IBM shuffles executives, organizations

ARMONK, N.Y. — Intensifying the marketing push for its newly announced Token-Ring local-area network products, IBM last week announced several executive and organizational changes.

IBM announced the breakup of its year-old Telecommunications Products Organization into product development and marketing functions.

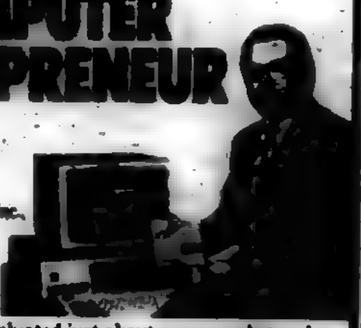
Telecommunications development work will now be handled under the Communication Products Division, and telecommunications marketing was transferred to the Information Systems Group.

In executive changes, former System Products Division President H. Mitchell Watson Jr. was named vice-president of marketing, succeeding Terry R. Lautenbach. Lautenbach was named Communication Products Division president.

The former president of the communication products group, James A. Bitonti, was named assistant group executive of the Tokyo-based Asia/Pacific Group.

Completing the changes, Corporate Vice-President Stephen B. Schwartz succeeded Watson as System Products Division president.

Schwartz had been assistant group executive of the Telecommunications Products Organization.



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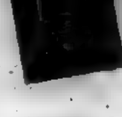

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you know your customer calls for reservations and information peak at certain times, causing an overload.

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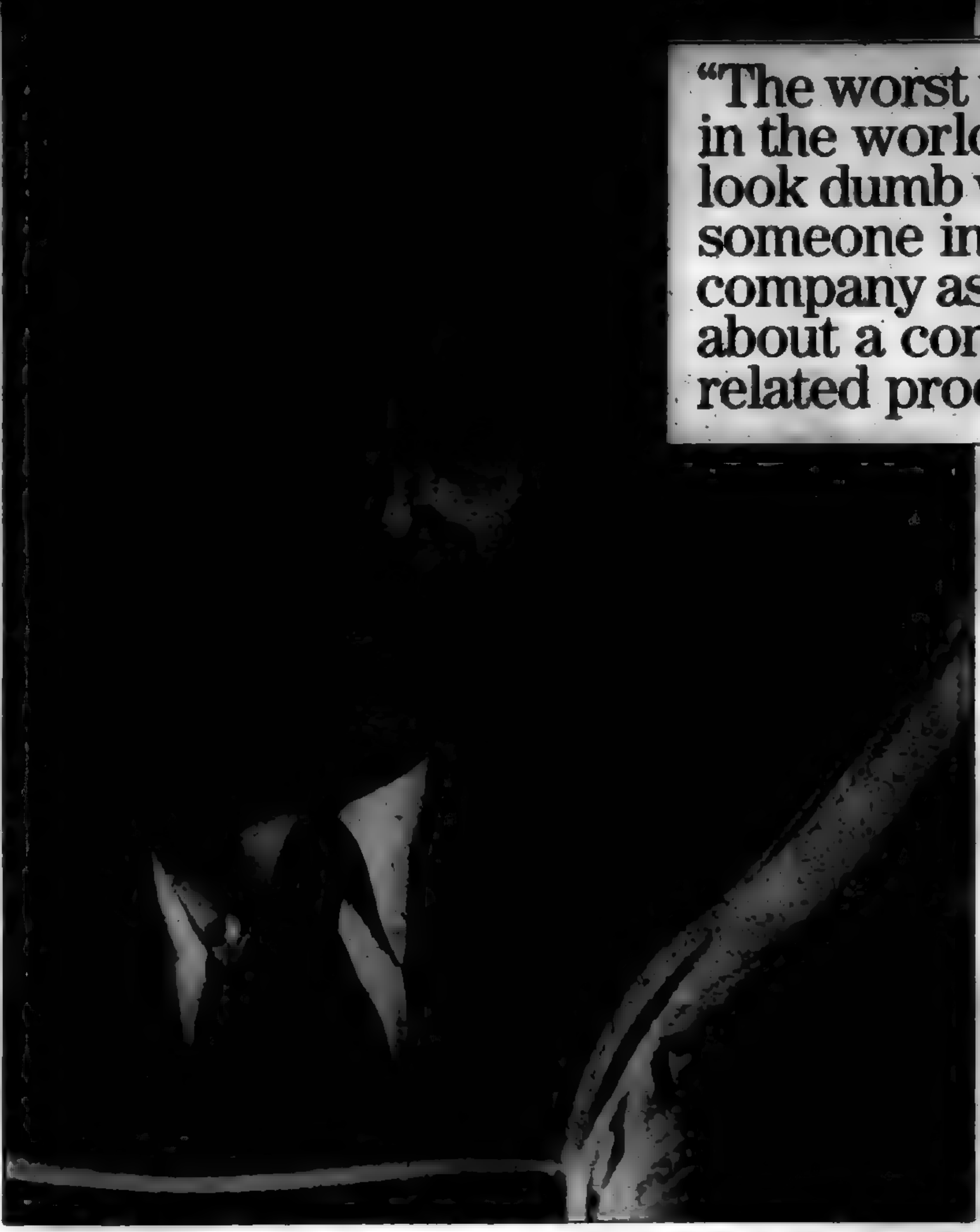

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Quarterly figures strong for Tandem

By Rosemary Hamilton

CUPERTINO, Calif. — Tandem Computers, Inc. finished up fiscal 1985 with a relatively strong fourth quarter that boosted its year-end results above year-earlier totals.

For the year ending Sept. 30, Tandem reported profits of $34.4 million on revenue of $624.1 million. In 1984, the firm earned $33.2 million on sales of $532.6 million. The year-end net income comparison does not include a $9.7 million one-time tax benefit that was added to 1984's results. The tax benefit was represented entirely in 1984's fourth-quarter net income.

The company reported revenue of $173.8 million for the fourth quarter that ended in September, a 14% increase from the $153 million in revenue reported in the same period a year ago.

Net income for the quarter, however, dipped slightly from the previous year. Tandem reported earnings of $11.1 million, compared with the $11.9 million (or $21.6 million with the one-time tax benefit) reported in September 1984.

Tandem is the maker of Nonstop and other fault-tolerant computers, which are designed for continuous data processing. President and Chief Executive Officer James G. Treybig said that while the company's balance sheet is stronger than ever, he is also hoping that 1986 will be a period of higher capital spending.

Adage reduces work force 8%

By Rosemary Hamilton

BILLERICA, Mass. — In response to pricing pressures, most notably from IBM, and diminished product demand, Adage, Inc. trimmed its work force by 8% to 490 persons.

The 44 employees were let go from all departments, according to the workstation manufacturer. The move is expected to help align Adage's expenses with its current business outlook, according to John P. Cunningham, executive vice-president of finance and administration. No further cutbacks are expected, he added.

The layoff comes after the company reported a net loss of $726,000 for the first six months of the year on revenue of $20.2 million. The net loss was only the second in eight years. During the same period in 1984, the company earned $1.3 million on sales of $22.4 million.

Adage recently announced that it would acquire Lexidata Corp., also of Billerica [CW, Nov. 4]. Cunningham said the layoffs had no relation to this pending acquisition.

Cunningham said that the company's most recently introduced products — the Cadstation 2/50, the 6080 graphics system and the 6500 workstation family — will be the "basis for renewed corporate growth."

Wang to combine three separate divisions

Software Solutions Group will seek better business relationships

By Rosemary Hamilton

LOWELL, Mass. — Wang Laboratories, Inc. plans to combine its software vendor, value-added reseller and dealer marketing divisions into a new unit called the Software Solutions Group, which should be in full operation by Dec. 2.

The group will institute a number of policies designed to beef up relationships with software vendors, value-added resellers and dealers.

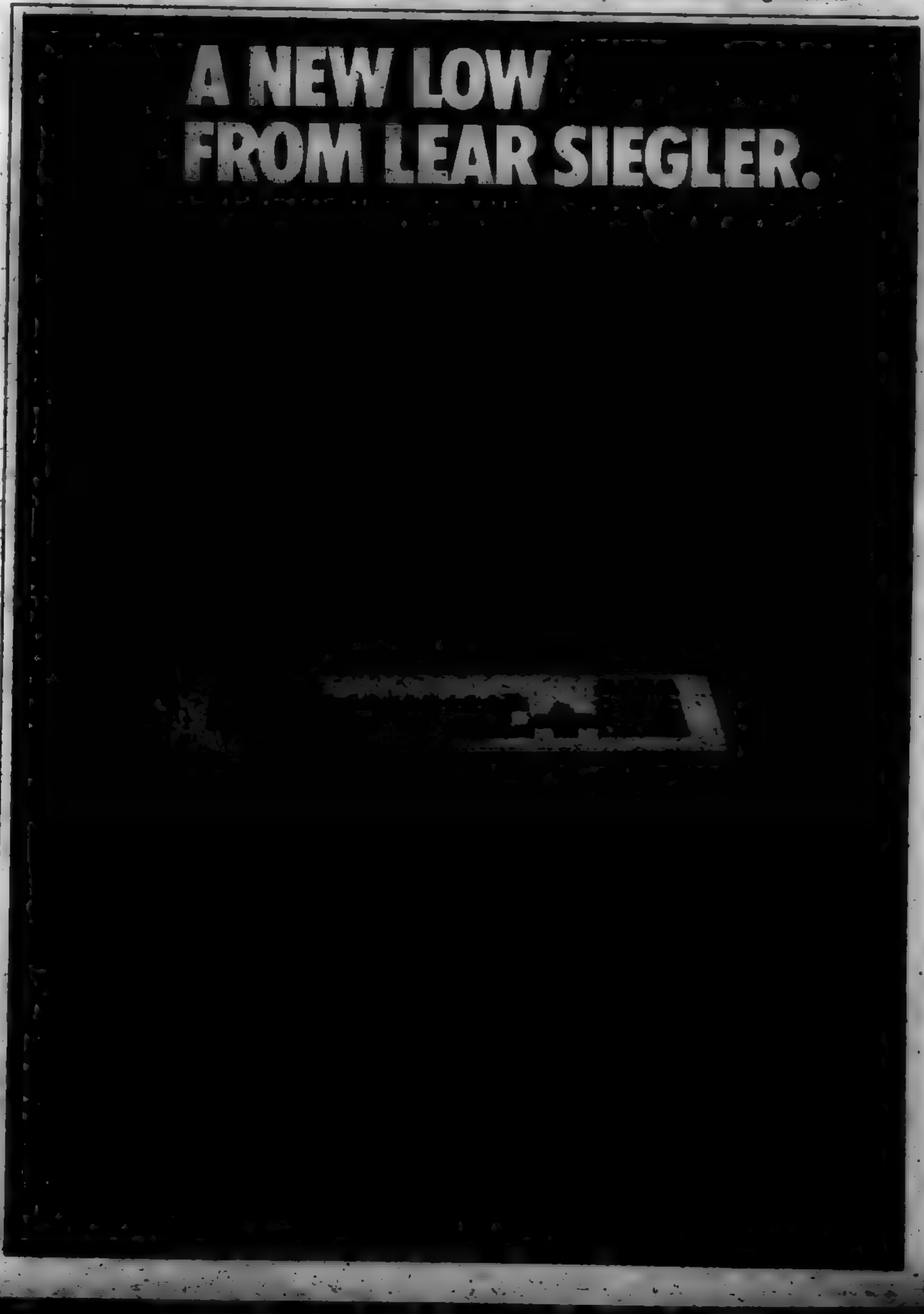
In general, the policies will offer a "variety of financially attractive options to encourage [software vendors and value-added resellers] to position their companies in a complementary business relationship with Wang," the company said. Software providers that do business with Wang are expected to receive some discounts and added benefits.

Value-added resellers that need assistance from Wang sales representatives when selling value-added software, for instance, can participate in a complementary value-added reseller program. This allows value-added resellers to trade discount percentage points to compensate Wang for sales and support assistance.

Under a new marketing assistance agreement, value-added resellers have the option to work with the Wang sales organization on a software-only basis and still get a hardware commission.

A Software Solutions program will also be added to strengthen business relationships with software vendors. A technical hot line into Wang's research and development department will be provided. Initially, about 50 software vendors and value-added resellers will have access. By April, Wang hopes to expand the hot line to all software providers.

In addition, the company plans to recruit additional value-added resellers for markets not being covered by its direct-sales organization.



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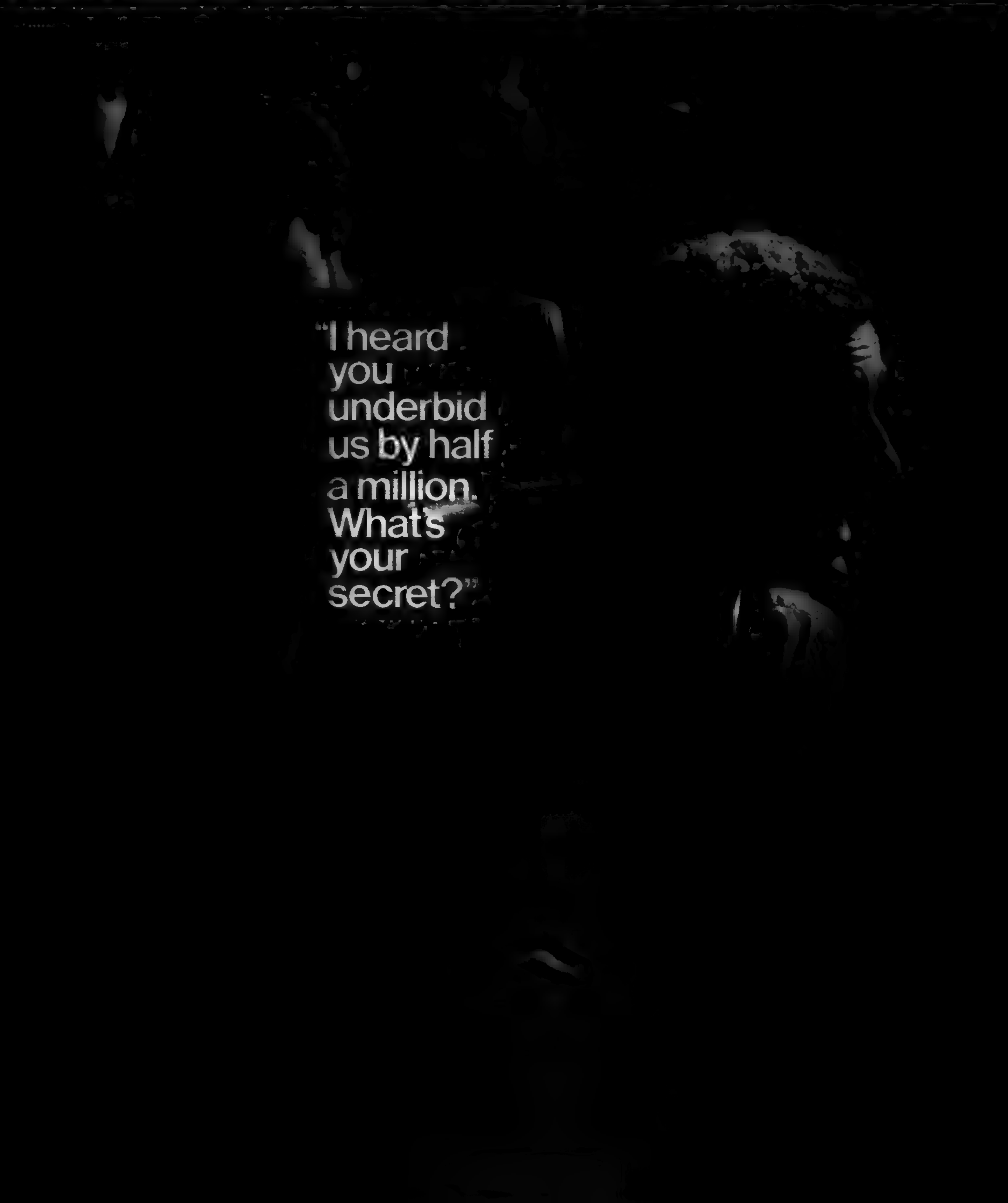
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On takeovers and tumult

From page 151

strategy, which is consistent with the strategy that Informatics had in the first place.

As far as the debt [from the acquisition] itself, we expect to have it reduced from $100 million to $50 million within a year. That will come from cash flow from operations as well as the proceeds from divestitures, but it also means that we intend to conserve cash for a while. We have $25 million in cash in the bank now so we're not strapped.

There really is no significant risk that we won't be able to meet our debt obligations, but on the other hand, we want to reduce even that risk.

So in the future, we will maintain an aggressive acquisition program, but it will be predominantly with stock and other securities.

How did you go about reducing expenses at Informatics?

Primarily people. We went from 208 people to 114 people in one day, which sounds a little coldhearted. However, I say an expense momentum had built up over the years, and the revenue momentum hadn't kept pace with it. It was simply a necessity to get the costs back down under what we were describing as dependable revenue levels.

Have the personnel cuts been completed?

They are over.

Sterling's acquisition of Informatics seemed like a clash of two very different types of corporate cultures. Have you found that? Has there been any friction?

The answer is very much yes. There were two different cultures at what I would call the top. I would say the cultures are very much in common at the operating-unit level. Many of the divisions either sprung up from small groups in the company earlier, or more specifically, many of them were acquired small companies. They had the culture they were looking for. We are returning that culture, and they find that is very, very refreshing.

Now, at the top, on the other hand, there has been the biggest single change of philosophy because we are going through a very aggressive decentralization program for Informatics. Last year their corporate staff spent $9 million, not counting all the expensive ads that they ran [in fighting Sterling's takeover bid], and we are reducing that to zero. To accommodate the needs that we still need to address, we are going to head back around $3 million. We simply intend to let the companies operate themselves, but we intend to maintain a watchful eye and help wherever they need help. They don't need help as often as the old Informatics [management] thought they did.

What assurances can you give Informatics users that they will continue to get support and that their products will not be phased out?

We acquired the company to grow it and build it. It was not a financial play. We didn't acquire the company at the detriment of either the customer or the shareholder. I know that sounds like a lot of motherhood, but we very strongly believe that if you leave the product development activities and decisions to the local level, then products will get developed faster and enhancements will get developed earlier. The people with their ear closest to the customer are the people that are now making those decisions.

> ”
>
> *There really is no significant risk that we won't be able to meet our debt obligations, but on the other hand, we want to reduce even that risk.*

I think our philosophy is one primarily established to listen to and address the customers' needs more quickly than in any other way. Then we make money that way.

But as far as assurances are concerned, if certain products are going to be phased out, I can't give those assurances 100%.

Would you say that this acquisition has sent a message throughout the software industry to companies that are not doing so well and maybe are not managed as well as they should be — no matter how big they are — that a merger like this can happen?

The answer is unequivocally yes. The old concern about a takeover was that you would disrupt all the employees and all the customers and all the prospects and disrupt the entire industry. I think we have disproved that myth.

I think if there is a public company out there that has perennially been providing disappointments to stockholders, and if the management doesn't have control of the company, then they ought to do one of two things. They ought to either get control quick or they ought to eliminate the disappointments.

The prevailing wisdom on hostile takeovers in the computer business used to be that they would not work. It's not like you are buying tangible assets like warehouses and factories. You are acquiring people, and people, if they are not happy, can go to anoth-

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er company.

That is exactly right. We have a pretty fundamental theory that no matter how much money people make, if the company is not making money and they can't respect the overall performance of the company, then they generally are not as happy as they would like to be.

I would submit that what we are doing for the company, looking at what the results have already become, is motivational rather than a depressant. We also believe that the key assets in the company are the people, and we think that we are treating them better now than they were treated before — if you look at it from that point of view.

What are Sterling's long-term revenue goals now?

It is nice to be able to look back in the business plan we wrote in August 1981. We said we wanted to be a $300 million company within five years. We will do that. We think that we can be a billion-dollar company within a decade. However, we are a whole lot more interested in being a company that is generating $100 million in profits than a company that is generating a billion in revenue.

Sterling buys software house

DALLAS — Sterling Software, Inc. continued its trademark pattern of acquisitions with the recent purchase of a closely held banking and insurance software house.

Sterling acquired Dallas-based Decision Systems, Inc. for $3.6 million in Sterling common stock. Decision Systems, which will become part of Sterling's Financial Software Group, recorded sales of approximately $1.4 million for the fiscal year ended Sept. 30.

Decision Systems products will be marketed by Sterling's Bank Software Marketing Division, which also markets products of two other firms acquired by Sterling, Directions, Inc. and Check Consultants, Inc.

When you wrote that business plan, did you envision that there would be as great a leap as this in one shot?

No. We thought we would do it through a series of acquisitions that would grow rapidly after we acquired them. It becomes kind of a geometric progression. Of course we didn't envision that we were going to go out and acquire a $200 million company. On the other hand, we did acknowledge the fact that if such an opportunity presented itself, we would do it. We never avoided that.

Does the Informatics acquisition mean you are going head to head with IBM at all?

God no, with a capital "G" and a capital "N." We have some philosophies that we very strongly believe in and adhere to, and one is that we swim in an IBM ocean. The best way to fail in this business is to go after IBM. A lot of people do it and do it successfully, but we think the odds are against it.

> ”
>
> *Dr. Bauer and his board had carefully prepared a pretty attractive severance package in the event something like this happened. We recently wrote a very, very sizable check to Dr. Bauer.*

Is the software industry climate right now for a lot of acquisition activity, not just by Sterling, but by other companies?

I think so. There is a major opportunity for both small companies to be acquired by larger companies to kind of assure their future, and for the large companies to find good, small companies. I think there is a lot of activity going on. The initial public offering market is not as good as it once was. Mergers and acquisitions represent perhaps the safest and maybe the most economically advantageous way for a small company to go forward.

In the last Informatics annual report, [former Chairman] Walter Bauer wrote that they were going to reposition the Mark IV and Mark V products for improved performance. Was that happening at all?

No. When you lose $3.7 million in a division, you hire people to write some pretty good words about what are you going to do about it. I would say the repositioning was not on schedule.

Was Bauer given any severance benefits other than the standard Informatics package?

Indeed he was. Dr. Bauer and his board had carefully prepared a pretty attractive severance package in the event something like this happened. We recently wrote a very, very sizable check to Dr. Bauer. He had worked a lot of years in founding and building and making successful a company that we obviously thought was very attractive. We think he deserved it.

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SUPERSHORTS

Data Language Corp. has announced a contract with **British Telecom** of the UK. British Telecom Applied Technology will distribute Data Language's Progress system for use in general business applications across all markets. It will also use Progress for in-house applications in the areas of sales tracking and inventory management.

Data Language also announced a contract for the distribution of Progress by **Nokia Electronics** of Finland. Nokia will distribute Progress through its network of dealers in Finland, Sweden and Norway.

Televideo Systems, Inc. has signed a five-year manufacturing/marketing agreement with **Ambi Corp.**

The agreement will give Televideo access to Ambi's national direct sales and marketing force for the companies product lines. Televideo will provide Ambi with its manufacturing resources.

◆

Compaq Telecommunications Corp. and **United Technologies Communications Co.** have announced a marketing and joint development agreement involving Compaq's series of telecomputers.

◆

Analogic Corp. has signed a three-year strategic marketing agreement among its **Computing Systems Group** and the **Data Systems Division** and the **Fort Collins Systems Division of Hewlett-Packard Co.**

◆

Philips International B.V. and **Signetics Corp.** have announced the formation of a U.S.-based venture to design, manufacture and market products for users of the industry-standard VMEbus. The venture will be called **Philips/Signetics Microsystems.**

◆

Nynex Corp. has formed a new subsidiary, **Nynex Credit Co.**, which will provide financial services to other companies in the Nynex family beginning in January 1986.

◆

Ashton-Tate has formed a corporate advisory board with a charter membership of 14 major U.S. corporations. The board will assist the microcomputer software company in developing products that meet the needs of corporate users.

◆

Olivetti Corp. has signed an agreement with **Computerland Europe Sarl** for the worldwide distribution of its various models of personal computers in countries outside the U.S.

◆

Summagraphics Corp. has entered into a settlement and cross-license agreement with **Hitachi Seiko Ltd.** after an alleged patent infringement. Both parties agreed to cross-license certain patents relating to tablet digitizers.

◆

Intecom, Inc. has announced its contract with **Planning Resource Corp.** for one switching system and associated peripheral equipment with options for an additional five systems.

Du Pont enters joint venture

By Charles Babcock

NEW YORK — The Du Pont E. I. De Nemours & Co. of Wilmington, Del., and N.V. Philips of the Netherlands have teamed up to form a joint venture to produce optical disks in the U.S., spokesmen for the two firms announced recently.

Both companies are doing development work in different areas on erasable optical disks and are combining their resources in hopes of becoming the world's largest supplier of optical disks, said Edgar S. Woolard Jr., vice-chairman of Du Pont.

Philips, which introduced the first digital compact disks in 1983, holds patents on the 4.72-in. devices. Du Pont is a manufacturer of high-density, 14-in. optical disks used in mainframe computer storage systems.

Both parties indicated that they hope to dominate the emerging market for audio disks, which use laser beam players to play musical recordings, and move from that base as a major manufacturer of data storage disks.

Together, they will lease a 160,000-sq-ft facility in Kings Mountain, N.C., for the production of 50 million compact audio disks a year. The joint venture plans to have a capacity to produce 200 million disks a year at plants worldwide by 1990, Woolard said.

Philips produces compact audio disks at its Polygram recording subsidiary in Hannover, West Germany, and video and data disks in Blackburn, England. It does development work on both audio and data disks in Eindhoven, the Netherlands.

Du Pont is conducting research on erasable optical disk technology based on organic materials.

Philips is attempting to develop magneto-optic and phase change technology for erasable disks.

The 3M Corp. in St. Paul, Minn., is also a U.S. producer of read-only, or write-once, disks.

The Du Pont-Philips combination will also be producing optical disk drives. Other optical drive manufacturers include Storage Technology Corp. in Louisville, Colo.; the British-French consortium Thompson-CSF; and Japanese manufacturers Sony Corp., Hitachi Ltd., Matsushita Electric Industrial Co. and NEC Corp.

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News from the computer world

From page 151

with General Electric Co.

■

Vector Graphic, Inc., which is in the process of merging with Dual Systems Control Corp., announced last week the layoff of 12 people. That may not seem like a lot, but at the one-time high-flying micro company it amounted to one-third of its work force.

■

Xidex Corp. of Santa Clara, Calif., has reached a preliminary agreement to acquire hard-disk manufacturer Charlton Associates of El Toro, Calif.

Under the terms of the agreement, Charlton will release all of its outstanding shares of stock in exchange for 2.2 million newly issued shares of Xidex common stock, as well as warrants to buy 4.6 million shares of Xidex stock at 120% of fair market value at the time the merger is completed.

Xidex, a manufacturer of computer storage systems, recorded annual sales of $380 million last year. Charlton recorded annual sales of $36 million.

■

Print head manufacturer DH Technology, Inc. of Sunnyvale, Calif., got the green light recently to acquire bankrupt Micro Peripherals, Inc. of Salt Lake City.

A Utah bankruptcy court approved the acquisition just one month after the printer manufacturer filed for protection under Chapter 11 of the Federal Bankruptcy Act. Under the terms of the acquisition, DH Technology will pay secured and unsecured creditors $428,000. A portion of the creditors will receive a deferred payment of $320,000 based on future Micro Peripherals sales. DH will also acquire all of the outstanding shares of Micro Peripherals in exchange for 40,000 shares of DH common stock.

Micro Peripherals will be operated as a wholly owned subsidiary of DH Technology.

■

The Japanese invasion continues. Toshiba America, Inc. has announced plans to build a $35 million facility on 26.2 acres in Irvine, Calif., for research and development and manufacturing of telecommunications and medical systems. The move marks the first time a U.S. subsidiary of a Japanese company will manufacture medical systems in the U.S. The building will also serve as headquarters for Toshiba's industrial business sector operations, and it will house sales and distribution facilities for telecommunications and other office automation products.

■

Another small electronics firm suffered the consequences of the computer downturn recently when Digital Applications, Inc. of Phoenix shut the doors of its printed board manufacturing operations and laid off 40 employees.

A spokesman for the company said the subsidiary of Aero Scientific Corp. of Anaheim, Calif., recorded a net loss of $85,000 on sales of $966,000 compared with $81,000 in profits on $1.9 million in sales for the same period a year ago.

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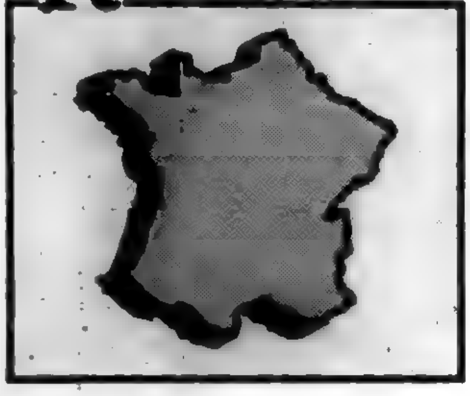

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DG forms group, reorganizes units

By Clinton Wilder

WESTBORO, Mass. — In a move designed to improve coordination and consolidate product marketing to its target customers, Data General Corp. last week announced the formation of a Business Group Marketing Division.

DG is attempting to tighten its marketing approach on diverse products by offering "total integrated system solutions" to customers in business, design and industrial automation markets, according to Business Group Senior Vice-President Robert C. Miller. Miller said DG believes those three markets have shown "increasing convergence," necessitating a more consolidated marketing strategy.

J. David Lyons, former vice-president of DG's Information Systems Division, will head the new division as vice-president of Business Group Marketing and will report to Miller.

Business Group Marketing will have responsibility for DG's current industrial automation and office automation divisions, as well as a new Product Marketing Division. John R. Scanlon, formerly director of software development for the company's System Development Division, will head Product Marketing.

The industrial automation group changed its name from the Technical Products Division to the Technical Systems Division. It is headed by Vice-President Donald L. McDougall.

Lyons will serve as acting head of the Information Systems Division, which is responsible for DG's Comprehensive Electronic Office automation system and related OA products.

In a connected move, DG consolidated all of its product distribution, except the direct sales force, under its former Desktop Division, renamed the Distribution Division.

The new group, headed by former Desktop Division Vice-President Cliff Bream, will continue to handle the retail channel but will also take over industrial distribution from Technical Products and the value-added reseller and OEM channels from Information Systems.

In addition, DG announced the formation of an independent business unit for expert systems, headed by Peter G. Jessel.

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MERGERS AND ACQUISITIONS

Comp-U-Card International, Inc. of Stamford, Conn., and **Financial Institution Services, Inc.** of Nashville jointly announced that their respective boards of directors have approved an agreement of merger under which Financial Institution Services will become a wholly owned subsidiary of Comp-U-Card. Upon completion of the the merger, Comp-U-Card will issue 0.58 shares of its common stock for each outstanding share of Financial Institution Services' common stock.

■

CMC International, Inc. of Bellevue, Wash., and **Votrax, Inc.** of Troy, Mich., announced the completion of merger negotiations and the signing of an agreement. The agreement calls for CMC's acquisition of Votrax for about 7.7 million shares of CMC common stock and $1.47 million in promissory notes. The agreement also calls for a third party to buy approximately 195,000 shares of CMC common stock for $120,000 cash. The firms decided against including Ixo, Inc. of Culver City, Calif., in the merger, as was previously announced.

■

Tallgrass Technologies Corp. of Overland Park, Kan., announced the acquisition of **Gemini Software, Inc.** Gemini Software has become a Tallgrass subsidiary and will operate under the name of **Tallgrass Software Technologies, Inc.**, located in Providence, R.I.

Drive maker posts profits

From page 151

counting for 78% of the total demand.

Chairman and Chief Executive Officer Irwin Rubin said Computer Memories management "is directing a major effort" toward developing alternate sources of demand when the IBM contract expires Dec. 31.

In other financial news, an artificial intelligence systems firm continued to grow, a micro applications vendor slowed down and a vendor of multiuser systems based on AT&T Unix software continued to suffer losses.

■ Symbolics, Inc., a Cambridge, Mass.-based AI vendor, reported a 71% jump in revenue to $24 million for its first quarter ended Sept. 29. Profits quadrupled from the year-earlier period to $2.4 million, or 9 cents per share.

■ Software Publishing Corp., the successful Mountain View, Calif., vendor of the PFS microcomputer software series, reported a 14% drop in profit on a 12% revenue decline for its fourth quarter ended Sept. 30. Software Publishing earned $846,000, or 12 cents per share, on $7.1 million in sales.

But the firm ended its first year as a public company with 42% growth in revenue and a 47% profit increase. Software Publishing earned $5.8 million, or 83 cents per share, on 12-month revenue of $37.2 million.

■ Fortune Systems Corp. reported a third-quarter loss of $4.4 million, or 21 cents per share, a steeper drop than its $3.7 million, 17-cents-per-share loss a year ago. Revenue dropped by some 50% from $16.7 million a year ago to $8.2 million.

The Belmont, Calif., Unix systems maker had been profitable in the second quarter, but posted a 37% decline in quarter-to-quarter sales in the third. But its loss for the nine months ended Sept. 30 mounted to $7.9 million, or 38 cents per share, compared with a loss of $7 million, or 32 cents per share, in the same period in 1984.

Thomson bets on chip revival

From page 151

the acquisitive empire of czar Harry Gray, United Technologies' chairman, has been highly successful.

Elsewhere, the signs for Thomson's gamble are not good. The aforementioned Intel announced 450 new layoffs; National Semiconductor Corp., an additional 500. And Texas Instruments, Inc. warned investors and employees not to expect much good news through the first half of 1986. While the race for more and more million instructions per second packed into microprocessors is an exciting one, it doesn't appear that it will be driving a big new demand for chips anytime in the near future.

■

Control Data Corp. appears to be caught in a vise grip of two coincidental factors — its worst management and strategic mistakes have come home to roost just when the entire industry, particularly mainframes and peripherals, has taken a dive. Its cash and asset base notwithstanding, CDC is hanging on the continued good graces of its creditors.

That's not an enviable position. Just ask Wheeling-Pittsburgh Steel Corp., which had its hard-fought steelworkers' contract settlement rejected by its lending banks. Wheeling-Pittsburgh eventually won that fight in federal bankruptcy court, but the message was clear. When it comes to debt negotiations, banks drive a hard bargain.

The latest rumor in Minneapolis is that CDC was planning a million-dollar advertising campaign aimed at improved public relations. All well and good, but aggressive action by management in the face of the greatest crisis in CDC's illustrious history will speak louder than words.

Important Announcement for All U.S. Computer Products Manufacturers!

The Japanese computer buyer is targeting U.S.-made products!

Japan, the world's largest computer market outside of the U.S., will eliminate all import tariffs on computers, peripherals and parts early next year. The Japanese Prime Minister and government trade ministries have instructed Japanese companies to substantially increase their purchasing of U.S. goods to lower the Japan-U.S. trade deficit.

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Responsibilities include organizing and leading, as a first-line manager, a small team of qualified technicians in the pursuit of issues and opportunities which can be developed into technological objectives. These objectives must then be effectively communicated to the senior executives of the company.

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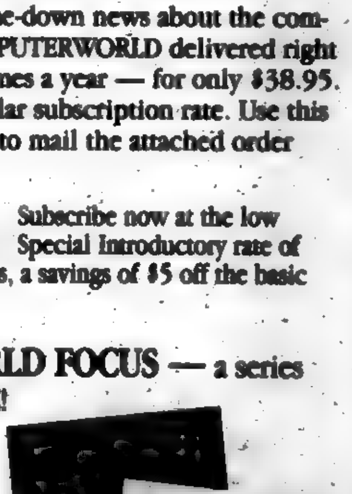

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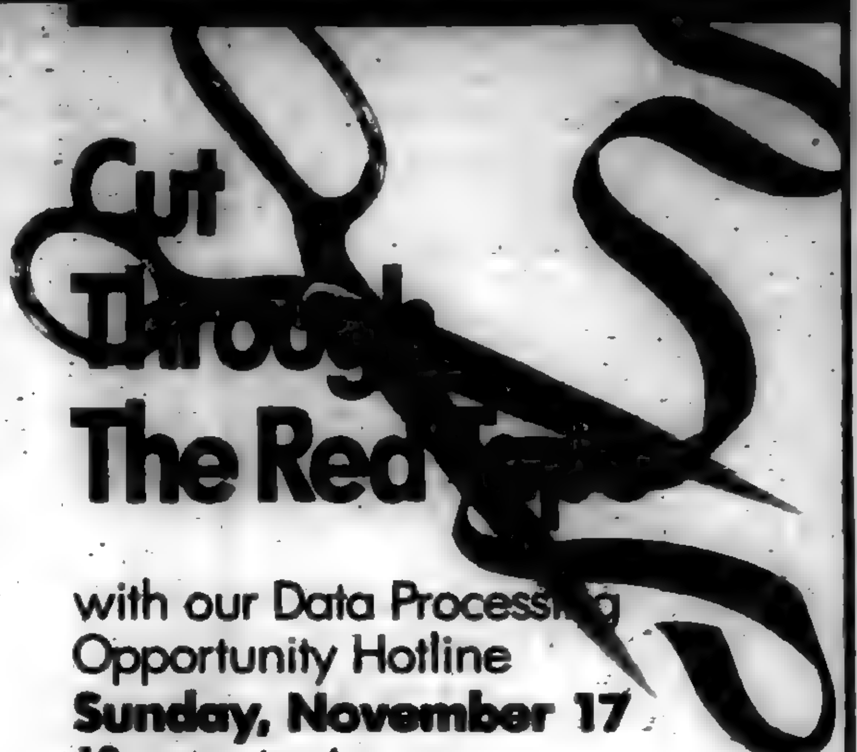

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Nuclear Medicine Scientific Programmer

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BUSINESS PROGRAMMER/ANALYST

Participate in the development of new on-line systems for Personnel, Payroll, Finance and Accounting. Involved in developing user requirements, analysis, design, coding and the implementation of business systems on a large IBM mainframe using COBOL, IDMS-DB/DC and Fourth generation languages. 2-3 years experience as a programmer/analyst developing business systems in a large scale IBM environment required.

To investigate the creative freedoms and tangible opportunities that a career at Ford Aerospace can offer, please send 2 copies of your resume in strict confidence to: Dave Rutherford, Professional Placement, Dept. A783-001, P.O. Box A, Newport Beach, CA 92660.

U.S. Citizenship Required
Affirmative Action Employer

Ford Aerospace & Communications Corporation
Corporate Information Systems

PROGRAMMER ANALYST

Consumers Distributing, North America's largest retail catalog showroom chain, has an immediate opening for an individual to design, program and implement systems, as well as maintain existing systems (merchandising and distribution).

We are presently running on a IBM 3033 OS/VS1 and are in the process of converting to MVS. Knowledge of Series 1 and System 36 would be a plus. The successful candidate must have an applications programming background using COBOL command level CICS.

We offer a generous salary plus comprehensive benefits. Send resume including salary history, to: PERSONNEL DEPT. PA., Consumers Distributing, 205 Campus Plaza, Edison, NJ 08837. (We're located in Raritan Center).

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Consumers

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TENURE TRACK QM/CS DEPT.

Instr. or Asst. Prof. in Quant. Methods/Comp. Sci., September, 1986. Tenure track. Area: MIS or SOFTWARE ENGR. or COMP. SCI. Qualified to teach in two or more of: Systems design & prototyping, DSS, IRM, process control, expert systems, software qual. assurance, security, software proj. mgmt., graphics, telecom., robotics, 4GL. PhD or Master's, teaching exp. and/or substantial prof. exp. and competence to teach undergrad. courses and grad level courses for MBA, MSC. Software Engr. The College of St. Thomas seeks candidates who are comfortable with and can contribute to the mission of a Catholic liberal arts college committed to the total development of the individual student. Send resume by 2/1/86 to Dr. B. Fetz, QM/CS Dept., College of St. Thomas, St. Paul, MN 55105.

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(207) 773-4749

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Yankee Bank is an aggressive and growing Boston based financial institution. We have a critical need for computer systems to support our business.

We are looking for an ambitious MIS professional to build our data processing function from scratch. This will include defining information requirements, procuring appropriate software and hardware, and building the data processing organization.

Candidates must have substantial data processing project management experience in the banking industry, and would most likely be the number 2 or 3 person in his/her present organization. This is a rare opportunity for the right individual to create and manage a total data processing function. Salary fully commensurate with experience and responsibilities.

Please send resume and salary history in confidence to:

Yankee Bank
for Finance & Savings FSB
99 Tremont St.
Boston, MA 02108

An Equal Opportunity Employer

DIRECTOR

Mesa College, Grand Junction, Colorado, requires a Director of Computer Services who will develop, implement and maintain an information system which meets the needs of the academic and administrative areas using modern technology. The position includes supervision and direction of campus computer services and coordination with administrative and academic offices, as well as state and local officials.

Requires appropriate Bachelor's degree with related business courses and extensive progressive experience in MIS, including proven accomplishment in project management and system analysis. State-of-the-art experience in data based management application, systems conversion, LANs, and at least 3 years of managerial experience required. Experience with POISE and DEC equipment helpful. Must be able to effectively communicate with academic and administrative users. Salary negotiable.

Letter of application and three letters of reference together with resume must be submitted by December 16, 1985, to:

Dr. Jo F. Dorris
Vice President
Administrative & Student Affairs
Mesa College
P.O. Box 2647
Grand Junction, CO 81502

COMPUTER USER SERVICES

Manager of User Services. Key administrative faculty position in rapidly growing university environment. Requires in-depth managerial skills and experience, preferably gained from working in an academic computer center. Technical skills are required in client support using mainframe computers (e.g., CDC, DEC VAX) and microcomputers (IBM-PCs and compatibles). Person selected will be responsible for computer software, consulting, training, and documentation support to faculty and students campus wide. Position requires incumbent to become involved in long-range planning with the immediate supervisor who is the Director of Academic Computing Services. The Manager of User Services supervises a staff of 6 full-time programmers and programmer/analysts and at least 20 part-time student consultants. A master's degree, or equivalent experience, is required. A doctorate is preferred. The ability to work well with people at various technical levels and good speaking and writing skills are essential. Salary is negotiable commensurate with applicant's background and experience. Please send resume and salary history to Personnel Office, George Mason University, 4400 University Drive, Fairfax, Virginia 22030 by November 29, 1985. AA/EOE.

Director
University of Central Arkansas Computing Resource Center

Establish and direct a computing resource center for use by University faculty/students and to provide computing consultation and services to regional businesses. IBM 4341. New facilities under construction.

Qualifications: 5 years professional experience using IBM mainframes and operating systems; 3 years system programming experience in VM and DOS/VSE, including CICS; ability to work with faculty, students and local businesses.

Salary: $40,000 with excellent fringe benefit package
Beginning date: After 1 December 1985
Closing date for applications:
20 November 1985

Send letter of application, resume and 3 letters of recommendation to:

Robert M. McChesney,
Vice President for Academic Affairs
University of Central Arkansas
Conway, Arkansas 72032

AA/EOE

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Data Base Analysts

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PREFERRED QUALIFICATIONS: Master's degree. One (1) year of experience in data processing position, i.e. programming, analyst, etc. Salary range $35,429.52 - $52,749.84 (negotiable).

Screening process begins November 22, 1985 and position will be open until filled. For official Florida Junior College application, contact FJC Personnel Department, 501 West State Street, Jacksonville, FL 32202. (904) 632-3370.

EOE

SYSTEMS ANALYST - Determine hardware and software requirements of clients; direct grp of systems studies, analysis and proposals to develop applications systems; verify tech specs. Design and implement systems; supervise, monitor and evaluate EDP staff; detect, diagnose and correct problem areas; prepare user manuals. Use of IBM 3033, 3081, 3084, and 4341 hardware, COBOL, Assembler, Fortran, CICS (Command level), VSAM and OS/MVS. Work with IDMS Data base, ADS on-line and manage teams of data processing professionals. Bachelor's degree in Computer Science or Mathematics + 4 yrs. in job offered or 4 yrs. systems and database design and development experience required. 40 hrs./wk., $51,000/yr. Resume to: NYS Job Service, JO #NY8013[illegible], 97-45 Queens Blvd., Rego Park, NY 11374.

SYSTM ANALYST - Analyz proc & problm, redfine data & convert to progrm EDP-output, data handling, new systms; text retrieval/software systms, compt persn oversee w/i group, pln maintain & devl DP facts/tech svc., 5yrs exp, BA, 40hrs/wk, $70,992/yr, Job Order # NY8015566, DOT Code 169.167.030, Mail resume to: NYS Job Svc., JO # 8015566, 175 Remsen St., Bklyn., NY.

Research Staff Member

[illegible]arch in theoretical foundations of Comp Sci w/emphasis on modeling & analysis of time, hardware & comm complexity of parallel comp & VLSI. Utilizes grad specialization in computational complexity & analysis of algorithms, knowledge of VLSI models, PASCAL, parallel machine models, techs for design & analysis of seq & parallel algorithms in graphics & comp geometry, oral & written exposition of research. Must have pub in algorithms, theory of comp & parallel processing. Ph.D. Comp. Sci/math req'd plus 2 yrs in job or 2 yrs Res/tchg teaching theory of algorithms, parallel processing & comp geometry. 40 hr/wk; 8:30-5:12 p.m.; $61,000/yr. Resumes to: NYS Job Service, 55 Church Street, White Plains, NY 10601, include JO# [illegible], DOT 020.167-062 E.O.E.

PROGRAMMER ANALYST - Design, develop, test, implement and maintain computer system software for company's client on Burroughs B6800 mainframes. Use of COBOL, ALGOL, NDL, DMS II, CANDE, GEMCOS and MCP. Bachelors degree in computer science, mathematics or engineering + 2 yrs in job offered or 2 yrs programming and analysis experience required. 40 hours/week, $34,000/yr. Resume to NYS Job Service JO#NY8018865, 97-45 Queens Blvd., Rego Park, NY 11374.

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The Space Telescope Science Institute is an astronomical-research center located on the Homewood Campus of Johns Hopkins University. We are currently seeking several experienced Software Analysts to provide software support in developing calibration algorithms for the Instrument Support Branch.

Prospective candidates should have a thorough knowledge of concepts, principles and the application of interactive-applications software programming. A strong background including system-level work with a degree in Computer Science or related field and VMS experience with an emphasis in FORTRAN is required. Experience with image processing techniques and a knowledge of astronomy would be advantageous.

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The Legislative Evaluation and Accountability Program Committee is a statutory agency of the Washington State Legislature providing analytical and fiscal data processing support to all committees of the legislature. We are seeking an executive caliber individual to administer the responsibilities of the agency. This high visibility position requires an energetic, imaginative, seasoned professional with business, technical and interpersonal skills gained through systems development and data base administration experience including management responsibility.

Responsibilities of the position will entail staff management; planning and administration of budgets; extensive interface with legislators, legislative committees and executive agencies; data base management, fiscal systems development, legislative issue analysis; and facilitating cost effective and rapid information flow throughout the legislative process.

Position offers an attractive compensation and fringe benefit package depending upon qualifications. Interested applicants are requested to send a letter of application, resume with salary history, and five references by November 25, 1985, to:

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205 Institutions Building
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COMPUTERPEOPLE
DATA SERVICES DIVISION

[illegible] Corporate Exchange Dr.
Suite 100
Columbus, Ohio [illegible]
(614) [illegible]

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We are currently running with an NCR V-[illegible] and V-8655 in a loosely coupled environment, using the NAM text editor software. Experience in these 2 areas is a definite plus, as is a college degree in a related field. Excellent oral and written communication skills, as well as effective interaction with senior management, user departments, and peers is a must.

Qualified applicants are invited to forward their resumes including salary history and requirements to:

WASHINGTON FEDERAL
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3101 Wisconsin Avenue N.W.
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EOE M/F/H/V

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Requires strong computer background. College/university record keeping, large system Burroughs experience highly desirable. Job duties will consist of one of the following, depending on qualifications: (only one position will be filled)

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Or

Software Development Manager: Supervises Programmer/Analysts. Team Leader for new data base application and maintenance activities. Minimum of five years experience in Cobol and Database required.

Salary to mid 20s. Send letter of application, resume, names and addresses of three professional references by November 22nd to Search Committee, Computing Services, SUNY College at Fredonia, Fredonia, New York 14063. SUNY College at Fredonia is an Equal Opportunity Affirmative Action Employer.

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Don Pullman ([illegible]) 274-[illegible]
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[illegible] North Central Ave., Suite [illegible], Phoenix, Arizona [illegible]

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The ideal candidate will possess a high level of directed energy, maturity and discipline. Managerial experience in testing end-user application software and a strong technical education in computer science or a related field is a must. Responsibilities include hiring, supervising, and training personnel to create the best possible testing system for our products. This highly visible management position demands strong organizational and communications skills; demonstrated experience in establishing and developing a testing group; interest in end-user software; familiarity with the needs and problems of software users; and a strong dedication to high-quality products.

Put quality into your career with Microsoft . . . the high performance software. We offer excellent compensation and benefits, including medical/dental/life insurance, flexible hours, a private office, and membership in a health club. If you're interested in this challenge, please send your resume in complete confidence to: **MICROSOFT CORPORATION, Human Resources, Dept. TM, 3055 112th NE, Box 97200, Bellevue, WA 98009.** We are an equal opportunity employer, M/F.

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EOE

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Dr. S. Fox, Dept. of Quant. Methods/Comp. Sci.
College of St. Thomas
St. Paul, MN 55105

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Requires MBA degree with major in MIS. Requires 18 months experience with DM IV/IDS II data base management system, TDSC II software, GCOS operating system and COBOL language. Requires 6 months concurrent experience with REX data base system. Salary $2,700 per month.

Submit resumes to:

Mr. [illegible]
Control #S-118
Minnesota Job Service
390 Second Avenue South
Minneapolis, Minnesota 55401

PROGRAMMER: Design, code, test, enhance & maintain computer applics. as related to finci. institutions. Must know ASSEMBLER, PL/1, COBOL, CICS, DL/1, VM, DOS/VSE on IBM mainframe. 2 yrs. exp. or 2 yrs. related exp. in programming. H.S. Grad. $30,000/yr 40 hrs/5 days/wk. Mail resume to NYS Job Service JO# 8007815. 485 Fifth Ave. NYC 10017 D.O.T.012167066.

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Responsible for development and maintenance of electro-mechanical manufacturing system and financial system, planning, analyzing and implementing the management information system, providing software support to printed circuit board design engineer. Must be familiar with C language, UNIX operating system and database management. A minimum M.S. in Computer Science and 3 months experience. $25,000 per year. Job site Fremont, California. Send this ad and your resume to Job #3755, P.O. Box 9560, Sacramento, CA 95823-0560 not later than November 28, 1985.

FACULTY FOR EUROPE

The University of Maryland University College seeks faculty to teach undergraduate computer science, computer applications, and information systems management courses to U.S. military bases in Europe. Most appointments begin in August, 1986, though there may be openings as early as January. Minimum requirements include a Master's degree, recent college teaching experience, and U.S. citizenship. Benefits include transportation and military base privileges (PX, commissary, etc.). Frequent travel and the cost of schooling make these positions difficult for those with children. Send your resume to Dr. Lois A. Mohr, Overseas Programs, The University of Maryland University College, College Park, MD 20742. AA/EOE.

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[illegible]
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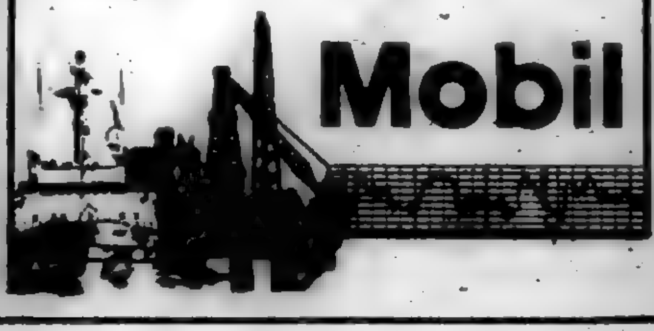

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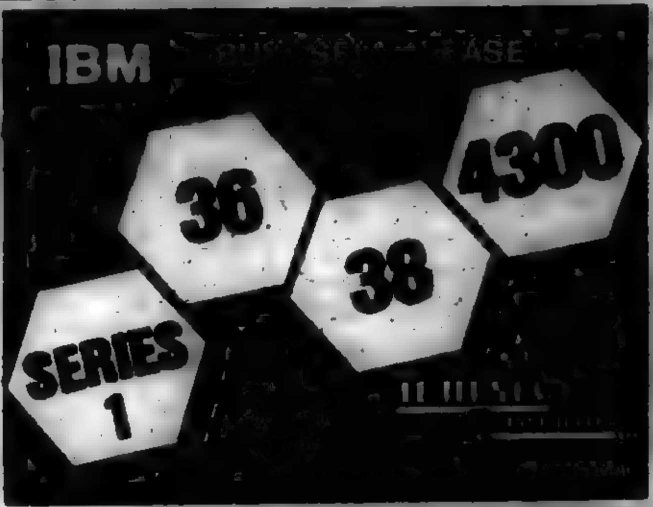

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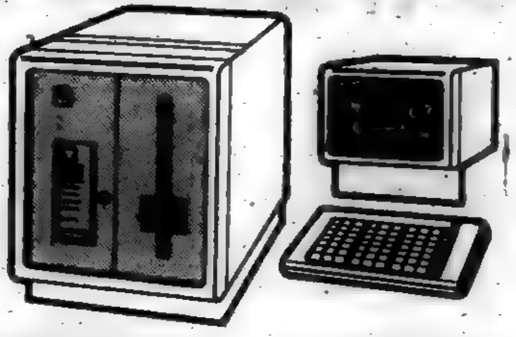

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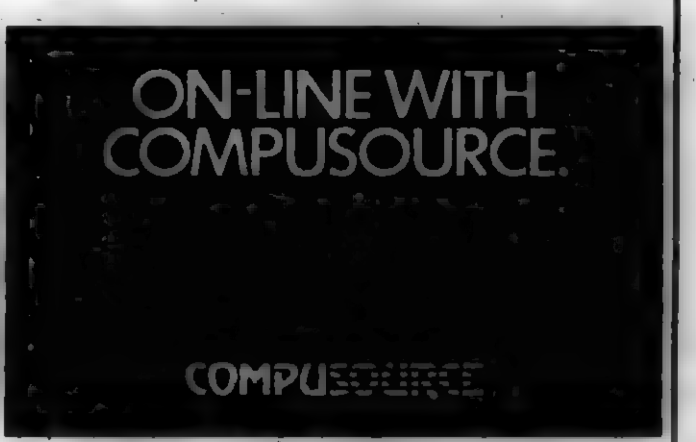

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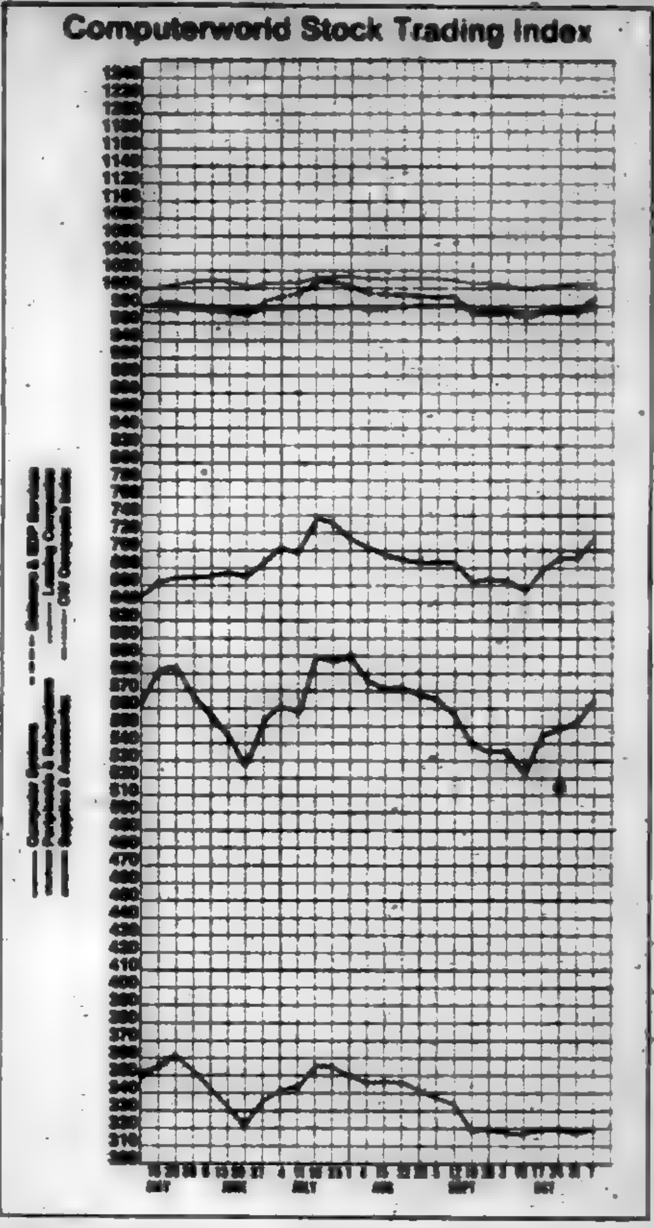
Computerworld can be purchased on 35 mm microfilm through University Microfilm Inc., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld's network: write to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 6, 1985

All statistics compiled, computed and formatted by TRADE QUOTES INC. Cambridge, Mass. 02139

EXCH		1985 RANGE (1)	CLOSE NOV 6 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	9- 12	8 3/4	+ 3/8	+4.5
O	ALTOS COMPUTER SYST	7- 16	11	+ 1/4	+2.3
A	AMDAHL CORP	10- 18	11	+ 1/8	+1.1
O	APPLE COMPUTER INC	14- 31	19 1/4	+ 1/4	+1.3
N	AT&T	19- 23	20 3/4	0	0.0
N	BURROUGHS CORP	51- 69	57 1/2	+1 1/2	+2.6
O	COMPAQ COMPUTER CP	6- 12	10 7/8	- 1/8	-2.2
O	COMPUTER AUTOMATION	3- 9	4 1/8	- 1/2	-10.8
A	COMPUTER CONSOLES	5- 20	6 3/8	- 1/8	-2.0
N	CONTROL DATA CORP	14- 35	17 7/8	+1	+5.9
O	CONVERGENT TECHNOL	5- 17	6 1/2	- 3/8	-7.5
O	CPT CORP	3- 12	3 1/2	- 1/8	-3.3
N	CRAY RESEARCH INC	38- 67	67 1/4	+2 1/8	+4.0
O	DAISY SYSTEMS CORP	21- 38	26 3/4	+ 1/4	+1.0
N	DATA GENERAL CORP	31- 58	41 5/8	+ 1/2	+1.2
N	DATAPOINT CORP	5- 22	5 3/8	- 1/8	-4.4
N	DIGITAL EQUIPMENT	93-128	123 3/8	+1 5/8	+1.3
A	[illegible]	12- 16	13 1/2	- 3/8	-2.7
N	ELECTRONIC ASSOC.	3- 8	4 1/8	- 1/8	-2.9
N	FLOATING POINT SYST	19- 39	32	+ 3/4	+2.3
N	[illegible]	24- 34	30 7/8	- 7/8	-2.8
N	GOULD INC	20- 30	22 5/8	- 7/8	-3.8
N	HARRIS CORP	23- 33	28 1/4	- 5/8	-2.2
N	HEWLETT-PACKARD CO	30- 40	33 1/8	+2	+6.3
N	HONEYWELL INC	55- 67	63 1/4	- 1/4	-0.4
N	IBM	118-138	132 7/8	+1 3/4	+1.3
O	IPL SYSTEMS INC	1- 4	1 1/2	0	0.0
N	ITT CORP	26- 37	35 3/8	- 1/4	-0.7
N	M/A-COM INC	15- 24	16 1/2	- 7/8	-5.0
O	MANAGEMENT ASSIST	2- 20	3 1/8	0	0.0
O	MATSUSHITA ELEC(ADR)	[illegible]	87 3/4	+ 3/8	+0.4
N	MODULAR COMPUTER SYS	6- 10	9 3/4	0	0.0
N	MOHAWK DATA SCI	2- 10	3 3/4	+ 1/8	+3.4
N	MOTOROLA INC	29- 44	38	+1 3/4	+4.8
N	NAT'L SEMICONDUCTOR	10- 17	11 5/8	+ 3/8	+3.3
N	NBI INC	11- 21	11 7/8	+ 1/2	+4.3
N	NCR	23- 35	30 3/8	+1 1/8	+3.8
N	PERKIN-ELMER	22- 30	24 7/8	+1 3/4	+7.5
N	PRIME COMPUTER INC	13- 20	16 1/8	+ 7/8	+5.7
N	SPERRY CORP	39- 55	47	- 1/8	-0.2
O	STRATUS COMPUTER INC	9- 20	19 3/4	+ 1/2	+2.5
N	TANDEM COMPUTERS INC	14- 35	17 1/2	+1 3/8	+8.5
N	TANDY CORP	24- 39	28 1/8	+2 7/8	[illegible]
O	TELEVIDEO SYSTEMS	2- 9	2 3/4	+ 3/8	+15.7
N	TELEX CORP	7- 18	17 1/2	+1 1/4	+7.6
N	TEXAS INSTRUMENTS	89-148	99 3/4	+3 1/4	+3.3
A	ULTIMATE CORP	9- 26	13 1/2	+ 5/8	+4.8
O	VECTOR GRAPHIC INC	0- 2	1/8	0	[illegible]
A	WANG LABS "B"	15- 30	19 1/4	+ 3/4	+4.0
A	WANG LABS "C"	15- 32	20 1/4	+ 3/8	+2.8
N	XEROX CORP	37- 55	50 1/4	+2	+4.0
	LEASING COMPANIES				
N	COMDISCO INC	9- 22	22 3/4	+1 1/8	+5.2
N	CONTINENTAL INFO SYS	9- 13	12 7/8	+1 1/8	+9.5
O	FINALCO GROUP INC	2- 7	3 7/8	+ 1/8	+3.3
O	PHOENIX AMERICAN INC	3- 5	3 1/8	0	0.0
O	SELECTERM INC	7- 14	8 3/4	- 5/8	-6.6
N	U.S. LEASING	30- 40	34 3/4	+2	+6.4
	COMPONENTS				
N	ADVANCED MICRO DEV	20- 41	28 3/4	+1 1/8	+4.3
O	ADV'D SEMICONDUCTOR	5- 25	10	0	0.0
N	ANALOG DEVICES INC	16- 28	20 3/8	+ 1/8	+0.6
O	ANALOGIC CORP	9- 15	12 1/4	- 1/4	-2.0
O	APPLIED MAGNETICS CP	9- 16	13	+ 1/8	+0.9
O	[illegible] CORP	3- 10	6 3/8	0	0.0
A	MICRO MASK INC	5- 14	8	+ 1/8	+2.1
O	[illegible]	15- 25	20	+ 1/4	+1.2

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1985 RANGE (1)	CLOSE NOV 6 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 4	3 7/8	+ 1/8	+3.1
O	ADVANCED SYSTEMS INC	9- 20	14 1/8	+ 1/2	+3.6
N	AGS COMPUTERS INC	10- 17	16 3/8	+ 3/8	+0.7
O	AMERICAN SOFTWARE	7- 18	9 3/8	+ 1/8	+1.3
O	ANACOMP INC	1- 4	2 3/4	- 1/8	-4.3
O	ANALYSTS INTL CORP	9- 11	7 1/2	- 1/4	-3.2
O	APPLIED DATA RES	27- 40	38	+ 5/8	+2.3
O	ASHTON TATE	8- 13	13 1/8	+1 3/8	+11.7
O	ASK COMPUTER SYSTEMS	9- 20	11 1/8	+ 1/2	+4.7
O	[illegible] COMP IND	1- 7	1 3/4	0	0.0
N	AUTOMATIC DATA PROC	35- 50	50	+1 3/8	+2.8
N	COMPUTER ASSOC INT'L	40- 20	24 1/4	0	0.0
O	COMPUTER HORIZONS	9- 13	10 1/8	+ 3/4	+8.0
O	COMPUTER NETWORK	5- 10	7 1/8	+ 1/8	+1.7
N	COMPUTER SCIENCES	12- 28	28	+2	+7.4
O	COMPUTER TASK GROUP	10- 20	20	+ 3/4	+3.8
O	COMPUTER USAGE	1- 3	1 5/8	- 1/4	-13.3
O	COMPUTONE SYSTEMS	6- 11	7	+ 1/8	+2.0
O	COMSERV CORP	1- 8	2 1/2	- 1/8	-4.7
O	COMSHARE	8- 16	10 1/8	+ 3/8	+3.8
O	CULLINET SOFTWARE	14- 28	16 1/4	+ 3/8	+2.7
O	CYCARE SYSTEMS INC	16- 27	18	- 3/4	-3.7
O	[illegible] SYSTEMS INC	6- 13	8 5/8	- 1/8	-1.4
N	GENERAL ELECTRIC CO	53- 68	61 1/4	+2	+3.4
N	GEN'L MOTORS E (EDS)	17- 47	38 1/8	+ 1/8	+0.3
N	GTE CORP	30- 46	41 1/8	+1 1/8	+2.8
O	INFORMATION SCIENCE	1- 6	2 1/8	+ 5/8	[illegible]
O	INFORMATION SYSTEMS CP	15- 30	17 1/4	+1 1/2	+9.5
O	KEANE ASSOCIATES	5- 15	13 1/2	+ 1/2	+3.8
N	LOGICON	24- 38	35 1/2	- 1/8	-0.3
O	LOTUS DEVELOPMENT CP	18- 30	20 1/4	- 1/4	-1.2
O	MCI COMMUNICATIONS	7- 11	10	+ 1/2	+5.2
O	MGMT SCI AMER INC	6- 15	8 3/8	- 1/8	-1.3
O	MATHEMATICAL APP GRP	2- 5	2 3/8	+ 1/8	+5.5
O	MICOM SYSTEMS INC	14- 42	17 1/4	- 3/4	-4.1
O	MICROPRO INT'L CP	2- 6	2 1/4	+ 1/8	+5.8
N	NATIONAL DATA CORP	7- 16	19 3/8	+ 1/8	+0.6
O	ON-LINE SOFTWARE INT	6- 16	8 1/2	+ 1/2	+6.2
O	PANSOPHIC SYSTEMS	11- 23	22	+ 3/8	+1.7
O	PLANNING RESEARCH	9- 16	17 3/4	+ 3/4	+4.4
O	POLICY MGMT SYSTS CP	10- 20	20 1/4	+ 1/2	+2.5
O	PROGRAMMING & SYS	6- 8	5 7/8	+ 1/8	+2.1
N	REYNOLDS & REYNOLDS	30- 44	43 1/4	+3 3/4	[illegible]
O	SEI CORP	11- 20	18 1/2	- 1/4	-1.3
O	SHARED MEDICAL SYST	24- 38	30 7/8	0	0.0
O	SCIENTIFIC COMPUTERS	3- 12	5 3/4	0	0.0
O	SOFTWARE AG	11- 22	14 3/8	- 3/4	-4.9
O	[illegible] CORP	10- 14	11 1/8	- 1/8	-1.1
O	[illegible]	9- 17	14 3/4	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	3- 6	5 1/8	+ 5/8	+13.8
A	ANDERSON JACOBSON	2- 11	2 3/4	+ 1/2	+22.2
O	AST RESEARCH INC	7- 20	10 7/8	+ 7/8	+8.8
O	AUTO-TROL TECHNOLOGY	6- 15	6 1/4	- 1/2	[illegible]
O	[illegible] COMPUTER	4- 20	5 1/4	+ 5/8	+13.5
O	BANCTEC INC	5- 12	5 3/8	+ 3/8	+7.1
O	BEEHIVE INT'L	1- 2	1/8	- 1/8	-50.0
N	BOLT BERANEK & NEW	20- 38	31 3/4	+ 1/2	+1.5
O	[illegible] CORP	1- 3	3/4	0	0.0
N	CENTRONICS DATA COMP	3- 12	5	+ 3/8	+8.1
O	CETEC CORP	5- 10	7 1/8	- 1/8	-1.7
O	[illegible]	6- 7	6 1/8	- 3/8	-6.3

EXCH		1985 RANGE (1)	CLOSE NOV 6 1985	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUGRAPHIC CORP	20- 27	20 1/2	- 7/8	-2.9
O	COMPUTER TRANSCEIVER	1- 4	3/8	0	0.0
N	COMPUTERVISION CORP	10- 46	10 1/2	0	0.0
N	CONRAC CORP	13- 18	16 7/8	+1 1/8	+6.1
N	DATAPRODUCTS CORP	11- 24	16	+1 3/8	+10.0
A	DATARAM CORP	3- 7	6 1/8	+ 1/8	+2.4
O	DATA SWITCH CORP	4- 9	7 3/8	+ 1/8	+1.7
O	DATUM INC	3- 9	3 3/4	- 3/8	-9.0
O	DECISION DATA COMPUT	5- 10	11 3/4	- 1/8	-1.0
O	[illegible] INC	3- 20	2 3/4	- 1/8	-4.3
O	EVANS & SUTHERLAND	8- 18	15	+ 1/8	+0.8
O	[illegible] TECHNOLOGIES	3- 20	9 3/8	+ 1/8	+1.3
N	GEN'L DATA COMM IND	5- 26	10 1/2	+ 5/8	+6.3
N	HAZELTINE CORP	3- 28	21 1/4	+ 1/8	+1.1
O	ICOT CORP	5- 17	1 1/8	+ 3/8	[illegible]
O	INFORMATION INTL INC	4- 13	11 1/2	+1 1/4	[illegible]
O	INTECOM INC	4- 30	3 1/8	+ 3/8	+13.3
O	[illegible] CORP	7- 38	30	+ 1/4	+0.8
A	LUNDY ELECTRONICS	4- 14	12 7/8	0	0.0
O	[illegible] DATA CORP	3- 12	3 3/8	+ 1/8	+3.8
A	MSI DATA CORP	5- 20	6	0	0.0
O	[illegible] CORP	12- 27	24 5/8	- 1/8	-0.5
O	NETWORK SYSTEMS CORP	20- 40	20 3/4	0	0.0
N	NO AMERICAN PHILLIPS	30- 42	38	- 7/8	-2.3
N	NORTHERN TELECOM LTD	1- 38	32 3/8	+ 3/4	+2.3
O	[illegible]	1- 3	1/2	0	0.0
O	PARADYNE CORP	7- 14	6 3/4	0	0.0
A	PENRIL CORP	5- 10	7 5/8	- 1/8	-1.6
N	PLESSEY CO (ADR)	5- 22	20	+ 3/4	+3.8
O	PRINTRONIX INC	6- 17	12 1/4	0	0.0
O	QMS INC	3- 11	9	- 1/2	[illegible]
O	[illegible] CORP	3- 17	3 5/8	- 1/8	-3.3
N	RECOGNITION EQUIP	8- 14	11 3/8	+1 5/8	+16.6
N	SANDERS ASSOCIATES	11- 37	36 1/2	+ 1/2	+1.3
O	[illegible] CORP	5- 17	10	- 1/2	-3.4
N	SCIENTIFIC ATLANTA	6- 14	11	+ 7/8	+8.6
O	SEAGATE TECHNOLOGY	3- 12	7 3/8	- 1/4	-3.4
N	STORAGE TECHNOLOGY	1- 9	1 7/8	+ 1/8	+7.1
O	SYKES DATATRONICS	0- 16	1/8	0	0.0
A	T BAR INC	3- 20	5 3/8	- 1/2	-8.5
A	TAB PRODUCTS CO	4- 16	17	+1 3/8	+8.7
O	TANDON CORP	3- 13	3 3/8	- 1/4	-6.9
A	TEC INC	7- 10	8 7/8	- 1/8	-1.3
N	TEKTRONIX INC	30- 62	56 3/4	-1 1/4	-2.1
N	TELEX	1- 40	40 5/8	+3 7/8	+10.5
O	[illegible] SYSTEMS CP	1- 22	3/4	+ 1/8	+20.0
O	TIMEPLEX INC	9- 25	21 1/2	+ 3/4	+3.6
O	TITAN CORP	2- 9	6 3/8	- 3/8	-5.5
O	VISUAL TECHNOLOGY	1- 16	3/8	-	-14.3
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	21- 30	28 3/8	+2 5/8	+10.1
N	BARRY WRIGHT	17- 27	18 1/8	+1	+5.8
A	DUPLEX PRODUCTS INC	12- 20	18 3/8	+ 3/8	+2.1
N	ENNIS BUS. FORMS	16- 20	18 3/8	- 1/8	-0.6
N	3M COMPANY	70- 85	80 1/2	+3	+3.8
O	MOORE CORP LTD	17- 22	19 3/8	+ 1/2	+2.6
O	STANDARD REGISTER	19- 30	29	0	0.0
N	WALLACE COMP SERVICE	29- 40	38	+ 1/4	+0.6

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VOL 19
ISSUE 46
NO 18 1985
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Universal Information Services won't work/69

In Depth
Icon programming language/75

Software AG raises sights

Mainframe office system will challenge Disoss, Profs

By John Gallant

RESTON, Va. — Software AG last week waded into the deep end of the office automation software pool with the introduction of a mainframe office system that competes against such rivals as IBM's widely used Distributed Office Support System and Professional Office System.

Software AG's Con-Nect office system works in conjunction with the company's Natural fourth-generation language and Adabas data base management system. Con-Nect provides three core capabilities: document handling, electronic mail and schedule management. The system was released in production quantities last week after a two-year development effort, officials said.

Two early users of Con-Nect reported that the product was marginally superior

See SOFTWARE on page 8

Micro trends star in Vegas

By Eric Bender

LAS VEGAS — The world's biggest microcomputer carnival returns to the desert this week, with more than 1,200 exhibitors camping out in the Las Vegas Convention Center and four hotels.

Targeted at computer resellers, Comdex/Fall '85 will draw more than 80,000 attendees, according to predictions from The Interface Group, the show's organizer.

While many products introduced during recent months will be demonstrated publicly for the first time at Comdex/Fall, few major offerings will make their formal debut at the giant show. One prime exception is Ashton-Tate's Dbase III Plus package (see story page 6).

Comdex/Fall also is expected to feature significant announcements from Microsoft Corp., including disclosure of new corporate licensing procedures and shipment of the retail version of Microsoft's Windows operating environment.

Numerous application vendors will launch software tailored for personal com-

See MICRO on page 6

DP personnel new victims of corporate cuts

By Charles Babcock

NEW YORK — In an era when corporate staffing fashion has shifted suddenly to emphasize a slim look, many MIS departments are finding that the commitment to information systems as a strategic weapon no longer shelters them from personnel cutbacks.

In recent weeks, MIS departments at General Foods Corp., CBS, Union Carbide Corp., AT&T Information Systems and several banks have been caught in general staff reductions. Far from being limited to the lowest levels, the cuts "are across the board, including middle management up to the level of vice-president," according to David W. Phillippy, president of the Association for Systems Management, a metropolitan New York professional group.

In many cases, the cuts come to troubled organizations — companies under pressure from corporate raiders or companies attempting to compete in recently deregulated climates. But other cuts have occurred at highly profitable corporations intent on staying that way.

CBS in New York, which recently laid off 74 of its news staff as part of the price of successfully fighting off a corporate takeover attempt by Ted Turner, is known to be scaling down other areas of the company. MIS has so far received no edict to cut back personnel, but senior staff members said their budget is being reduced and that they expect to see a wave of resignations once the company, as expected, offers an early retirement plan.

AT&T Information Systems in Morristown, N.J., is cutting back 24,000 people by Jan. 1, including MIS staff and managers, officials said. "As each piece was put into Information Systems, we found there

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TOP OF THE NEWS

Hitachi, one of Japan's largest computer manufacturers, is set to announce the opening of a manufacturing plant in a suburb of Oklahoma City within the next two weeks. The plant will reportedly produce large-scale storage devices on the scale of IBM's 3380.

■

AT&T Information Systems will soon announce an OEM agreement with T-Bar, Inc. of Wilton, Conn., to market its matrix switch, industry sources report. It would be the second large OEM-matrix switch contract in recent months. Bytex Corp. of Framingham, Mass., is believed to be the supplier of IBM's recently announced 3728 Matrix Switch Communications Controller. AT&T will reportedly incorporate the T-Bar switch into its Dataphone II line of communications equipment. Software modification will provide an integrated control system across the Dataphone line, sources said.

■

Cullinet Software last week released its new Application Development System/Batch product to six beta site users for what is expected to be a three-month test period. Likely to be officially an-

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CW EXCLUSIVE

IBM abroad: Japanese insider on the NTT deal

In September, IBM announced a joint venture with Japan's Nippon Telegraph and Telephone Corp., the primary goal of which is compatibility between the two companies' networking protocols. The deal between two of the world's largest corporations, scheduled to be officially joined Dec. 18, is expected to have a far-reaching impact on global telecommunications and computer industries.

Kaoru Kubo, who served as NTT's chief negotiator in the complicated and sensitive dealings that led to the joint venture, is vice-president and general manager for advanced communications systems in NTT's newly established international division. Kubo provided personal insights into the venture when he was interviewed in Tokyo by *Computerworld* Update Editor Glenn Rifkin.

NTT's Kubo

What are the implications of the NTT-IBM venture for the U.S. market?

From the viewpoint of NTT, we have two things in mind. First, we were previously dealing mostly with only three of Japan's leading mainframe manufacturers, so IBM Japan's 28% of the market has been missing. So, we'd like to capture some of that market. And if you look worldwide, 70% of the market is filled by IBM products. NTT is basically not a manufacturer. We are a systems integrator; we integrate whole networks, information processing, hardware, software, terminals and local-area and value-added networks. Our position is basically independent from manufacturers. But to have effective systems and to satisfy customer demands appropriately, you have to establish a fairly good relationship with mainframe manufacturers.

But we aren't aiming for the U.S. market itself. Rather, we are looking for the Asian market, Chinese market and Latin America, because to sell integrated systems to the developed countries is very difficult. There are so many very power-

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NEWSPAPER

Tough export rules stemming tide of illicit computer sales

By Edward Warner
Computerworld News Service

The street value in the Soviet Union of a VAX-11 series minicomputer from Digital Equipment Corp. has risen dramatically during the past two years, according to U.S. Customs Service investigator Roger Urbanski. Soviet users now pay four to five times more for a VAX-11 than they would pay for the mini were it and other high-technology gear not banned from being sold to Eastern bloc nations.

The Soviets are paying more for such equipment because of more restrictive export rules and increased diligence of the U.S. Customs Service and U.S. computer manufacturers, according to Urbanski, who is director of the Customs Service's Strategic Investigations Division. The stepped-up effort to control the illicit export of computers and high-tech goods has come in large part as a direct result of the Soviets' attempt, exactly two years ago this month, to smuggle a VAX-11/780 into the Soviet Union via South Africa, a nation against which the U.S. then had no export restrictions.

The computer was eventually intercepted in Europe, just as it was about to cross into the Eastern bloc. The subsequent wide reportage of the affair, Urbanski said, "did as much for international cooperation [on technology transfer] as any case we've ever had."

New export rules

Since the VAX case, the U.S. Department of Commerce has established new export rules to prevent high-tech smuggling, including the requirement that U.S. computer manufacturers receive a special Commerce Department license in order to be able to sell personal computers, computer peripherals or software outside the U.S. The Commerce Department, which has always passed judgment on the export of each mainframe, requires those seeking the license to certify that they have an export control program in place.

More smugglers, Urbanski said, are also being caught. Last week, the president of a New York company pleaded guilty to attempting to export $9,000 worth of integrated circuits and semiconductor devices to North Korea, another nation on the Commerce Department's list of countries to which U.S. high-tech gear cannot be sold.

While newly strengthened laws and increased vigilance have made it more difficult — and therefore expensive — for the Soviets to acquire U.S.-made computers, the flow of technology out of the U.S. is continuing.

Citing a recent U.S. Department of Defense study, Urbanski said the value of equipment moving out of the country illegally is "on a similar scale to [the sums involved in] drug importation."

Unlike drug smugglers, though, those who acquire high-tech goods for Soviet bloc nations need not worry that possession of a U.S.-made computer will result in their arrest. In fact, Urbanski said, "Many of the [high-tech] products to reach the Soviet Union leave the U.S. legally" and are then diverted, usually first to a neutral nation and then to the Eastern bloc.

Another difference between high-tech smuggling and the drug trade is that computers hidden in mismarked crates have no odors or other characteristics by which Customs Service inspectors may detect them. As recently as last year, the Customs Service had hoped to install small transmitters in computers before the machines left the factory. The transmitters would alert customs inspectors at international shipment points, but the plan was scrapped in the face of objections from computer manufacturers who worried that the transmitter might affect a user's data.

Ultimately, most of the responsibility to prevent high-tech smuggling rests with the computer vendors themselves. "We take it pretty seriously in terms of our equipment being desired" by smugglers, reported DEC spokesman Jeff Gibson, who said more stringent screening procedures are under development at DEC to help the company determine where a foreign sale may eventually be headed.

Control Data Corp., which markets in 33 nations, conducts a Dun & Bradstreet Corp. type of exam on each of its foreign distributors to determine if they are legitimate, according to Hugh Donahue, CDC vice-president for international trade relations. As for CDC mainframes and supercomputers, Donahue maintained that "we know every customer we ship them to."

DEC's Gibson, however, emphasized that industry-standard precautions were already in place at DEC in November 1983 when the attempted smuggling of the VAX-11/780 occurred, and that leads some to wonder how much vendors can do to prevent smuggling.

Reader views make news

[illegible]

any hot news about vendors?

If so, we'd like to hear from you. Computerworld has established a [illegible]

Zilog Unix-based system bows

Supermicro uses AT&T 32-bit microprocessor

By Maura McEnaney

CAMPBELL, Calif. — In a partial departure from its practice of using only proprietary chips in its computers, Zilog, Inc.'s Systems Division subsidiary last week introduced an AT&T Unix-based 32-bit supermicrocomputer driven by AT&T's WE32100 32-bit microprocessor.

The introduction of Zilog's System 8000/32, which can support up to 58 users, marks the first time the company veered from the tradition of implementing proprietary CPU chips in its systems. It is also the first time AT&T's 32-bit chip has been used in non-AT&T products.

In addition to the product rollout, Zilog announced price reductions and 32-bit upgrade capabilities for its 16-bit System 8000 Series 2 supermicro line.

Senior Vice-President Jerald Higgins told reporters last week Zilog opted not to use its forthcoming 32-bit chip in the System 8000/32. The company instead selected the AT&T chip over the few existing 32-bit chips now on the market because of the AT&T processor's optimal performance in the Unix operating system. Scheduled to begin shipping in March, the System 8000/32 will be aimed at government and general business applications, Higgins said.

"We are definitely going to focus in on areas where we have been successful before," he said. According to Higgins, the System 8000/32 is designed to have high-level supermini performance at less than 20% the cost.

The introduction puts Zilog in a ring with some well-established competitors, including vendors such as Altos Computer Systems, Inc., which now markets a Unix workstation. The announcement also puts Zilog somewhat at odds with Digital Equipment Corp.'s Unix version of the Microvax II. But, according to analyst Michael Gross of Framingham, Mass.-based International Data Corp., "They are really going after the minicomputer market.

"They have to deliver support at the end-user level," Gross added. "Anybody can put together hot hardware."

The Zilog supermicro will be available in two versions. The Model 110, which can support up to 26 users, comes with 8M bytes of main memory and up to two 85M-byte, 5¼-in. disk drives. It costs $24,950. The Model 130, priced at $39,950, can support up to 58 users. It has up to 16M bytes of main memory capacity and supports up to four 337M-byte disk drives.

Both supermicro versions support AT&T's Unix System V Release 2.1 Version 1.

The 32-bit upgrade for users of Zilog's 16-bit System 8000 Series 2 systems consists of a CPU board containing the WE321000 microprocessor and the AT&T Unix System V operating system with virtual memory. It is priced at $8,000 and will be available in the second quarter of next year. Between now and June 30, the upgrade will be priced at $4,950.

Also announced by Zilog were the following:

- Expanded memory on the System 8000 Model 12 from 0.5M to 1M byte. Price on the 52M-byte version for 10 users was reduced from $19,950 to $14,950. The same version now is available with an 85M-byte disk for $16,950.
- Expanded memory for the System 8000 Model 22. The 1M-byte Model 22 now comes standard with an 85M-byte disk. Price for the 10-user version was reduced from $26,950 to $24,950.
- Expanded memory and price reductions on the System 8000 Model 32. A 10-user configuration with 1M byte of memory and a 168M-byte disk is now priced at $27,950.

NEWS SUMMARY

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STC shaves high-end disk price by 10%

Reduces cost of disk controller, upgrade

By James Connolly

LOUISVILLE, Colo. — Answering IBM's recent price cuts with its own reductions, Storage Technology Corp. (STC) last week slashed the list price of its undelivered, high-end, dual-capacity disk drive by 10%.

In addition to the 10% price cut for its IBM-compatible 8380 Model E disk drive, the mainframe peripheral manufacturer also announced a 5% reduction in the cost of upgrading single-capacity 8380s to the dual-capacity drive and revealed cuts ranging from 10% to 18% in the cost of its 8890 Sybercache intelligent disk controller.

Fred Moore, STC's manager of worldwide marketing, acknowledged that the STC announcement was a response to IBM's 10% cut in the price of its 3380 Model E disk drive and 5% cut in the single-to-dual-capacity upgrade price [CW, Oct. 28].

"We compete generally at a price somewhat lower than IBM, and we are continuing to do that," Moore said.

According to Moore, STC seeks to price its products at least 10% to 15% below IBM's volume price agreement price.

Revised costs

The price of the dual-capacity STC 8380 Model BE4 version was lowered from $106,200 to $96,200. The cost of upgrading an 8380 single-density model to a dual-density model was cut from $45,050 to $42,800.

In October, STC announced that deliveries of the dual-density 8380 would begin at the end of the second quarter of 1986, six months ahead of schedule.

The price of the 8890 Sybercache controller was reduced from $153,300 to $135,350 for a typical configuration consisting of two directors, a four-channel switch and a 6M-byte cache.

Control Data to sell division; refocuses on core businesses

By Clinton Wilder

MINNEAPOLIS — In its ongoing effort to refocus on its core businesses and pay off its bank debt, Control Data Corp. last week announced the sale of its low-end peripherals business to Xidex Corp. of Mountain View, Calif.

Xidex, a microfilm vendor expanding into data storage, will purchase most of CDC's Business Products Group for a price in the $55 million to $75 million range, according to a CDC spokeswoman. The divested business includes CDC's tape and disk-pack storage products for mainframes and floppy diskettes for micros. The deal is expected to be finalized by Dec. 15.

Scott Whittenburg, a CDC vice-president who heads the group to be divested, said changing storage technologies and market conditions have removed the strategic value of low-end peripherals from CDC's business.

"There is no longer the synergism of our Business Products Group with our peripherals because the storage media is now part of the drives that are sold," he said. "There is still a market for disk packs and ½-in. tape as commodity products for a company like Xidex selling to distributors and end users, but not to our OEM market. Now we can focus on adding value to our OEM base, rather than trying to be all things to all people through all channels."

For Xidex, the acquisition adds computer tape to Xidex's product line, which currently includes flexible and rigid disks.

"This certainly adds to our market presence and gives us more volume through which we can lower our costs," according to Gary Filler, Xidex executive vice-president and chief financial officer.

The sale represents the most significant sign to date that CDC is reversing years of diversification to concentrate on its core businesses — mainframe-related products and services. Facing a fiscal crisis exemplified by its $255.6 million third-quarter loss, CDC has recently announced its intention to divest its ventures in financial services, computerized ticketing and other wide-ranging fields.

The Business Products Group constitutes a major portion of CDC's Peripheral Products Co., which is expected to lose $150 million this year, according to Jonathan Fram of Paine Webber, Inc. CDC will retain its mainframe disk and tape drive businesses and concentrate on sales to OEMs in that marketplace, a spokeswoman said.

"This is the first major step in a very long road of consolidation; they have no other options," according to analyst Michael Geran of E. F. Hutton & Co. "They will concentrate in the high-end and intermediate storage areas where they think they have a shot at economies of scale."

CDC is currently negotiating loan extensions involving an estimated $215 million in short-term debts with its creditor banks. Although company officials say those discussions are proceeding satisfactorily, Geran and other analysts believe CDC's recent divestitures are in direct response to pressures from its lenders.

"Obviously the banks are being very contentious," Geran said. "Control Data still has a lot of work to do. When it is done [selling pieces of its business], the shrunk, slimmed-down company will have retained its mainframe and military computer business, some specialized information services and a limited disk drive business. We're looking at reversing a 10-year pattern of [CDC's intention to sell] computers for education."

Selling Ticketron

CDC had previously announced its intention to sell its profitable Ticketron ticket services business and some segments of Commercial Credit Co., its successful financial services unit. The businesses sold to Xidex were also slightly profitable, earning about $5 million in the last year, according to Geran.

"When you sell assets, you have to sell what is doing well," Geran said.

The sale to Xidex involves 2,000 CDC employees, including 1,000 in Brynmawr, Wales; 300 in Omaha; and 175 in Lincoln, Neb. A spokeswoman said Xidex is expected to make job offers to "the vast majority" of affected workers, but overlaps with products Xidex already makes may result in some layoffs.

In a related development, Systime, Inc., CDC's UK subsidiary, announced it will sell its Leeds, England, manufacturing facility and slash inventories in an attempt to generate cash. A group of major banks are scheduled to meet to discuss the financial future of the subsidiary. Analysts predict CDC will post losses of more than $15.4 million in the UK for the current financial year, with Systime expected to account for some $14 million of that loss.

The CDC purchase marks the third acquisition for Xidex this year. In February, Xidex acquired Dysan Corp. of Santa Clara, Calif., which manufactures a variety of storage media, including rigid disks, disk packs, cartridges and flexible disks. Several weeks ago, the company announced plans to acquire 5¼-in. rigid disk manufacturer Charleston Associates of Irvine, Calif.

CW staff member Maura McEnaney contributed to this story.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August [illegible] issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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POSTMASTER: Send Change of Address to Computerworld, Circulation Department, P.O. Box 1016, Southeastern, PA 19398-9984.

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Ashton-Tate Dbase III Plus scheduled for Comdex rollout

Enhancements include menu-driven front end, networking support

By Eric Bender

CULVER CITY, Calif. — Ashton-Tate's Dbase III Plus, an upgrade to its flagship product and scheduled for official rollout this week at Comdex/Fall '85, features a menu-driven front end and support for local-area networks, according to industry analysts who have viewed the software.

Scheduled to ship by February, the $695 package from the leading supplier of microcomputer data base management software adds relational capabilities to its Assistant mode, which aids new users. Additionally, Dbase III Plus bundles in the tools previously offered in the Dbase III Developer's Release, providing more than 50 enhancements to Dbase III's programming language, analysts said.

The new package also boosts performance, sorting up to twice as fast and indexing up to 10 times as quickly as its predecessor.

Ashton-Tate officials declined to discuss the product.

Good reviews

The analysts, who saw the software demonstrated but did not get hands-on experience, generally gave good reviews to the enhancements but questioned Ashton-Tate's pricing strategy.

"The front end is very slick," according to George Colony of Forrester Research, Inc. in Cambridge, Mass. "Dbase was too difficult to use for most casual users."

"Their menu approach is very easy to use," said Jan Lewis of the Palo Alto Research Group in Palo Alto, Calif. She downplayed the usefulness of alternative approaches based on natural language technology, remarking that "a natural language that understands 90% of what you say and doesn't understand the other 10% is useless for a naive user."

Lewis applauded the network's ability to offer an upgrade path. "You can buy a single-user product today and upgrade to a multiuser network as you expand; that's a nice feature." This scenario permits "growth without planning," she added.

Dbase III Plus includes three main modules: a single-user portion; a data base administrator, which can manage operations on a network; and an access facility, which gives access to the network. Stand-alone Dbase III Plus users wishing to move to a network will begin with the standard package and add three users at a time by purchasing LAN Packs, which cost $995 and include three diskettes with access-facility software.

Users get full Dbase III Plus capabilities as long as the standard package has been installed on a network server. Single-user Dbase III applications can be ported over to the net by rewriting a single line of code, according to one source familiar with the software. Full implementation of security and access measures for multiple users requires additional modifications.

"The network capabilities seem to be appropriate, in terms of record locking, file locking and user access," according to Michael Goulde, market analyst at the Yankee Group in Boston. "My greatest concern is in pricing, which is steep for anything but the smallest network. I'm skeptical whether the loyalty Ashton-Tate's products have developed will carry them at the network level — it's a toss-up."

The Vegas strip: host to Comdex/Fall

Others expressed concern about network pricing and noted that the $695 single-user cost is likely to handicap Dbase III Plus in the low-end data base management market, where Software Publishing Corp.'s PFS:File and IBM's equivalent Filing Assistant dominate.

Although Ashton-Tate can make a case that corporations should standardize on a single data base manager, "the price point is still up there," said Scott Smith of the Gartner Group, Inc. in Stamford, Conn.

Smith also suggested that it may be tough for Ashton-Tate to position the Dbase family away from its power-user beginnings. "The key will be to sell it as easy to use, when it has a reputation for being very difficult to use."

An upgrade from Dbase III will cost $100. No direct upgrade will be offered for the original Dbase II package. By various estimates, the installed base for the Dbase line ranges between 500,000 and one million.

No site licensing arrangements are available, but several analysts suggested that it is only a question of time. "Site licensing is inevitable," Lewis maintained.

"Ashton-Tate is really staying with a single-user orientation," said Judy Davis, an editor with the Boston-based "Seybold Report on Office Systems." "But they have to consider those kinds of things if they want to run in a big office environment."

Dbase III Plus is copy protected and runs on an IBM Personal Computer, Personal Computer XT or AT with 256K bytes of internal memory. The package has import and export capabilities for Lotus Development Corp.'s 1-2-3, DIF, Microsoft Corp. Sylk, ASCII text and Software Publishing's PFS:File and can import Dbase II files. It is compatible with the existing Dbrun runtime version, which costs $50.

The new software will run on IBM PC-DOS 3.1 networks including the IBM PC Network, 3Com Corp. networks and networks running under Novell, Inc.'s Netware operating software.

Dbase III Plus will work on the IBM Token-Ring network as well, when that net becomes available.

Micro trends star in Vegas

From page 1

puter local-area nets, including Innovative Software, Inc., which will demonstrate a network version of its modular Smart Software System.

Comdex/Fall will highlight other moves toward improved communications as well, with a flood of other local net, micro-to-mainframe and micro-to-mini products scheduled to appear.

The show also will spotlight various other industry trends, including vertical-market software, desktop publishing and computer-aided design and manufacturing on micros. And it will host a rapidly growing crop of "artificial-intelligence-based" programs, although most of these offerings provide only a thin veneer of AI technology.

Among software upgrades, Lifetree Software, Inc. will show its Volkswriter 3 word processing package, which features an on-line 170,000-word dictionary and four-function math capability. Office Solutions, Inc. will display Release 4 of its Officewriter word processing program, which also offers math capability, along with expanded network support and keyboard macros. Software Solutions, Inc. will unveil its Datacase 2.5 data base management software, which includes a new procedural language.

On the hardware side, no showstoppers are predicted. Several IBM Personal Computer AT-compatible systems will appear, including models from Tandy Corp., along with the usual handful of portable computers.

Manufacturers of add-on products will display a wide range of offerings for the IBM Personal Computer, including boards compatible with two emerging standards — the Lotus/Intel/Microsoft Expanded Memory Specification and the IBM Enhanced Graphics Adapter.

A host of output devices will debut, with considerable interest focusing on a printer based on proprietary ion deposition technology. Jointly introduced by C. Itoh Electronics, Inc. and Delphax Systems, Inc., the printer will be offered in 30 and 45 page/min versions.

Comdex/Fall kicks off with a keynote speech on Wednesday at 9:30 a.m. by Hewlett-Packard Co. President John Young on "Surviving the Industry Downturn." Exhibitors will staff their booths through Sunday.

While conference sessions are not the show's prime attraction, several may spark considerable interest. The annual "Software Summit," which starts at 12:30 p.m. Thursday, features top industry executives including Microsoft Chairman William Gates and Software Publishing Corp. President Fred Gibbons.

Full conference registration, including exhibits, costs $195, and an exhibits-only admission costs $25.

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AT&T trims 184 production workers

NORCROSS, Ga. — AT&T has laid off 184 production employees at its fiber-optic cable manufacturing plant due to a "sharp drop in equipment orders," a spokesman said.

The layoffs represented 7% of 2,600 hourly production workers at the plant, said John Clemons, public relations specialist for AT&T's Atlanta operations. The plant employs a total of 4,100 workers.

No further layoffs are anticipated but were not ruled out. Clemons said that AT&T is "looking at the possibility of rehiring the employees" when and if market conditions improve.

The layoffs, which were effective Nov. 8, were said to be the first this year at the plant and are not connected with recent staff reductions at AT&T Information Systems division.

— James A. Martin

Arete to announce supermini-based optical disk at Comdex

Firm plans doubling of processor power, hard-disk upgrades

By James Connolly

SAN JOSE, Calif. — Arete Systems Corp. will announce this week that it is doubling the processing power of its superminicomputer line, expanding disk capacity and introducing one of the first supermini implementations of optical disk storage technology.

In announcements scheduled for Wednesday at the Comdex/Fall '85 show in Las Vegas, the San Jose-based multiprocessor manufacturer will announce a 1G-byte optical disk drive for its Series 1000 systems.

The write-once drive, to be supplied to Arete by one of two manufacturers to be named later, will be available to Arete's OEM customers, such as Sperry Corp., and to end users of the Series 1000. The Series 1000 is a multiprocessor designed for distributed and departmental processing.

The drive is intended for use in applications such as record keeping in hospitals, libraries and government agencies. An Arete spokesman said it is suited for static data bases, such as medical records that are called up infrequently. He said additions to records on day-to-day transactions can be stored separately until the data base is updated at a later time.

The 12-in. disk drive was designed for compatibility with AT&T Unix System V and to replace tape drive systems. It is scheduled for mid-1986 delivery at an end-user price of $30,000.

Arete will announce that Series 1000 users can double their system performance by swapping their current Motorola, Inc. 68000-based processor boards for Motorola 68020-based boards and upgrading software.

Maximum performance of 2.5 MIPS

Arete's vice-president for marketing, Dave Mackie, said that the Series 1000 now features a maximum performance of 2.5 million instructions per second (MIPS) and that the combination of the 68020 and optimizing code can produce performance of 5 MIPS. The Unix-based processors support up to 88 users in a four-processor configuration.

A 68020 board costs $5,800 with a 68000 board trade-in and $10,400 without a trade-in. The 68020 boards will be available in the first quarter of 1986.

The company also will announce a mass storage expansion cabinet to supplement existing hard-disk storage, which Mackie said has been limited to 600M bytes by the size of the Series 1000 processor cabinet.

Mackie said the new cabinet will support 12 10½-in. disks and four 9-in. tape drives. The disks will provide up to 8G bytes of on-line disk capacity, according to Arete.

Mackie said users can configure mass storage systems as needed using combinations of 168M-byte or 337M-byte 8-in. drives and 474M-byte or 689M-byte 10½-in drives, with prices depending upon the configuration.

CW publisher to issue on-line daily news outlet

LAS VEGAS — CW Communications, Inc., publisher of *Computerworld* newspaper and more than 55 computer-related publications, will unveil at Comdex/Fall '85 this week a new concept in computer industry news delivery. The on-line Computerworld News Service will deliver up-to-date news from around the world on a daily basis.

Designed to aid professionals in computer-related fields with information needed for day-to-day decision making, the news service will draw upon the company's network of newspapers and magazines whose headquarters are located in more than 25 countries.

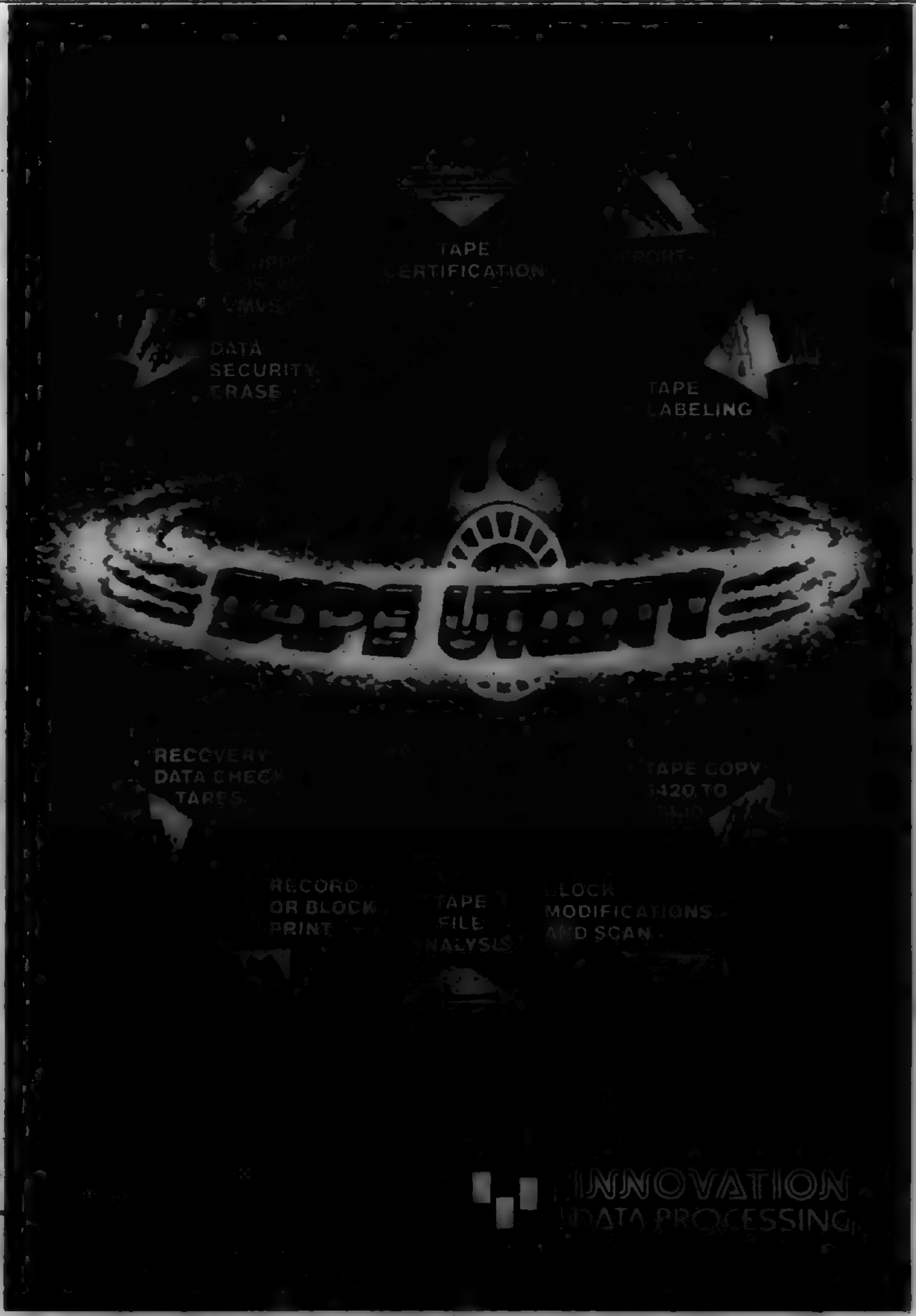
A staff of nearly 400 editors and reporters, along with news bureaus in Boston, Paris and Tokyo, will provide daily worldwide coverage of the computer industry.

Accessed with micro, modem

Based out of the CW Communications corporate headquarters in Framingham, Mass., the service will be available to subscribers on a selective basis in January and can be accessed with a personal computer and modem.

The communications software required to access the service, included as part of the subscription fee, will be custom-designed for individual systems to assure simplified access and automatic logon.

The CW Communications international editorial department said individuals may sign up immediately and that additional details on charter memberships and trial offers can be obtained by calling, toll-free, (800) 343-6474 or (617) 879-0700 in Massachusetts.



AT&T launches IBM 3274-type controller, peripherals

Multihost access, micro support emphasized

By James Connolly

NEW YORK — AT&T last week launched a new drive into the IBM 3270 market, emphasizing multihost access and personal computer support with the release of an IBM 3274-type controller and related peripherals.

AT&T Information Systems said its 6500 Multifunction Communication System, based on the 6544 Multifunction Communication Controller, will allow a single 3270-compatible terminal to access information stored in up to three 3270-compatible host computers or 16 asynchronous hosts and to display the information in four windows. The 6544 is said to support up to 32 terminals using unshielded twisted-pair wiring and coaxial cable.

Also announced were five 6500 series terminals, a color dot matrix printer and microcomputer adapters.

The 6500 product line replaces AT&T's existing 4540 and E4540 line of IBM-compatible terminals and controllers, which had been manufactured by AT&T's Teletype Division until that division was absorbed by AT&T's Computer Systems Division. An AT&T spokesman said 4540 terminals can be used with the new controller but that new terminals cannot be used with the earlier controllers.

Products competing with IBM

John King, a consultant with the James Martin Group, said the AT&T announcement is another step in its effort to provide a broad range of products, particularly products that compete with IBM's line. But he added that it will have more of an impact on the likes of Telex Corp., Memorex Corp. and ITT than IBM. "AT&T is just another alternative to IBM, and AT&T has a very large sales force out there," he added.

Voicing disappointment at the announcement, analyst Ilene Goldman of Framingham, Mass.-based International Data Corp. said the AT&T products appear to mimic those of other plug-compatible peripheral vendors like Lee Data Corp. She cited delays in AT&T's scheduled deliveries for some capabilities, such as support for IBM's Systems Network Architecture, which AT&T plans to deliver in February. Also planned are a protocol conversion module and an X.25 interface module scheduled for June delivery and the Single Session PC Adapter set for third-quarter 1986 delivery.

Among the terminals introduced is the 6539 Multitasking Display, a 14-in. color display with multitasking window management supported by AT&T's Video Co-Processor microchip. It emulates the IBM 3270 Models 2, 3, 4 and 5 and the Digital Equipment Corp. VT220. Other terminal introductions include the 6538 Multitasking Display, a 15-in. monochrome display with the equivalent features of the 6539; the 6529 Standard Display, a 14-in. color display with single-session emulation of the 3270 Models 2, 3, 4 and 5 and of DEC's VT220; the 6528 Standard Display, a 15-in. monochrome version of the 6529; and the 6518 Basic Display, a 12-in. monochrome display for IBM 3178 emulation.

AT&T also announced its Single Session PC Adapter and supporting software, designed to let the AT&T 6300 and 6300 Plus and other personal computers running Microsoft Corp. MS-DOS work as PC 6500s or IBM 3270 Personal Computers with 3270 emulation and single-host synchronous access. The adapter card is an Irma card licensed to AT&T by Digital Communications Associates, Inc.

The company also introduced the AT&T 6571 Color Graphics Printer and 6561 Printer Controller. The printer is a 400 char./sec. dot matrix color printer.

AT&T said a typical cluster of eight basic displays, six standard monochrome displays and two printers connected to one synchronous host costs $41,020. A multitasking, multihost configuration consisting of eight monochrome multitasking displays, six color multitasking displays and two color printers costs $58,620.

The basic 16-port, bisynchronous 6544 controller, priced at $7,880, will be available in December. Additional functions can be added by installing add-on modules such as the Synchronous Host Module for $2,400 and the Synchronous Device Interface Module for $3,920.

Software AG raises sights

From page 1

to IBM's Profs, based on their concurrent pilot tests of the two office systems. They said Con-Nect's document handling and data access facilities were difficult to use, but lauded Software AG's intentions to enhance the product with support for IBM communications standards and to make Con-Nect available on non-IBM machines.

With the unveiling of Con-Nect, Software AG becomes the first major independent software vendor to offer a mainframe office system on the scale of Disoss or Profs. Con-Nect runs under IBM's major operating systems on mainframes, a territory that has long been staked out by Profs and Disoss.

Product manager David Miller told *Computerworld* that Con-Nect will coexist with rather than compete against IBM's offerings in the office software mart. "We also have no intention of replacing" Personal Computer-based office products, he said. "We are striving to give MIS managers a way to provide these capabilities within the control of the MIS department."

Con-Nect allows users to merge data stored in Adabas into documents through Natural procedures — a facility the two beta users said was difficult for inexperienced users to handle. The system can also be accessed from a microcomputer through Software AG's Natural/Connection link. That capability allows micro users to participate in the host-based electronic mail network and to store and access documents in Con-Nect.

The document handling facilities, which users said required at least rudimentary knowledge of Natural, support editing, retrieval and storage of large documents. Documents can be stored by key words to allow for logical searches of the document archive. Schedule management acts as an electronic calendar for individuals and groups, and the electronic mail facility supports the creation, viewing, tracking and transmission of mail and messages.

Con-Nect costs between $30,000 and $40,000, depending on operating system. In addition, a user without Natural and Adabas would have to lay out $30,000 to $60,000 for the fourth-generation language and a minimum of $106,000 for the DBMS to implement Software AG's office solution. To tie micros into the Con-Nect network, a user will have to pay between $20,000 and $30,000 for the mainframe portion of Natural/Connection and between $200 and $1,000, depending on quantity discounts, for each micro portion purchased. In comparison, Version 2 of Disoss/370 has a monthly charge of roughly $1,335.

Miller said Software AG intends in mid-1986 to release a version of Con-Nect that supports IBM's Document Interchange Architecture (DIA) and Document Content Architecture (DCA). That support will allow for document transfer between Con-Nect and other office systems supporting DIA and DCA, including Profs, Disoss and the increasingly Disoss-compatible offerings from mini manufacturers like Data General Corp. and Digital Equipment Corp. He said the firm will also likely supply a DEC-compatible version of Con-Nect that will work with the currently available DEC VAX-based Adabas.

Two beta sites, Central Hudson Gas and Electric Co. in Poughkeepsie, N.Y., and Commercial Union Insurance Co. in Boston, are currently testing Con-Nect against Profs.

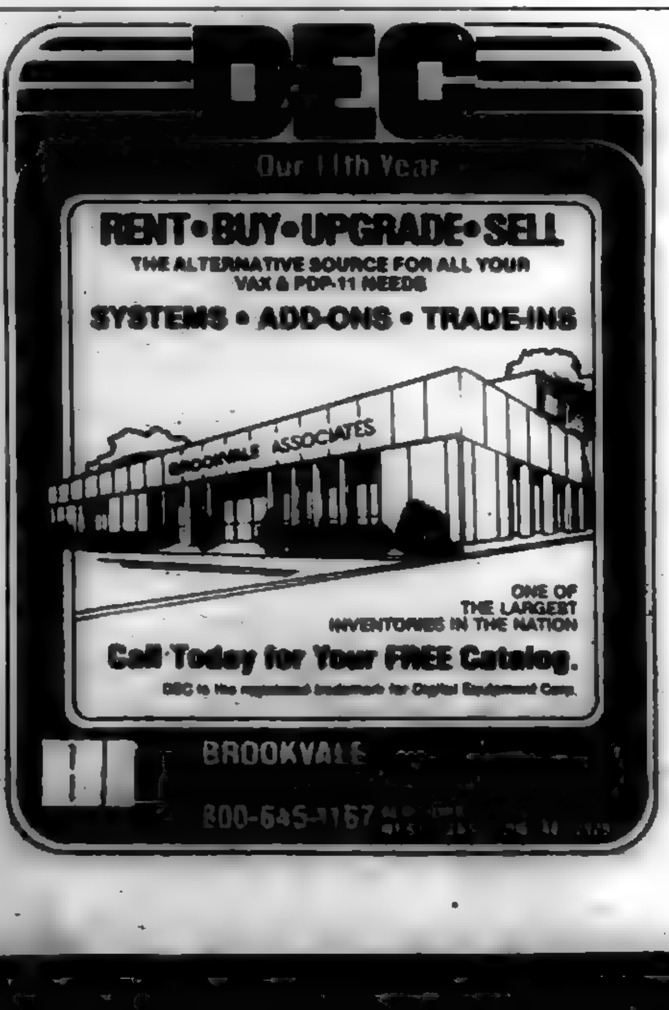
"Neither product has an outstanding group of features that the other doesn't offer," said Carlo Scagnelli, data base administrator with Central Hudson Gas and Electric. The company has used Con-Nect since August on an IBM 4341 processor under MVS. "We have found that Con-Nect is somewhat easier to learn and some of the facilities are easier to understand and handle. But when you add everything up, it's pretty much a wash, with the ease-of-use edge going to Con-Nect.

"The most important difference between Profs and Con-Nect," Scagnelli continued, "is that Profs already has some document interchange capabilities with other systems. But Con-Nect has a direct link into a DBMS, which Profs does not."

According to Richard Wolverton, director of data base services at Commercial Union, which has used the product since August on an IBM 3083 under MVS/XA, the availability of Con-Nect in a variety of environments is a plus.

"One of the things that has intrigued us," he said, "is the potential of running Con-Nect in a number of environments and communicating among them. We may run it under VM and MVS/XA and have people sending documents between those environments without having to log on and off. We are already running Adabas under [DEC's] VMS, and a VAX version of Con-Nect would tie everything together and give us one standard interface."

Neither company has decided whether to bring Con-Nect into its production environment.



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WORLD DIGEST
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MUNICH, West Germany — The West German information technology industry continues to register strong growth. According to a recent trade report, the industry's total production rose to $3.1 billion during the first six months of 1985 — an increase of 20.4%.

The report revealed that the production of DP equipment rose by 20% during the first half of 1985, compared with the same period a year earlier.

HONG KONG — The trial run of Easypay, an electronic funds transfer at the point-of-sale project involving 29 major banks and 117 retail outlets here, has successfully managed more than 250,000 transactions since June, and plans are in the works to expand it, supporters said. According to Electronic Payment Services Co., the company commissioned to run the service, the 278 terminals on the Easypay network spent a total of 16,920 minutes — 282 hours — connected to the host in August alone.

Shoppers who use the system can pay using either credit or debit cards, the latter identical to cards used for transactions on automated teller machines. The shopper validates the transaction by entering his personal identification code on a small keypad linked to the terminal. Data from the card's magnetic strip is encrypted and routed from the terminal to the shopper's bank through a Tandem Computers, Inc. system acting as the switch. There, the customer's charge account is debited, and a credit is issued to the store's account.

LONDON — British Telecom International has been ranked No. 2 among the top 500 European corporations most desirable to invest in, according to a list published recently in the *Financial Times*, a British business newspaper. The ranking places the firm above third-place British Petroleum and comes as something of a surprise since British Telecom was only privatized by the UK government last year.

IVREA, Italy — Ing. C. Olivetti & Co.'s M 24 personal computer has won the 1985 Best Business Micro Award from the United Dutch Publishers. The award, given annually, cited the machine for its ergonomic design, processing speed and price/performance.

CANBERRA, Australia — Australian vendors involved in a soon-to-be-announced federal government contract for the Department of Aviation are complaining that the bulk of the $15 million order is going to Digital Equipment Corp. and only very small portions — worth about $500,000 — have been awarded to two Australian companies. Sources reported that the Australian computer industry claimed the contract will demonstrate that the government's preference policy, which was intended to promote Australian products, has not worked.

Justice Department takes issue with privacy bill

By Mitch Betts

WASHINGTON, D.C. — The U.S. Department of Justice last week objected to portions of a computer privacy bill on grounds that it would make it too burdensome for law enforcement authorities to intercept or obtain electronic mail and data communications messages during criminal investigations.

At a U.S. Senate subcommittee hearing, a department spokesman commented for the first time on the Electronic Communications Privacy Act of 1985 (S. 1667). It would outlaw the interception of electronic mail and other digital messages and provide rigorous procedural hurdles before law enforcement authorities could obtain the messages.

James Knapp, a deputy assistant attorney general, said the extra procedures — the same ones required now for police wiretaps of telephone conversations — are too burdensome to be applied to computer transmissions. Under questioning by Sen. Charles McC. Mathias Jr. (R-Md.) and Sen. Patrick J. Leahy (D-Vt.), Knapp said the procedural steps "would seriously impede law enforcement."

Knapp said that the computer privacy bill, sponsored by Leahy and Mathias, would require law enforcement agents to use a complex process to get approval from high-level Justice Department officials before obtaining a court order.

Knapp repeatedly argued that government agents already must obtain a court order to search electronic mail systems and that this less rigorous procedure is sufficient. He said that it is the same procedure used for regular mail and that electronic mail deserves no greater protection than regular mail — and perhaps less.

"The search warrant is more than adequate protection for your privacy," Knapp said, referring to electronic mail messages.

The general outlines of the bill were supported by the Electronic Mail Association, the American Civil Liberties Union and the Association of Data Processing Service Organizations, Inc.

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DP staff victim of corporate cuts

From page 1

was more and more duplication," said Michael N. Granieri, AT&T Information Systems spokesman.

'We're going through a bloodbath'

At General Foods, recently acquired by Philip Morris, Inc., staff cuts have reached deep into the MIS ranks. A staff of 700 in White Plains, N.Y., will be reduced 20% to 560, according to one top-level MIS insider. "We're going through a bloodbath. MIS is the first, and I think it's getting the hardest hit," he said.

Robert McKinney, director of information systems at Union Carbide in Danbury, Conn., said a staff of 140 will be pared to 100 at headquarters, with development taking a harder hit than operations. He declined to comment on cuts throughout the company, but a nearby placement director said Union Carbide's MIS staff of 500 will be reduced by 28% to 360.

Among those most affected, experts said, are managers who themselves have tolerated a high turnover rate.

Robert E. Lindsey, a placement specialist in Colorado Springs, tells of an upper level MIS manager in the Midwest who said several months ago that he felt comfortable in his job because his staff exhibited a normal 10% to 15% annual departure rate. "Three weeks ago, he called me to say he had been terminated," Lindsey said.

Thus, for some MIS people, a new and less secure outlook is taking hold. Particularly sensitive are those in such troubled industries as heavy machinery, farming, energy, computer memory chips and, in some instances, pharmaceuticals and chemicals.

"In Colorado, the economy is made up of agriculture, energy, high tech and services, and the first three are not doing well," said Marv DeSelm, manager of the United Bank of Denver's business services group. The Denver institution has cut back employees 6% to 7%, including MIS, he said.

> ”
>
> *'MIS has been more or less spared in the past. It's not being spared any more.'*
>
> — **Herbert Z. Halbrecht**
> **Halbrecht Associates**

Cutbacks are taking place in old manufacturing companies in cities such as Cleveland and Detroit and in the former oil boomtown, Houston, placement directors said. James Fleming, a placement manager at Robert Half of Houston, Inc., said he has only 25 jobs waiting to be filled, compared with the typical 300 positions in 1982.

"Openings are very specific, and companies are hard to deal with. They want exactly the right qualifications," Fleming said.

Reports from other Robert Half offices indicate each region is experiencing the cutbacks in its own way. In New York, the reductions have occurred on a spot basis in the pharmaceutical, broadcasting, chemical and, in some cases, manufacturing industries.

"We had a tremendous influx of people over the summer. Since September, however, the number of job openings has been as high as ever," said Joan R. Bernstein, manager of data processing placement for Robert Half of New York, Inc.

With their more varied economies, New York and Boston appear better able to reabsorb terminated MIS professionals than oil- and agriculture-based communities.

"Most of our banking, insurance and financial services industries are adding to their staffs as we approach the holidays. Normally, you don't see that," said Frank R. Goldschmidt, DP placement manager for Robert Half Accountants in Boston. The only exception, he said, is the high-technology industry itself, which is still trimming.

Regardless of where the cuts come, however, they are experienced on an individual basis.

It is hard to export MIS professionals from Houston, despite the poor job climate, because they do not want to sell their homes in the city's depressed real estate market, Fleming said.

Companies in parts of thriving Northeast cities like New York no longer want to pay travel and interview expenses to people from the Southwest or Midwest because there is enough talent available in their immediate areas, placement officials said.

Left MIS to go back to the farm

"One $75,000-a-year manager took close to a year to find another job," Lindsey said. "I know three MIS people who went back to farming," the Colorado Springs placement officer added.

Even when they find new jobs, displaced MIS personnel can find the going tough. Herbert Z. Halbrecht of Halbrecht Associates, Inc., an executive search firm based in Stamford, Conn., said it is easier to find a job for a highly paid star of a company than for middle-aged, middle managers making $50,000 to $55,000.

"After a middle manager has been out of work for six months and his spirit is broken, he'll take a job in the $40,000" range, Halbrecht said.

A. Lance Zaremba, a computer security specialist, spent 20 years with the New Jersey pharmaceutical giant Hoffman-LaRoche, Inc. before getting the ax in a February cutback. He spent three months looking for another job, then found one as a software quality assurance engineer at ITT.

Less vacation, no bonus

While the base salary is similar, he misses the five weeks of vacation, which was trimmed to one day at ITT, and he no longer qualifies for a bonus that was equivalent to six weeks of his salary. "In effect, I took a cut," he said.

Most terminated MIS professionals eventually find jobs, and they find them quickly if they happen to be RPG-III programmers, needed by companies moving up to the IBM System/38 from the System/34 and 36, Bernstein said. CICS programmers are still in demand, as are people who can manage the micro-to-mainframe link.

DP auditors "are very hot," Bernstein said.

But most of the people let go do not have these skills. "Unfortunately, many older people are used to one system. Their shop isn't state of the art. And they can be replaced by someone at the same skill level for less pay," she said.

Being cut or replaced is something that many MIS staff members are psychologically unprepared for, particularly middle managers who have given much to the company and have rarely seen a colleague dismissed. But that situation seems to be changing.

"MIS has been more or less spared in the past. It's not being spared any more," Halbrecht warned.

■

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Ford's planned cuts exclude MIS

NEW YORK — Cutbacks in MIS, along with general staff cuts that are sweeping major U.S. corporations, may be ill advised, if the Ford Motor Co.'s approach pays off.

Like the major corporations of Du Pont E. I. De Nemours & Co., Eastman Kodak Co., Union Carbide Corp., General Foods Corp. and CBS, Ford wants to reduce its payroll to help it stay competitive, and it is working toward staff reductions of 20% by 1990.

But instead of being allowed to shrink, the MIS department at Ford is growing, according to a Ford spokesman. "Our management sees MIS as critical to corporate objectives. . . . We look on information systems and information technology as major areas of competition among auto manufacturers around the world," said Jerry Peterson, manager of worldwide systems planning at Ford.

Orders 90% of parts by computer

Ford is already ordering 90% of the parts for the cars it builds through a computerized order entry system and wants to push the total to 100%. With computerized ordering, it is easy to get an update on the status of a shipment, which in turn helps "just-in-time" delivery to the factory floor.

Ford has invested extensively in computer-aided design and manufacturing and will continue to do so in order to speed innovation and product development, Peterson said.

"We see increased attention in office automation. Very few areas impact our cost/performance ratio as much as white-collar automation," he noted.

Ford is trying to tie together robots and automated sections within a plant to achieve greater computer-integrated manufacturing, he said.

"Part of our future success will depend on how successfully we can use this technology," Peterson said. Ford employs 5,500 people in MIS worldwide, and that number will continue to grow as long as corporate executives believe there will be productivity gains as a result, he said.

— Charles Babcock

ORACLE now available on the IBM System/88

MENLO PARK, CA, November 4, 1985 -- IBM will be selling and supporting the ORACLE relational database management system (DBMS) on the IBM System/88 line of fault-tolerant computers, it was announced today. ORACLE is compatible with IBM's mainframe database management systems, SQL/DS and DB2. This compatibility allows applications written for SQL/DS or DB2 to run on the System/88 under ORACLE.

Oracle Corporation President Larry Ellison said, "We are very excited about this agreement, and are 100% committed to making our relationship with IBM an enormous success. We have always worked hard to maintain compatibility with IBM's DB2 and SQL/DS products."

Oracle Corporation, founded in 1977, produces and markets the ORACLE relational database management system, fourth generation software tools and decision-support software. In 1979 Oracle introduced the first commercial SQL-language DBMS. Today ORACLE runs on a wide range of computers, including IBM mainframes, DEC, DG, HP, Stratus and most other minicomputers, and a wide variety of microcomputers, including the IBM PC/XT and PC/AT. ORACLE runs under most operating systems, such as MVS, VM/CMS, VMS and AOS, as well as UNIX and MS/DOS, and several others. The System/88 is the latest entry to the list of ORACLE-supported systems.

Oracle Corporation distributes its products through a worldwide network of 30 direct sales offices. In addition, ORACLE is sold by IBM on the System/88, and by other computer manufacturers, including Sperry, Stratus and Honeywell. Today, 39 of the top fifty multi-national corporations use ORACLE.

For further information, contact Oracle Corporation, 2710 Sand Hill Road, Menlo Park, CA 94025.

ORACLE

1-800-345-DBMS

Manpower adds IBM System/36 to temp training repertoire

By Rosemary Hamilton

Manpower International of Milwaukee, the temporary help service that has been training its workers on dedicated word processors and IBM Personal Computers, is bringing the IBM System/36 into its repertoire.

Calling it a "major move to the next rung on the ladder," Manpower President and Chief Executive Officer Mitchell Fromstein told *Computerworld* during a visit to Boston last week that he has purchased System/36 minicomputers, but would not provide specific details. The goal is to train Manpower employees in a multiuser environment.

Mitchell said the initial phase, involving the company's 100 largest regional markets, will cost Manpower approximately $5 million, including hardware and training materials.

"We see IBM as concentrating on the System/36," Fromstein said. "This will enable us to serve the entire automated office environment."

The temporary help service, which said it has more than 700,000 employees worldwide, jumped into the high-tech world three years ago. Since then, about 100,000 Manpower temporaries have been trained in word processing and such common Personal Computer applications as the 1-2-3 spreadsheet from Lotus Development Corp.

The move into the System/36 arena will give Manpower temporaries the opportunity to learn communications and graphics software applications as well as data base management, Fromstein said. "Then we'll be able to send commandoes out there," he said.

The company has dished out about $12 million for word processing equipment and IBM Personal Computers, according to Fromstein. Every office, he said, has at least two pieces of equipment.

Manpower, which had sales last year of $1.25 billion, has poured millions of dollars into hardware and training to stay ahead in the temporary help market, Fromstein said. "Office automation surfaced three or four years ago in our strategic planning," he said. "When we realized what was going to happen, it made our blood run cold. We were sitting there with a work force of close to a million, and the closest most of them came to OA was an electric typewriter."

Departing from the traditional methods of training workers on computer hardware — in classrooms and with user manuals — Manpower developed a system based on a series of training diskettes called Skillware.

The purpose is to cut out the technical jargon that can scare off any novice. This technique, according to Fromstein, can transform any worker into a word processing operator or a skilled 1-2-3 user in one day.

TOP OF THE NEWS

NEWS from page 1

nounced sometime during the beta test period, ADS/Batch will allow users to develop batch-oriented applications interactively using the same command language as Cullinet's ADS/Online on-line system development tool. The product was demonstrated to several hundred users at the company's recent user conference in Boston. It is a complete rewrite of a similarly named Cullinet package released in 1980.

■

Look for a Comdex/Fall introduction of management support software from Charles River Data Systems, Inc. for its entire line of 32-bit AT&T Unix-compatible processors. Tentatively dubbed Workcenter, the software reportedly will include a spreadsheet, word processor and a data base management system. No word on pricing yet.

■

Motorola last week said it will phase out a major portion of its dynamic random-access memory business. It will scrap its N-channel MOS 256K-byte dynamic RAM production, after only one year of volume production, limiting its 256K-byte work to higher density CMOS products. The company also will consolidate two wafer fabrication divisions into a new, Phoenix-based Integrated Circuit Wafer Manufacturing Group.

■

James Fiebiger will stay on as chief of Mostek Corp. in the Carrollton, Texas, semiconductor firm's new identity as a subsidiary of French electronics conglomerate Thomson-CSF. United Technologies completed the previously announced sale of Mostek to Thomson last week for $71 million. Fiebiger was named president and chief executive officer of Thomson Semiconductors, which will be a unit of Thomson-CSF, based in Rutherford, N.J.

■

On Tuesday of this week, U.S. Federal District Court Judge William Ingram will conduct a hearing on NEC Electronics, Inc.'s request for summary judgment in its longstanding dispute with Intel over NEC's alleged copyright violations of Intel's 8086 and 8088 microprocessors.

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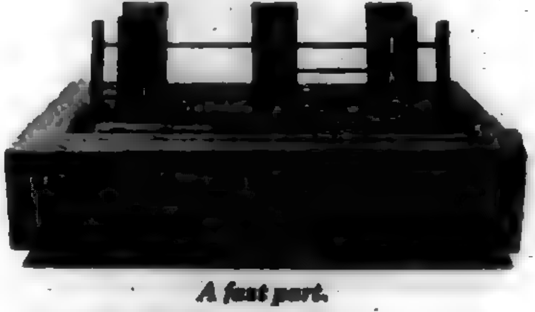

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Perkin-Elmer data group reborn as Concurrent Computer

By Charles Babcock

NEW YORK — Slicing off a fifth of the company, Perkin-Elmer Corp. last week spun off its Data Systems Group as a new company that it hopes will gain greater recognition.

Up to 18% of the new company, Concurrent Computer Corp., will be sold to the public in a stock offering, and 1% was sold to the management of the new entity.

"We have spent 10 years in the computer business, and we have to conclude that we at Perkin-Elmer are perceived as part-timers," PE Chairman Horace G. McDonell said.

The company's briefings for security analysts are typically attended by followers of the semiconductor industry who are interested in its semiconductor equipment business. PE also produces analytical instruments, missile guidance and optical systems, but when it gives a briefing on its computer business, the stock market analysts who follow the computer industry rarely attend, company spokesmen said.

In setting up Concurrent Computer, McDonell said PE was trying to draw attention to its leadership role in parallel processing and foster a more entrepreneurial spirit within its former Data Systems Group, the unit that produced its 32-bit superminicomputers.

"We have 3,000 people who are anything but part-timers and who deserve more recognition than they have gotten," he said. One person immediately gaining more recognition is James K. Sims, former general manager of the Data Systems Group, who was named president and chief executive officer of the new company. McDonell will remain as the chairman of the new firm.

At the moment, PE retains 99% of the stock of Concurrent, and its management is drawn exclusively from the ranks of the former PE Data Systems Group.

Little more than a name change

McDonell acknowledged that the creation of the subsidiary would amount to little more than a name change of a division except for the intent to sell more of the stock to the management and the public.

PE has agreed to sell up to 10% of the stock to the management for use as stock options over a 10-year period. In addition, the company plans to sell an additional 17% or 18% in a public offering to create public trading in Concurrent's shares.

For there to be public backing for its computer division, Concurrent "must be viewed as a pure player" rather than part of a technology company in a mixture of fields, McDonell said.

The former Data Systems Group had sales of $259 million and profits of $24 million in fiscal 1985. As Concurrent, it will have 3,100 employees, including a 1,600-person sales and service force. PE's total sales in 1985 were $1.3 billion.

PE's two computer manufacturing plants will be part of the new company. A 200,000-sq-ft facility is located in Oceanport, N.J., and a second, 80,000-sq-ft plant is located in Cork, Ireland. Concurrent headquarters will be in Holmdel, N.J.

Company spokesmen said PE currently has 23,000 installations of its computers worldwide.

The Data Systems Group began its existence as Interdata in 1966 before being acquired by PE in 1974.

■

Also last week, PE said first-quarter profits dropped to $14.5 million, or 32 cents per share, from year-earlier profits of $17.5 million, or 39 cents per share. However, the year-earlier figure included a nonrecurring gain of $4 million. Revenue increased 3% to $294.5 million from $285.9 million.

Industry urges policy changes

WASHINGTON, D.C. — The U.S. semiconductor industry has lost 54,000 jobs worldwide this year, according to an industry spokesman who urged the U.S. government to address the two problems at the heart of the decline: "unfair" Japanese trade practices and the cost of U.S. capital.

Michael Maibach, an Intel Corp. executive and representative of the Semiconductor Industry Association, told a U.S. Senate subcommittee last week that employment by U.S. semiconductor companies has fallen from 280,000 jobs in December 1984 to 226,000 last month, a 19% decline. He compared this with a 5% decline in related employment in Japan.

"The first problem we face as an industry is the lack of the 'rule of law' among trading partners," he said.

He said the remedies include U.S. access to the Japanese market, financial help for U.S. firms hurt by dumping and effective trade agreements.

The second major hurdle, Maibach said, is the cost of U.S. capital, which is almost twice the cost of capital to Japanese companies. Thus, the U.S. should enact tax reform and cut the federal deficit, he said.

— Mitch Betts

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THE BEST PART

Apollo Domain boosted by Alliant server arrangement

As deal jells, Apollo exec Poduska resigns

By Donna Raimondi

CHELMSFORD, Mass. — Design and engineering systems vendor Apollo Computer, Inc. last week announced its intention to boost the power of its Domain network by adapting as central servers the recently released superminicomputers and low-end supercomputers developed by Alliant Computer Systems Corp.

Separately, Apollo founder and Chairman J. William Poduska Sr. resigned to start a new, unnamed high-performance workstation company that will sell to Apollo as an OEM. Poduska said the products, scheduled for delivery in early 1987, will run at 20 to 30 million instructions per second and will be compatible with Apollo's Domain system.

Apollo will offer Alliant's FX/1 minicomputers and FX/8 parallel low-end supercomputers as central compute servers to its Domain system. The arrangement will immediately provide Alliant with a large installed base to sell into, said Bob Herwick, senior analyst at Hambrecht & Quist, Inc., a leading technology-oriented investment banking firm. For Apollo, the deal opens up a higher range of the marketplace by providing more processing power required by large manufacturers, Herwick said.

> 'This is clearly a major contract for us.'
>
> — Ron Gruner
> Alliant president

The Domain system consists of a network-based environment of interactive 32-bit computers dedicated to individual technical areas such as electronic or mechanical computer-aided design, manufacturing or engineering. The system provides two operating systems, high-level programming languages, a library of program development and productivity tools, third-party software and access to a variety of communications gateways and peripheral resources.

The Alliant, acting as a server, will significantly boost power for compute-intensive applications. An engineer doing finite element analysis, for example, can interactively design a product on a workstation, analyze the design on the Alliant compute server and access the results without changing the user environment or interface.

For young Alliant, founded in 1982, the development was a watershed, according to company President Ron Gruner, who added, "This is clearly a major contract for us." Alliant originally released its FX/Series in July and recently shipped its first FX/1 unit to an MIT laboratory in Cambridge, Mass. Apollo and Alliant have been discussing the nonexclusive agreement, for which Apollo will develop the necessary interfaces, for several months.

Apollo will handle the marketing, sales and service for systems linked by Domain. The announcement follows closely on the heels of Apollo's 15% purchase in Spectragraphics Corp., which will allow Apollo to open the IBM mainframe world to the Domain network, an Apollo spokesman said.

The Spectragraphics deal is an entry into the IBM 5080 color graphics terminal emulation arena, which is essential to getting large, end-user orders in the engineering and mechanical design world, analyst Herwick said. Rumors abound that the long-awaited IBM workstation will offer 5080 emulation, making it an important feature for vendors to have. The deals Apollo is making will allow them to capture a place in the very large markets like the automobile and aerospace industries, he added.

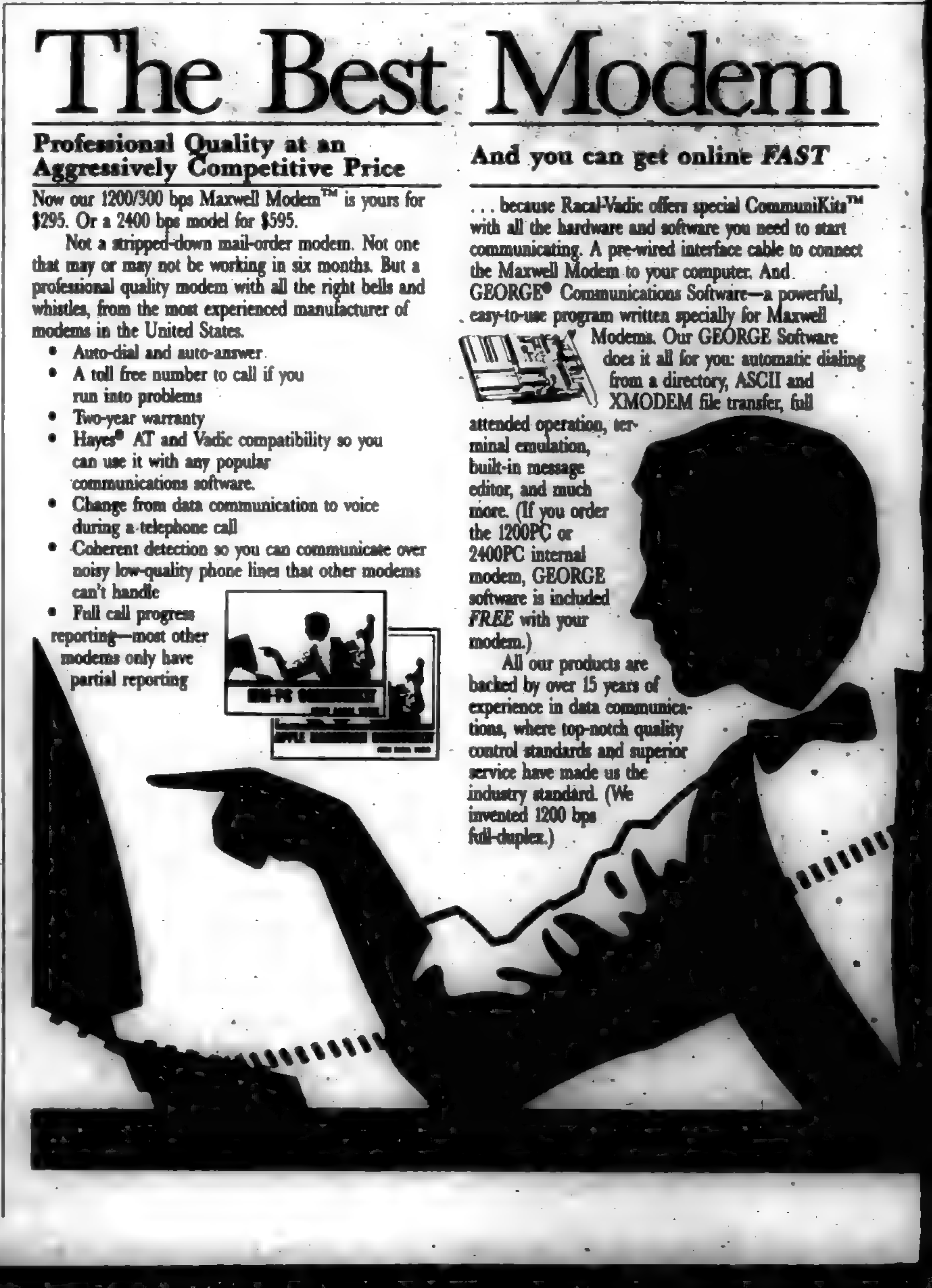
Poduska's new firm will develop workstations "priced significantly higher" than Apollo's current products. The machines, based on application-specific semiconductor technology, will integrate graphics with processing capabilities, Poduska said.

Poduska, who will retain his Apollo stock holdings, said he resigned from the Apollo board "to avoid any possible suggestion of a conflict of interest." Apollo President and Chief Executive Officer Thomas A. Vanderslice replaced Poduska as chairman.

Apollo retained investment rights for the new venture and the right to acquire it upon its initial public offering. Poduska may hire only six Apollo employees in the next three years.

Apollo also last week named Computer Consoles, Inc. Chairman and Chief Executive Officer John F. Cunningham to its board. Cunningham, once considered a candidate for the Apollo presidency, resigned as president of Wang Laboratories, Inc. earlier this year.

Staff members Clinton Wilder and James Connolly contributed to this report



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FBI charges alleged software pirates as crackdown continues

Third in string of recent cases probed

By James A. Martin

LOS ANGELES — In what appears to be a mounting effort by federal authorities to crack down on the flow of pirated software, the Federal Bureau of Investigation said last week it uncovered evidence that two individuals illegally reproduced and sold an undisclosed amount of personal computer software programs.

The FBI's evidence is to be turned over to a federal grand jury, a spokesman said, and indictments will most likely be forthcoming.

This is at least the third such case in recent months in which the FBI has probed allegations of software pirating. In October, the FBI said, it investigated a scientific publishing firm in Philadelphia for reportedly pirating a typesetting software program [CW, Oct. 14]. Also last month, an FBI probe in San Francisco resulted in a five-count indictment against an individual who allegedly reproduced copies of a court reporting software program [CW, Oct. 28].

Software vendors and distributors are understandably pleased with the recent increase of federal investigations into pirating and the resulting indictments. David B. Sturtevant, senior director of public communications for the Association of Data Processing Service Organizations, Inc., said the probes indicate that federal law enforcement officials "now recognize this as a pervasive problem in our society, an economic problem that has the potential to eat at the roots of a very important sector of our economy."

The FBI executed search warrants on Oct. 31 against Morris Shainberg of Computer Software Consultants, Inc. and Gregory Allen Howard of Lowry Communications, according to Richard T. Bretzing, special agent in charge of the FBI Los Angeles office, in a prepared statement. Computer equipment, illegal copies of software programs and any other evidence were confiscated by the FBI. All evidence will be turned over to a federal grand jury for consideration of indictments, Bretzing said. He would not say when any such indictments or judicial action might be expected.

Shainberg and Howard had used several corporate and individual aliases while allegedly selling the pirated software. The FBI would not say if the names and companies given were authentic.

According to Bretzing, Shainberg and Howard had sold illegal copies of Ashton-Tate's Dbase III and Framework; Lotus Development Corp.'s 1-2-3 and Symphony; Computer Associates International, Inc.'s Easy Business System program; and "a number of other popular" IBM Personal Computer programs.

The pirated copies were being offered for as little as $125 through a series of *Los Angeles Times* classified advertisements during the late summer months.

A spokesman for State of the Art, Inc., a Costa Mesa, Calif.-based accounting software manufacturing and licensing firm, said several "duped end users" called the company to complain about what they assumed were software programs from State of the Art.

From that, the company launched a private investigation "to determine who was behind the pirated software," said David Samuels, president. The investigator then turned over all evidence to the FBI. Computer Associates had also been conducting its own probe when contacted by the FBI, according to Betzing.

Betzing said most piracy cases involve personal computer users making extra copies of software programs on floppy disks for friends. "That kind of piracy is costly to the software industry but is difficult to prevent or prosecute," he said.

Copyright infringement and unauthorized distribution of software and misdemeanor indictments are expected, which carry maximum penalties of one year in prison and/or a $1,000 fine. But Samuels indicated felony charges might be forthcoming as well, such as unlawful trademark violation. The FBI would not comment.

Honeywell OEM inks DPS 6 deal

EAST HANOVER, N.J. — Ultimate Corp., Honeywell, Inc.'s leading OEM customer, last week announced a $110 million OEM deal to incorporate Ultimate's coprocessors and software with Honeywell's DPS 6 superminis during the next three years.

The Ultimate 7000 series of 32-bit superminis will incorporate the DPS 6 and peripherals with the Spectrum Manufacturers Association version of Pick Systems' Pick operating system. Ultimate is a member of the Spectrum association.

The agreement is the largest OEM deal to date between the two companies, which have had an OEM relationship for six years.

Ultimate has sold more than 1,500 DPS-based systems in that time, according to a spokeswoman.

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VIEWPOINT

EDITORIAL

Don't cut here

Early retirement, special severance deals, plain and simple layoffs — all have become common as companies respond to increasing competition by trimming staff ranks. What has not been common is an emerging trend: cutbacks, often as high as 20%, in data processing staffs (see story page 1).

Until now, MIS staffs had enjoyed something of a privileged position in this regard. Thanks to the high value placed on special processing and programming skills and the organization's dependence on computer systems, MIS was exempted from staff cuts in times of recession or declining business.

No longer. Instead we may be seeing a growing conviction among top management that computer staffs are bloated and must be the first to slim down. That is the apparent thinking at General Foods Corp., which has ordered MIS cuts before trimming elsewhere.

This is dangerous thinking. Bloat is one thing, but we doubt that there are many companies with enough fat in their data processing staffs to allow cuts of 10% to 20% without severely hampering their operations. It is axiomatic that information strategy decisions being made by corporations today are far more important than the data processing decisions they made 20 years ago and will largely dictate a company's commercial success for the next 50 years. Far-sighted firms accept this fact and manage staffs accordingly.

At Ford Motor Co., for example, the MIS staff is growing despite plans that call for the total number of Ford employees companywide to shrink 20% by 1990. Why? Because Ford management views information technology as a critical tool in its effort to boost productivity and compete aggressively.

MIS professionals must not sit quietly by as their departments are threatened with cuts so severe that remaining staff must make do with limited resources. Instead they must take a leadership role in the corporation's competitive battle. Part of the MIS charter is to educate management to the value of information technology — whether through pilot projects, position papers or quiet lobbying. At no time has that educator's role been more important.

Notes & observations

Once more IBM has struck while the coals were hot. In securing its recent connection to Japan's Nippon Telegraph and Telephone Corp. (see story page 1), Big Blue was taking advantage of the heightened trade frictions between the U.S. and Japan. This deal, which pairs the world's largest computer company with the world's second largest computer services company, has staggering implications for the global computer community. Five years ago, the Japanese government would most likely not have permitted such a joint "megaventure." But recent U.S. pressure on Japan to open up the Japanese telecommunications market to our exports induced Tokyo to bite its lip and stay its hand when IBM and NTT went courting. This sensitivity to the nuances of international politics allowed IBM to wield its political clout and far-reaching influence and then pull in yet another prize in its continued dominance of the world's computer industry. Just like the textbooks tell us to do it.

WELL MR. SHINTO, WHAT SHALL WE DO TOMORROW?
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LETTERS TO THE EDITOR

Codd vs. Cullinane: Choosing sides in debate over relational DBMS

As a consultant who has worked with many users in the throes of deciding which data base management system to buy, I found E. F. Codd's two-part article "Is your DBMS really relational?" [CW, Oct. 14 and Oct. 21] to be a welcome relief in a world of misleading, if not downright false, advertising by some DBMS vendors. Every older nonrelational DBMS, except IBM's IMS, is claimed to be relational — having undergone a marketing metamorphosis rather than any appreciable technical change.

Clearly, there is no better person than Codd, the inventor of the relational model, to call attention to this sorry lack of truth in advertising and to provide a carefully thought-out set of principles by which to evaluate a relational DBMS. Codd's article should be used by every consultant, consumer and vendor in the DBMS world.

At the same time, it was disconcerting one week later to read John Cullinane's letter to the editor [CW, Oct. 28] attempting to discredit Codd's excellent article.

First, Cullinane's claims that the Cullinet Software, Inc. IDMS/R is a relational DBMS are clearly false. Second, although there is no reason why a fully relational DBMS cannot handle applications with severe performance requirements, present implementations cannot do so. However, IDMS/R also cannot handle applications with severe performance requirements: These applications are usually relegated to IMS Fastpath or TPS.

Third, the remark about a relational DBMS being unable to fly conflicts with the hundreds of existing authentic relational DBMS installations. Many of these out-perform IDMS/R in addition to providing a substantial increase in user productivity. Thus, Cullinane's airplane analogy is nothing more than a cheap shot and a misrepresentation of the actual facts.

Somewhere in the neighborhood of 90% to 97% of all applications can be, and are, supported by the transaction processing capabilities of today's authentic relational DBMS.

The term "nice" applied by Cullinane to relational technology was atrociously condescending. One might as well call the invention of the telephone, automobile and electricity "nice."

Finally, Cullinane's assertion that Codd's article was a "thinly veiled" attempt to bless IBM's dual data base strategy shows total ignorance concerning Codd's continual battle with IBM — about 15 years in length — while still an IBM employee. Attendance at Codd's lectures bears out that Codd has never supported or apologized for the dual data base strategy and does not now.

Codd's article obviously had one principal objective: to provide the data processing community with a method for evaluating relational DBMS products in a world where vendor advertising is all too confusing. Codd has achieved this objective and served us well.

Cullinane could serve the DP community better by turning his attention to more constructive activities, such as leading his company in the development of a new DBMS product that is authentically relational and dropping claims in Cullinet advertising and manuals that this release is a relational DBMS. In all respects — technically, professionally and especially ethically — Cullinane has been outclassed by Codd.

Joan Boroff
Surise, Fla.

■

E. F. Codd's two-part article on relational data base rules "Is your DBMS really relational?" [CW, Oct. 14 and Oct. 21] was a much-needed insight into the large gap that exists between true relational features and the "relational" models passed off by so many software vendors. John Cullinane's response to this article is a clear example of misinformation and sour grapes.

In his letter to the editor, Cullinane claimed that the Codd article stated that a true relational data base would not be able to handle applications with "severe performance requirements" [CW, Oct. 28]. The sentence in Codd's article that Cullinane quoted states "Only if performance requirements are extremely severe should buyers rule out present relational DBMS products on this basis."

Codd is clearly not referring to a true relational DBMS but to the current "relational" systems of which Cullinet Software, Inc.'s IDMS/R is a prime example.

If Cullinane truly believes relational technology is the technology of choice, then he must accept that Codd, as the originator of the relational model, is also the unchallenged authority on what rules define it.

Jeff Spalding
Altamonte Springs, Fla.

VIEWPOINT

The demise of general-purpose systems

By Charles P. Lecht

Normally, the bigger the bucks we spend, the more we want to be able to do with the things we buy. But, no longer is "more" the point when it comes to large systems; no intelligent data center manager should acquire a large system based on its capability as a general-purpose system.

The same is true for small and medium-size systems, but most of us find that notion easy to accept. In fact, however, with large systems as well as with smaller ones, primary consideration should be given to how well the system can fulfill *particular* needs now, how long it will do so and how easily it can be migrated from or upgraded to accommodate a change in needs.

When defining large systems, I purposely exclude those immensely powerful supercomputers that are found in special research laboratories and promise millions of instructions, floating-point operations and logical inferences per second. It is hard to envision the day when the power these systems provide could be made commercially available without rigid restraints on its usage.

LECHT ON SCIENCE

My definition also excludes the mammoth integrated services digital networks being created by virtually every major commercial and governmental power in the world.

Our largest commercially available computer systems — IBM's recently announced 3090 scalar and vector processors — bring more than 50 million instructions per second (MIPS) to companies with enough cash to acquire them and cannot help but astonish veteran users. A comparison of improvements in the MIPS available in large-scale computer systems shows a hundredfold improvement in the 1960s and only a fivefold improvement in the 1970s.

Now we are witness to a tenfold improvement in the first half of the 1980s. What this means is that the commercially available high end is undergoing a revitalization.

How are these systems used? Nearly everyone's list includes the following: information storage/retrieval, data base management, data space management (where data is located) and transaction processing, communications processing, robotics, graphics design, economic modeling, weather prediction, seismic analysis, plasma physics, nuclear physics, circuit design, fluid dynamics, structural dynamics and computational chemistry.

Applications covered by one or another of the above entries or a combination of these include the following: banking systems, management information systems, entertainment processing and computer-aided design and manufacturing.

In the data centers within which large systems find their use, both business and science applications are companions to a degree greater than in any other place computers are used. The list of specific names that are given to these are as long as the creative imagination will allow, but on close examination, most of them will be nothing more than different labels for the same applications identified above.

However, there is great value for both manufacturers and users in trying to create a list of things that large systems do that is irreducible and to search for common processing scenarios that may have widest application.

The difference between having done this and not having done it may well explain much of IBM's continued success in large systems manufacturing and sales. Those who manage large-scale data centers and find themselves paying ever-increasing software costs should take note. Their success — indeed, survival — may depend on how well they adopt this strategy.

The days when computer systems, small to large, are made and bought solely by the power they might provide if used on some undetermined application are over. An ever-increasing specialization — in large systems as well as in small and midsize ones — is rushing toward us. For that we should be grateful.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Moving toward mandatory data security

By Sanford Sherizen

Laws, professional guidelines, insurance requirements and similar pressures stand to make corporate information security mandatory rather than voluntary. Most organizations will soon have no choice but to secure their data resources.

Already, corporations must enforce specific security procedures, sometimes as a matter of survival.

No company that uses purchased software, for example, can ignore the need to institute a security awareness program lest it come to trial for unauthorized software duplication. The existence of an active employee awareness program and a written policy statement, both of which indicate a firm's commitment to preventing duplication, offers a strong defense.

Organizations in regulated industries must institute other procedures as well, this time as a matter of federal and state regulation.

The U.S. Department of the Treasury and other regulatory agencies require certain banks and financial organizations, for example, to report certain problems of financial integrity and losses from computer crime. Increasingly, the Department of Defense insists that its contractors file risk analyses, and the Department of Health and Human Services requires Medicare providers to do the same.

In the near future, more regulatory, professional and commercial organizations will demand that their constituents, members and customers make specific security provisions. In turn, more companies will be held to mandates stating how information security should be structured and who will be held responsible if a preventable crime occurs.

READER'S PLATFORM

> *Corporations that hope to prosper under the coming regulations should enter a general state of preparedness as soon as possible.*

Most corporations will have to address the following four aspects of information security to abide by the new rules:

Protection. The ability to meet certain prevention standards, such as a security awareness training program, a set of physical and procedural security objectives and a strong program of password control.

Detection. The ability to audit and monitor systems to uncover computer crimes and abuses. This includes alerting low-level managers and other workers within the corporation to their responsibilities for detecting crime.

Prevention. The ability to establish the integrity of financial data and other systems through encryption, message authentication, built-in redundancies, testing and other techniques.

Reporting. The ability to press charges against computer crime. To win convictions, organizations must first convince their employees to admit that breaches occur and must encourage each worker to report any suspicious activity.

Corporations that hope to prosper under the coming regulations should enter a general state of preparedness as soon as possible. Firms that act now will be better able than their sluggish competitors to meet the inevitable.

To set in motion the preparatory process, managers should see that their companies take the following steps:

- Incorporate information security as part of the company's strategic planning process so that security measures are well coordinated with other strategic requirements.
- Make upper level managers aware that they are the people who will be held responsible for the development and adequate support of information security programs.
- Increase security awareness training and computer crime prevention programs to prepare end users for rules that might take effect.
- Do not wait for outside forces to impose information security standards and requirements; instead, define security measures from within.
- Start to choose specialized personnel to formulate a sophisticated information security program or to supplement any program that currently exists.

If top managers or end users doubt the need for these actions, the MIS manager or security director can substantiate the claim with a great deal of evidence. Many organizations have already brought pressure to bear on businesses' information security policies.

The federal government is in the forefront of requiring measures for the protection of information, especially in its legislative efforts.

Outside of the legislature, the government mandates security policies through organizations like the Defense Department and the National Security Agency (NSA). Both groups have a long history of upholding information security internally and within their contractors' shops.

They are currently expanding their sphere of influence by applying national security requirements to civilian agencies as well. Their efforts are a substantial peacetime attempt to apply security standards outside of the defense community.

National Security Decision Directive 145, which a committee headed by the NSA is currently putting into operation, stands as the cornerstone of efforts to expand the government's influence. The directive requires almost every government agency to uphold strict standards for information classification and for computer and telecommunications security.

The NSA said it plans to encourage any business that uses or supplies government data to abide by the directive. It said it hopes to see a ripple effect in other businesses until the security measures become de facto standards. Data processing organizations throughout the nation will feel the effects.

The computer industry and its professional organizations are also beginning to set specific security requirements. Members of the videotex industry are seeking computer crime laws and other protections.

Sherizen is a Natick, Mass.-based information security consultant and criminologist.

NIH puts bar codes, supermicro to test; slashes paperwork

By Mitch Betts

BETHESDA, Md. — Office automation and the Paperwork Reduction Act notwithstanding, there is still a lot of paperwork in the federal government.

No matter how much automation occurs inside an agency, documents and proposals from the public arrive at the government's doorstep in the form of paper. That is certainly the case at the National Institutes of Health (NIH).

According to Dr. Harold Waters, chief of the referral section of the NIH Division of Research Grants, the NIH gets 33,000 grant applications a year, each one an average six inches thick.

"We get documents that are more than a mile high, three times a year," Waters said. "That's mountains and mountains of paper, and until recently, we were a rubber band and paper clip operation."

To manage this bureaucratic nightmare, Waters is testing a new automated system that uses bar code technology and a supermicro to log and track each document. The product, appropriately called Paperflo, is a turnkey system from Infocel, Inc. of Rockville, Md.

Using Paperflo, a bar code label is attached to each document and key information is logged onto an AT&T 3B2 base station. Each time the document gets passed to a different office, that office uses a bar code wand attached to a notebook-size workstation to register the document's receipt and then to record what action has been taken before routing it to the next office.

Top line summary

Application: Document logging and tracking

Business: Health care research

User: National Institutes of Health

In a typical configuration — like at the NIH — 20 or so workstations are hard wired to the supermicro. The cost is about $75,000.

The supermicro uses the AT&T Unix System V operating system and proprietary software for a menu-driven, relational data base management system that can generate reports about the document flow.

So far, there are eight installations of Paperflo, in such applications as personnel records, purchase orders and hospital medical records, according to Infocel spokesman Christopher Grover. He said paper-intensive organizations and agencies handling very valuable or sensitive documents are the best applications.

At the NIH, Waters said, the system enables him to track not only the paperwork but also the decisions that have been made regarding particular applications and the productivity of the operation. Because each action is time stamped, the system tracks how much time a document has been sitting in one place, such as the printing office.

"If something is in there for 15 days or more, I get a list, so I know if something is stuck," Waters said. "By tracking it, I can go in and find it and shake it loose," he said.

Waters said the initial resentment among employees that "Big Brother is watching" has disappeared. "They are aware of the system, but mostly I've been complimenting people who get things moving rather than hassling people," Waters said.

NIH has a complex process for handling grant applications, beginning with an initial review by senior scientists, and then printing 60 copies of each proposal for final review, before the grant is approved. "It's the bar code that's helping us through this process," Waters said.

A big benefit of Paperflo is that when applicants call for a status check, the NIH employees can easily determine where the document is and what actions have been taken. "Instead of looking like dumb bureaucrats, we look like we know what we're doing," Waters said.

The productivity gains are especially important since the staff has been cut 30% in the last two years while the work load has increased 15%, Waters added.

Furthermore, the system does not require a great degree of computer literacy, and paperwork mistakes are virtually eliminated, he said. "It's just about as idiot proof as it can be," he said.

Five universities receive DP grants

By Mitch Betts

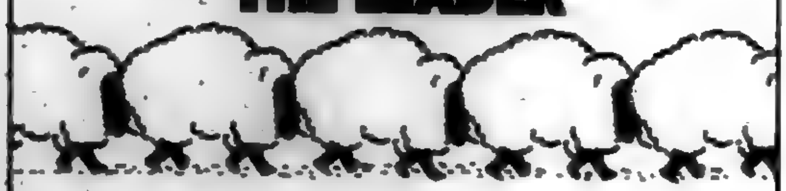
WASHINGTON, D.C. — The National Science Foundation recently awarded grants totaling $12.5 million to five universities to help establish and operate major computer research facilities.

Institutions receiving the National Science Foundation grants are the following:

- University of Massachusetts — Amherst ($4.7 million) for research in the areas of intelligent systems and distributed and parallel processing.
- University of Colorado ($3.2 million) for an experimental computational facility that will be composed of a loosely coupled network of scientific workstations.
- Princeton University ($2.2 million) for research on supercomputers with massive amounts of physical memory in the tens of billions of bytes.
- University of Minnesota ($1.5 million) for research using supercomputers to design and analyze algorithms and applications software.
- University of Washington (almost $1 million) for the study of distributed computer systems.

The grants were announced by National Science Foundation's Coordinated Experimental Research Program. All grants are for five years, except for the University of Washington grant, which is for two years.

WHY FOLLOWERS OFTEN LOSE SIGHT OF THE LEADER



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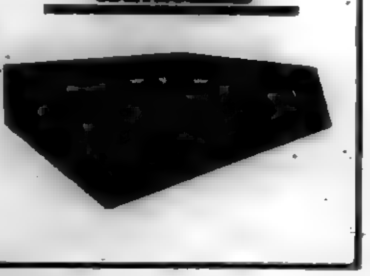

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COMMUNICATIONS

WIRE TAP
Daniel Minoli

Hiring staff: an artful skill

THIRD IN A THREE-PART SERIES

Hiring a data communications professional may be a million-dollar investment. Yet the decision is usually made after studying a resume and interviewing the candidate for only two or three hours. Before spending an equal amount on a communications system, a manager would probably conduct a comprehensive, time-consuming study, read voluminous system specifications and write sizeable reports.

Given this discrepancy, it comes as no surprise that the people eventually turn out to be the weak link in a large network environment.

Some time-tested human resource factors described below may help in choosing the best person for the job.

The tendency is to look at the most recent accomplishments and responsibilities of a prospective job candidate. Decision making is generally referential to the last position (if the candidate managed X people, now the candidate can manage X plus delta; if the candidate was paid Y dollars, now the candidate can be paid Y plus delta). While this is a very conservative approach, a selection based on this criteria may turn away potential talent and creativ-

See HIRING on page 26

Minoli is a member of the Bell Communications Research (Bellcore) network architecture planning group. Opinions in this column are strictly the author's and do not represent the view of Bellcore.

Octel touts voice mail system

Automated receptionist feature adds versatility

By John Dix

SAN JOSE, Calif. — An automated telephone receptionist feature has been added to Octel Communications Corp.'s voice mail system. The software option can be used on new or existing systems supporting Octel's standard voice messaging functions.

When outfitted with the Enhanced Call Processing software, Octel's Aspen or Aspen Branch systems answer incoming telephone calls with a recording asking the person to enter call-routing instructions.

Callers can be forwarded to an extension, leave a voice message or be routed to other Aspen message features, such as Information Center Mailboxes.

The Enhanced Call Processing software enables users to create custom voice menus to Information Center Mailboxes, which contain recordings of frequently requested information. A marketing department, for example, could prepare a series of recordings that give brief descriptions of its products and leave them in labeled mailboxes, Octel suggested. After hearing about products, callers could leave their name and number or be forwarded to a customer service representative.

If Aspen is used strictly for reception purposes, the caller would be instructed to use his Touch-Tone telephone to enter the desired extension. Callers with rotary phones or who are unsure of an extension will be forwarded to an operator. If the extension is busy, the caller is forwarded to the user's voice mailbox.

Enabling callers to route their own calls reduces the expense of having operators and department secretaries answer phones and transfer calls, according to Robert Cohn, Octel president and chief executive officer. The software feature is also less expensive than direct inward dialing, a

See OCTEL on page 25

MAP interface modules debut

By Paul Korzeniowski

SANTA BARBARA, Calif. — Advanced Computer Communications has announced the first set in a planned series of interface modules for General Motor Corp.'s Manufacturing Automation Protocol (MAP).

The company's family of Advanced Communication Processor (ACP) boards are based on a Motorola, Inc. 68000 microprocessor, up to 1M byte of random-access memory and 128 bytes of erasable programmable read-only memory.

The ACP 6180 and ACP 6480 are for use with Digital Equipment Corp. VAX superminicomputers and supply various levels of compatibility with the seven-layer MAP network model, which is based on International Standards Organization's (ISO) Open Systems Interconnect model.

The ACP 6180 supplies the first four layers of the MAP protocol — the physical, data link, transport and network layers. The device was designed with four internal buses that surround random-access memory: a host interface bus, main processor bus, data bus and peripheral bus.

For those users with a token-bus interface modem, the ACP 6180 provides network and transport services on top of the ISO High Level Data Link Control link. The interface occupies one hexadecimal slot on the VAX Unibus.

For those users desiring an on-board token bus, the ACP 6480 provides transport and network services on top of the IEEE 802.2 logical link and 802.4 token-bus interface specifications, which have been incorporated into MAP as a standard transport mechanism. Media access is achieved by using a Motorola 68824 token-bus interface chip. A board-level modem connects the device to the network.

The company plans to introduce inter-

See MAP on page 24

INSIDE

Codex announces a new line of communications network processors, which the firm says are the most powerful available to date/23

NEW THIS WEEK

- AT&T introduces four Call Accounting Systems
- NCR Comten enhances its protocol converter
- For more on these and other new products, see pp. 111-136.

INSTANT ANALYSIS

"Once MAP is fully implemented, we will be able to cut one to two years from our five-year product development cycle."

— Robert J. Eaton
vice-president
of General Motors,
speaking at the recent
Autofact '85 in Detroit

Net vendor gets software firm

Industrial Networking aims for OA market

By Paul Korzeniowski

SANTA CLARA, Calif. — Industrial Networking, Inc. fired a shot at its competitors in the emerging factory automation network market by acquiring Software Decisions, Inc., a Southfield, Mich., network software company.

Software Decisions, founded in 1983, develops and markets host-resident software for General Motors Corp.'s Manufacturing Automation Protocol (MAP), an architecture the car manufacturer is promoting as a factory automation standard. The company also wrote a package that determines if a vendor's product conforms to the seven-layer MAP network model.

Software Decisions "has emerged as a leader in the MAP software industry," noted Joseph P. Schoendorf, Industrial Networking president. By combining Software Decisions' "MAP software strengths with the networking expertise of our company, we have increased our ability to provide complete MAP solutions," he added.

Industrial Networking, founded in October 1984, is a joint venture formed by Ungermann-Bass, Inc. and General Electric Co. Industrial Networking supplies networks that conform to the IEEE 802.4 token-ring network specifications, hardware for the lower levels of MAP.

In September, GE announced that a MAP-compliant local-area network based on work by Industrial Networking, GEnet Factory LAN, would be available early next year.

See NET on page 26

M/A-Com offers data switch

By Paul Korzeniowski

SOLANA BEACH, Calif. — M/A-Com Telecommunication Division, Inc. has introduced the IDX750, a smaller version of its large data switch, the IDX3000.

The IDX750 can connect up to 768 full-duplex, asynchronous channels at speeds up to 19.2K bit/sec. The nonblocking data switch can queue requests whenever a line is busy and displays line status information. Privileged callers can put a current call on hold, take a second call and later return to the first.

The product's diagnostic capabilities include fault reporting, module self-tests and loopback tests. The switch enables users to connect to various devices on the network once an operator has loaded required configuration data.

The data switch works with multiplexers, a network exchange and a network controller.

Multiplexers concentrate onto one T1 trunk up to 24 asynchronous lines using twisted-pair wire at distances up to one mile. At greater distances, Bell North American DS-1 framing format supplies access to microwave, leased lines and satellite links. Dial-up modems can be used on the network, and the device enables modem ports to be connected to a host.

The network exchange performs data-switching functions and routes data through the data switch. On-line prompts and Help menus help configure the system. The device supports 32 trunks, each with 24 lines on one trunk.

The network controller, based on a Motorola, Inc. 68000 microprocessor, is resident on the network exchange and interfaces to the rest of the network through a set of virtual lines.

See DATA on page 26

WE CHALLENGE ALL COMERS TO A LASER BATTLE.

DIGITAL'S NEW LN03 IS FAST AND AFFORDABLE.

Until now, laser printers fell into the category of pure science fiction for most applications. Those that could handle even a modest work load cost more than the moon and stars. And those that were affordable just couldn't keep up with a busy office.

Now there's Digital's new LN03. The most productive laser printer you can buy for less than $7000. A lot less. In fact the LN03 costs little more than half that. Yet it leaves every laser printer in its price range in the dust.

For pure speed, nothing in the price range can beat the LN03. At 8 pages per minute – or 333 cps – it can handle the volume of a busy office with ease.

It also prints true compound documents, with business graphics and text on the same page, in a single pass. And it prints on virtually any cut sheet paper, including overhead transparencies. All of which makes it ideal for almost any multi-user environment.

IT WON'T WASTE YOUR TIME.

The LN03's real edge in speed and productivity comes from its paper handling capacity. With 250 page input and output trays, the LN03 can print thick documents – pre-collated – without reloading. Try that with any other laser printer in the class and someone will end up changing the paper 10 times or more, reverse collating every page by hand, and babysitting the entire process. Which is counterproductive to the whole idea of office automation.

BETTER QUALITY THAN LETTER QUALITY.

The LN03 also gives you advantages over daisywheel and dot matrix printers, too. Because one LN03 can do the job of the two conventional printers you're probably using now.

In fact it can do *more* than *both*. For a lot less money.

For starters, it forms characters precisely with 300 x 300 dot resolution. Characters that are not only far cleaner than your dot matrix printer, but even better than your letter quality printer. You may actually have trouble telling the difference between text that's been printed on the LN03 and text that's been professionally typeset. In fact the LN03 characters are so well formed, they're recognized by Optical Character Readers with no problem at all.

To give your documents a professional appearance, the LN03 lets you pick and choose from a virtually unlimited variety of typefaces, sizes and styles. And they've all been developed especially for the LN03 by Compugraphic Corporation, the world's recognized authority on computer-generated typefaces.

Two resident typefaces give you no fewer than 16 different sizes, styles and pitches, while optional ROM cartridges let you add just about any face or font you might consider. Including your own custom designed faces. You can even down-line load your own character set or custom designed graphics fonts to print your logo, letterhead or forms. If you like, the LN03 can print sideways, down the length of the paper as well as across, to accommodate spreadsheets, compiler listings, graph captions or other special effects.

In short, the LN03 gives you a remarkable combination of print quality and versatility. So every piece you print makes a great impression.

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The LN03 will even make transparencies for overhead projectors. Try that on any of your printers.

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COMMUNICATIONS

Codex launches nodal processor

Motorola 68000-based tool handles 256 concurrent calls

MANSFIELD, Mass. — Codex Corp. unwrapped a communications nodal processor last week, the first in a new product series called the Codex 6700 Distributed Communications Processor family.

Touted as the most powerful nodal processor available to date, the Codex 6760 distributed processor can support up to 256 concurrent calls and continuous throughput of 40,000 characters per second. The switch can be used in point-to-point applications as well as in multinode topologies.

Codex, which is a subsidiary of Motorola, Inc. and a manufacturer of multiplexers as well as other data communications hardware, said nodal processor networks provide an attractive alternative to packet-switched solutions.

Based on Motorola 68000

To achieve the level of performance and range of features required and still make the product a cost-effective alternative to packet switching, the new switch family is based on the Motorola 68000 microprocessor and custom bit-slice processor technologies, Codex reported.

The 6760 is said to support a mix of protocols, including bisynchronous, asynchronous and High-Level Data Link Control or IBM Synchronous Data Link Control.

Protocol intervention is provided for IBM 2780/3780 RJE equipment in a nontransparent fashion. Acknowledge/Negative Acknowledge acceptance commands are issued to remote devices by the local serving node, limiting the need to go back to the host for acknowledgment and improving response time. The 6760 is also said to support an X.25 interface for use with public-switched networks.

Bandwidth allocation

Transmission efficiency is optimized with dynamic bandwidth allocation, Codex reported, where the bandwidth of the box is devoted only to active channels. Multiple protocols can be supported over the same statistically multiplexed link between nodes.

For further link efficiency, the 6760 uses Adaptive Data Compression, a technique that identifies and eliminates frequently occurring characters in a data stream.

Throughput is increased an average of 30%, the company claimed.

To optimize host and terminal resources, an algorithm is used to pick the minimum delay path for each session. The algorithm routes calls as needed to balance network loads and compensate for line congestion on high-speed links operating at up to 64K bit/sec.

A User Destination Routing feature enables users to select and contend for compatible network hosts.

A typical Codex 6760 Distributed Communications Processor carries a price tag of $45,000, including software, and is available for shipping within 90 days of the receipt of order.

XEROX

Xerox is about to move xerography light years ahead.

GM and Boeing give protocols a hard sell at Autofact '85

DATA STREAM
Paul Korzeniowski
CW Senior Writer

One can't help but notice how General Motors Corp. and Boeing Computer Services Co. have begun to act like vendors. The companies were furiously pushing the Manufacturing Automation Protocol (MAP) and Technical and Office Protocol (TOP) at the recent Autofact '85 Conference and Exposition.

MAP, promulgated by GM, and Boeing-supported TOP are seven-layer network architectures based on International Standards Organization (ISO) specifications.

The architectures were the center of attention at the Detroit show. The reason? They promise to make it possible to link different kinds of computers. Connectivity is a goal most MIS managers have desired since they received their first paychecks. The MAP-TOP booth overflowed with expectant engineers and MIS managers.

> ”
>
> *Connectivity is a goal most MIS managers have desired since they received their first paychecks.*

Vendors also lined up to support MAP and TOP but perhaps a little less willingly than the user visitors. GM and Boeing, two of the largest computer users, have made it clear that they intend to require all information processing equipment they buy to conform to MAP or TOP. In essence, the companies have put a multimillion-dollar gun to the heads of the vendors.

For too many years, users have been saddled with incompatible products. Systems that provided solutions for one department were inaccessible from other departments. As a result, users like GM and Boeing have been left with automation islands and few truly integrated systems.

In theory, MAP and TOP will integrate all of GM's and Boeing's computer systems. In fact, MAP and TOP may suffer a protracted adolescence like other overly hyped ideas such as artificial intelligence and integrated voice and data capabilities. Presently, MAP and TOP are more talk than substance. GM doesn't have one operational MAP prototype, nor does Boeing have a demonstrable TOP net.

A number of companies took part in a MAP-TOP demonstration at Autofact. One product was a job scheduler from Hewlett-Packard Co. The offering played a small role in the network, a typical situation for products of the 21 vendors taking part in the demonstration. Pieces of MAP are available, but no one vendor can supply a complete network.

Nor is that the point of the architectures. MAP and TOP are models, not products, and when vendors incorporate the common interfaces and specifications, they should, theoretically, be able to communicate.

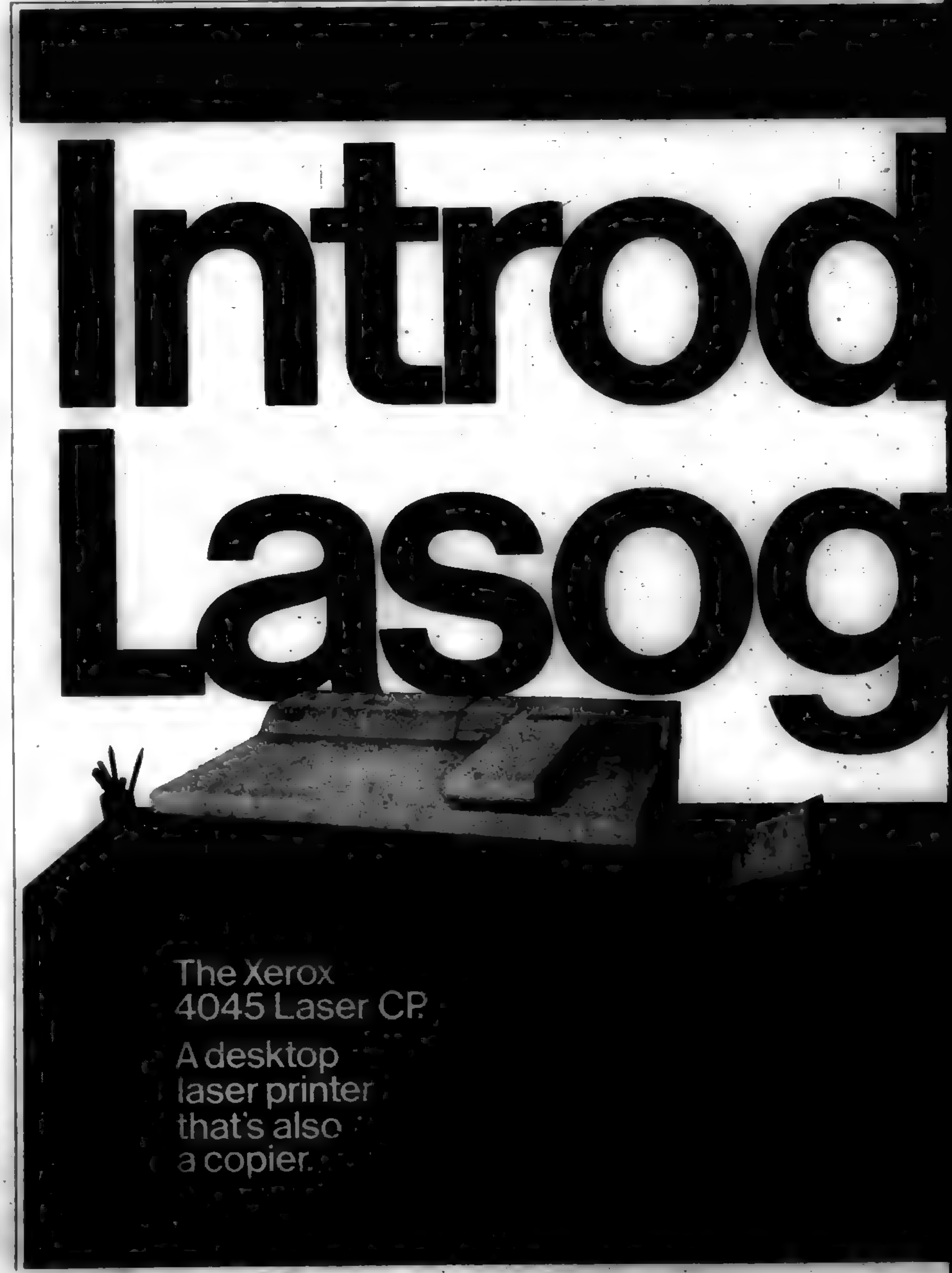
Historically, however, standards have given vendors some design latitude that often translates into in-

MAP boards announced

From page 19

faces for other boards, according to Paul Nelson, an Advanced Computer Communications product manager. The second set of boards will be a Q-bus interface that will be released in the second quarter of 1986.

Prices for the 6180 range from $5,000 to $7,000 and for the 6480 from $4,000 to $7,000.



compatibility. A spokesman from Concord Data Systems, Inc. noted that, in one case, two MAP-compliant terminal servers were unable to communicate until both vendors tinkered with the products.

As part of an Autofact demonstration, a network was designed to produce a small board with three pegs for a game called the *Towers of Hanoi*. During a press conference, cameras showed the network in action. Rather than a board with three pegs, one with two pegs was produced. A rather embarrassed GM employee attempted to smile at the camera as the production ground to a halt.

Progress still needed

The demonstration illustrated just how much progress is required before MAP and TOP can begin to supply the benefits they boast. GM will establish pilot programs in a few plants next spring, and Boeing is scheduled to implement a TOP pilot at the same time.

GM estimated that it will take until 1988 for MAP to be implemented, and Boeing painted a simillar picture for TOP implementation.

Much of the work between now and 1988 will be to further redefine and specify sections of the models. Only the first two model layers have been fully specified and accepted as complete by the ISO, although many others are nearing acceptance.

Most of the work for layers three through five has been done. Some work has been finished for layer seven, the application layer. Little progress has been made for the sixth, the presentation layer — a key layer because it provides translation capabilities between different types of machines.

By leveraging their purchasing power, GM and Boeing may force vendors to meet their needs. Wave a $10 million contract in front of a vendor, and it will salivate like Pavlov's dog.

But smaller companies should carefully weigh their investment in MAP or TOP, which may prove to be more expensive than alternatives. Without leverage such as that provided by GM, smaller companies may be unable to force vendors to live up to their claims.

They could be left with a network that looks great on paper but supplies few tangible benefits.

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Octel touts mail system

From page 19

telephone company option that gives each user a telephone number, minimizing central switchboard personnel.

With direct inward dialing, customers lease telephone numbers from their telephone company in blocks of 100.

The first two or three digits of that number are common to all company numbers, and the remaining digits denote extensions.

As with standard service trunks, fewer direct-dial trunks are needed than actual number of extensions supported. The number of trunks needed is calculated using ratios that take into account the fact that not all users will be receiving calls at the same time. Direct inward dial service, however, does require use of more trunks than usual because they cannot be used for outgoing calls.

Automated call-routing systems like Aspen and those provided by other companies can be used with standard trunk lines, saving that expense. The systems also eliminate private branch exchange hardware required to support direct inward dial trunks.

According to Cohn, Aspen can be interfaced with any PBX in the U.S. and integrated with Centrex services and numerous PBXs, including systems from Rolm Corp., Northern Telecom, Inc., Mitel Corp. and Hitachi Ltd.

Integrated voice mail systems support automatic call forwarding — interfaced systems do not — and alert the users when they have mail by lighting a messaging waiting lamp or giving a broken dial tone.

Cohn went as far as to say that Octel integrates with more types of PBXs than any other voice message system.

The Enhanced Call Processing software option for Aspen and Aspen Branch — which range in capacity from four to 24 ports and provide six to 63 hours of message storage — costs $5,000.

Hiring staff: an artful skill

From page 19

ity. Career-long accomplishments should be given appropriate value; experience should be valued even if acquired prior to the last position.

It is important not to overhire for a position, both monetarily and technically, and ideal to get the right level of person who is self-motivated and creative. During the interview process, it is important that the data communications manager cover three areas — negative job aspects, company culture and career path.

If there are negative aspects of a job, such as long hours, travel or lack of clerical support, they should be mentioned right away. Hiring people and having them leave a few weeks later because of environmental factors is not cost-effective to the firm. It requires the long, expensive hiring process to begin again.

Some managers spend 70% of the interviewing time discussing the realities of the job and 30% of the interviewing time discussing the idealized issues of the job. A candidate briefed in this manner is well prepared to face the challenges.

The company culture should be discussed openly. If the right technical person is found, but there is a major cultural discrepancy, the data communications manager should put himself in the candidate's shoes. Failing to do so may again imply a mismatch and a repetition of the restaffing effort with the high associated costs.

For example, a longtime military person may find it a challenge to adjust to a matrix management environment. By the same token, onetime common-carrier employees may find it hard to switch to a user environment. The issue is accentuated when the job switch is intercompany rather than intracompany. Not all individuals will find job adjustment hard, but it is important to be aware of the risk.

Third, the realities of career path opportunities should be addressed. Here it is better to err on the side of caution rather than be overly optimistic. It is all too easy to say that great opportunities exist.

Instead, the data communications manager should give some typical figures representing actual promotional opportunities.

In this three-part series some empirical issues, which may prove useful in selecting and retaining the best possible data communications staff, have been raised [CW, Nov.4; Nov. 11]. Employees' loyalty and satisfaction will go a long way to improve the overall quality of the network services rendered by the communications department.

9700 Laser Printing System

2700 Laser Printing System

As you can see Xerox has developed an entire family of laser printers.

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Four of our models can produce graphics with stunning clarity.

And all of them, the 4045, 2700, 3700, 8700, and 9700, will even print out almost any kind of form, not to mention text, tax forms, invoices, billing statements, and catalogues.

And our laser printers are so quiet that, in many cases, you hardly know they're there.

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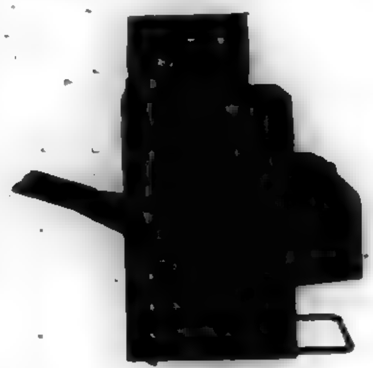
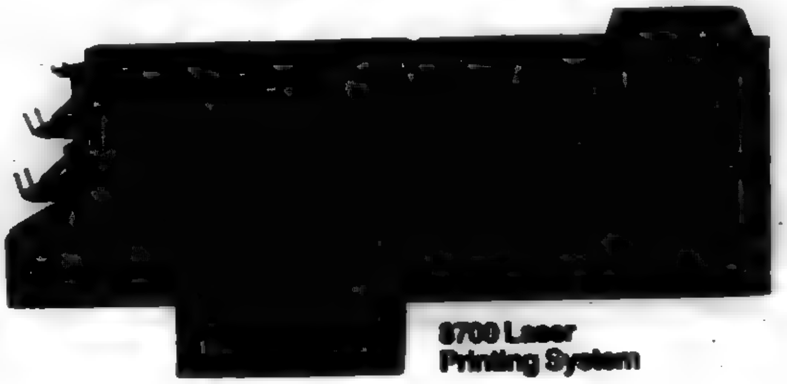

3700 Laser Printing System


8700 Laser Printing System

Data switch introduced

From page 19

The controller supplies up to 1M byte of random-access memory and a 10M-byte hard disk.

The product supports 768 lines and can be expanded to support 3,072. The data switch is compatible with Digital Equipment Corp.'s DMZ32 that connects 24 lines to a VAX superminicomputer.

The IDX750 is priced at $110 per port.

Net vendor buys firm

From page 19

The 10M bit/sec. network consists of a bus interface unit, head end remodulator, network management console and network software.

Software Decisions was said to supply some Industrial Networking network competitors with the software they needed to link their nets into the operating environments of CPU vendors.

Paul F. DePond, Software Decisions president and chief executive officer, will now report directly to Schoendorf. The two companies will continue to operate in their locations. Industrial Networking Vice-President Michael S. Gardner will assume Software Decisions' sales and marketing operations.

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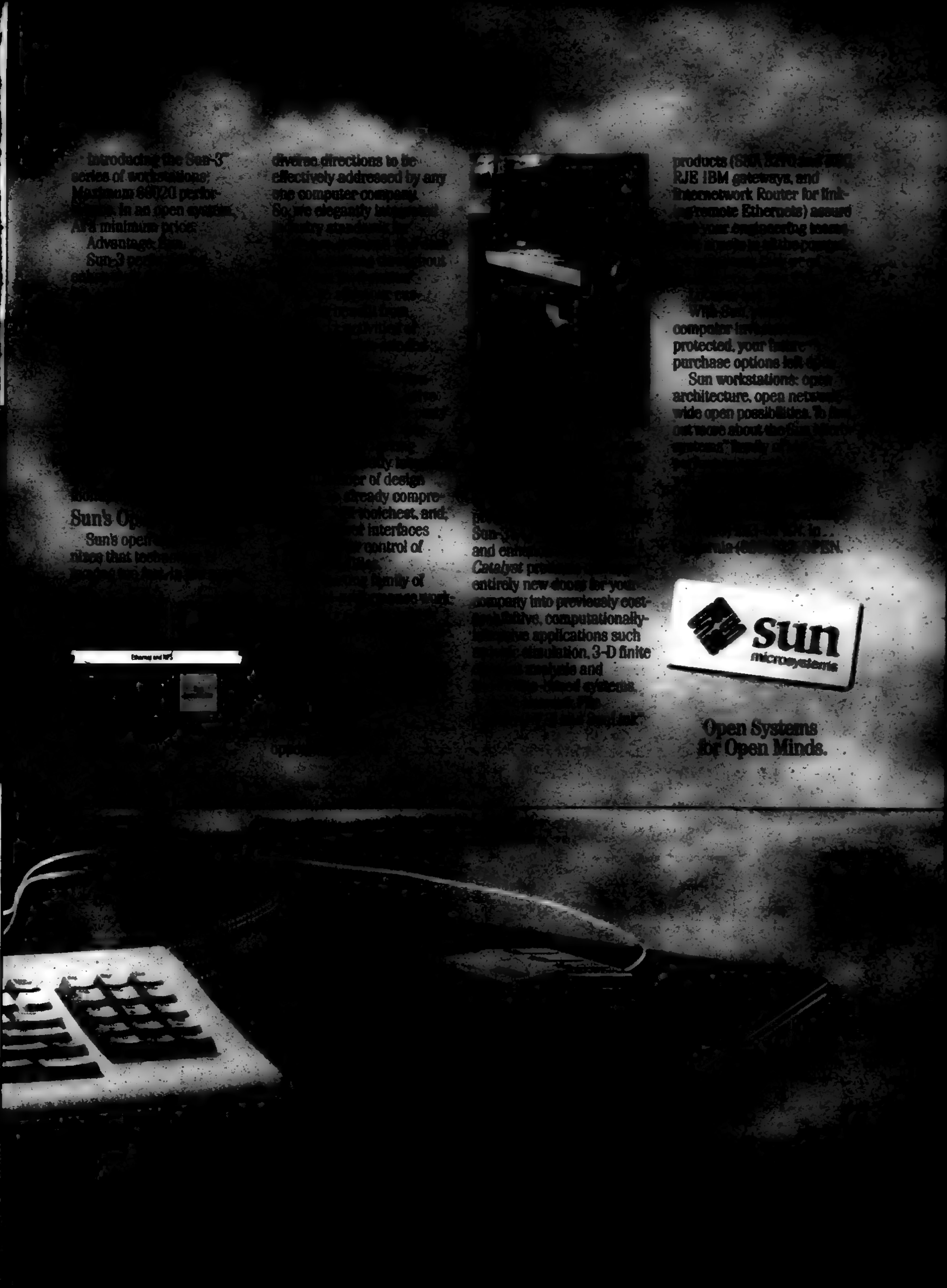

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Languages step back, go ahead

To speed today, to be put back tomorrow.

— Edmund Spenser
Mother Hubberds Tale

Fourth-generation language products are taking a step backward to go forward.

Claims have caught up to the vendors, many of which a year ago were marketing the higher productivity languages as a replacement for Cobol. Several vendors of the major languages were recently asked to supply the names of users that were basing major operational systems on a fourth-generation language. None of those users contacted by *Computerworld* had completely done away with Cobol. As long as the programs work, Cobol may never go away.

Fourth-generation language aficionados point to Morgan Stanley and Co. of New York as the firm that swore off Cobol some four years ago. As trade mythology has it, Morgan Stanley did away with Cobol and now does all of its programming in Software AG's Natural. It is true that Morgan Stanley has shifted its primary focus from Cobol and now does most of its programming in Natural, but the company has not eliminated all its Cobol programs and has no intention of doing so.

Morgan Stanley maintains some 20 compute-intensive programs in Cobol, PL/I and assembler. "If we took those 20 programs and wrote them in Natural, we might double our CPU consumption," said Scott Abbey, vice-president of data administration at the firm.

The new role of Cobol in those mainframe shops that have made a major

See LANGUAGES on page 39

Spreadsheet test users prefer SQL Calc despite glitches

By John Desmond

Two beta test site users of Oracle Corp.'s SQL Calc, which is integrated with a microcomputer version of the Oracle relational data base management system, said they would use the new spreadsheet as a replacement for Lotus Development Corp.'s 1-2-3, despite experiencing some glitches.

Announced last week, SQL Calc offers screens and commands similar to 1-2-3's, in addition to IBM SQL-compatible commands. IBM's SQL, known for its data manipulation capabilities, is the IBM standard query language used in SQL/DS and DB2 relational DBMS products. SQL Calc operates on an IBM Personal Computer XT or AT with at least 512K bytes of memory and 2M bytes of hard disk storage, at a price of $995 including PC Oracle. Users with PC Oracle pay $395 for the SQL Calc spreadsheet. Oracle plans to offer SQL Calc on a variety of systems, including IBM mainframes and minicomputers from Digital Equipment Corp. and Data General Corp. as well as most AT&T Unix systems in the second quarter of 1986.

Users at Electronic Data Systems Corp.'s (EDS) eastern regional data center located in Camp Hill, Pa., and at Citibank in New York described their experiences with SQL Calc.

The Citibank user, who declined to be named, said he is using SQL Calc on a Personal Computer XT with 640K bytes of memory and a 10M-byte hard disk. The XT is connected to a DEC VAX through another vendor's communications software. The major advantage of SQL Calc, the user said, "is the ability to use Oracle [DBMS] tables within the spreadsheet."

See SPREADSHEET on page 34

SOFTSCOPE

Tokyo firm to market Ramis II

Three's company. **Martin Marietta Data Systems** formed a three-company consortium to establish a Tokyo-based software company to be called **Intelligent Systems Co.** The firm will market and support Martin Marietta's Ramis II fourth-generation language in Japan. Other companies in the consortium are **Mitsui & Co.**, one of Japan's largest firms, and **Florida Progress Corp.**, the parent company of **Florida Power**. As part of the joint effort, a version of Ramis II supporting the Kanji character set will be developed.

See SOFTSCOPE on page 33

Software out for Cyber processors

By John Gallant

MINNEAPOLIS — Control Data Corp. last week moved to bolster the availability of applications software for its Cyber 180 processor line.

The company introduced a utility that automatically converts programs written in Digital Equipment Corp.'s VAX-VMS Fortran to CDC's NOS/VE Fortran for use under the NOS/VE operating system. CDC also unveiled a new Independent Software Vendor (ISV) program to encourage vendors to migrate applications for the Cyber 180/NOS/VE and the first two offerings in that program.

According to a company spokesman, the Fortran Conversion Aid (FCON) allows programmers to convert automatically the majority of VAX-dependent Fortran source code to its Cyber 180 equivalent.

See SOFTWARE on page 39

INSIDE

Twelve aerospace firms formed a consortium to develop reusable software and prototyping tools/41

Coordinating growing end-user computing has become a key MIS task, according to a DPMA conference speaker/42

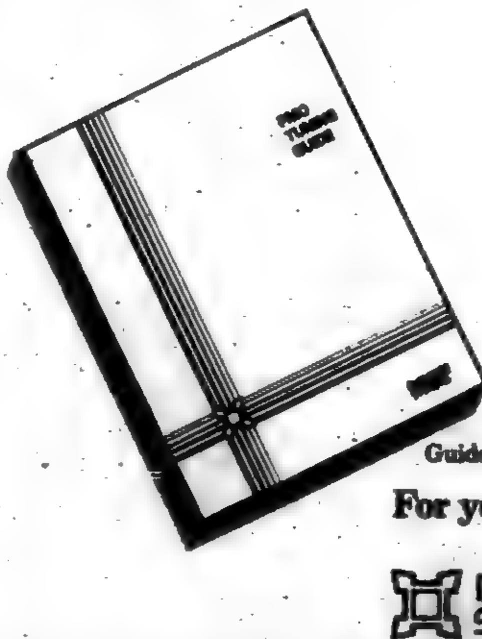
NEW THIS WEEK

- McDonnell Douglas enhances Reality
- ITT adds Advanceline to Dialcom network
- For more on these and other new products, see pp. 111-130.

INSTANT ANALYSIS

"The biggest obstacle facing fourth-generation languages is the stubborness of DP managers who insist on doing everything in Cobol."

— Philip Dorn
Dorn Computer Consultants



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4. PLEASE SPECIFY THE MAIN COMPUTER AT YOUR SITE:
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   - Model: ________

3317-81N5

Softscope notes

From page 31

Teaming up. Soft-Switch, Inc. has joined forces with two of the biggest names in the computer industry — IBM and Electronic Data Systems (EDS). The company's Soft-Switch document distribution software will now be available through IBM's Information Network. The software supports the exchange of revisable and final-form documents among a variety of office system environments.

EDS, a subsidiary of General Motors, signed a licensing and reseller agreement with Soft-Switch. Through the deal, EDS acquired a corporate license to use the company's software and rights to market those products to its own customers. EDS also obtained a corporate license to use Soft-Switch products in its 31 information processing centers nationwide. Each center handles data processing for GM, EDS and EDS' customers. EDS also became a venture-capital investor in Soft-Switch, acquiring an equity interest in the firm.

■

You're in the navy now. Computer Corporation of America (CCA), whose Model 204 DBMS was chosen by IBM for use in a U.S. Department of Defense contract, was recently awarded a $1.5 million multilicense contract with the U.S. Navy. The service's Military Personnel Command will use Model 204 to manage the Navy's officer and enlisted personnel distribution. The DBMS will be incorporated into the Navy Military Personnel Distribution System. CCA's UK sister company, CCA Limited, earlier won a $575,000 contract with the Royal Navy, which will use Model 204 for its Naval Manpower Information System. Sources within CCA said the Royal Navy contract caused something of a stir in the UK because it represented a reversal of the service's long-standing ICL mainframe-only policy in favor of IBM mainframes.

■

Reaching out. AT&T will nearly double the number of its nationwide customer programming services centers, which offer customized software design and other services to users of AT&T micros and 3B computers. The five new centers, which will bring the number of such facilities to 11, will open this month in Boston, Dallas, Los Angeles, Seattle and Washington, D.C. The centers offer technical consulting, project management, customized programming and on-site training services. Personnel manning the facilities include Microsoft MS-DOS and AT&T Unix programmers, systems analysts, applications consultants, documentation specialists and project managers.

■

Baiting the hook. With IBM's announcement that it is dropping support of System/34 software, Wang is really pushing its RPG-II Conversion Aid, a software package that converts applications written in IBM's RPG-II to run on Wang's VS processors. Wang is offering up to eight hours of conversion planning consultation to companies that purchase the $750 package. Users will be able to choose the nature of that support. Clients will also receive up to 40 hours of free technical assistance during the conversion period.

■

Users unite. Licensees of Nomad2, D&B Computing Services, Inc.'s fourth-generation language, have formed a users group. Formed as a nonprofit corporation under Delaware law, the Castle Software Corp., Inc. is designed to promote the exchange of information among users and to facilitate communications between users and D&B Computing Services.

■

Data center link. Duquesne Systems, Inc. and VM Software, Inc. have developed an interface that allows Duquesne's Shared Tape Allocation Manager for IBM's MVS operating system to interact with VM Software's VMtape package. The interface, to be available in January, will allow tape drives to be physically shared between VM and MVS without operator intervention. Shared Tape Allocation Manager allows MVS users to automate the allocation of shared tape devices; VMtape is a tape drive and volume management system.

■

Ada ahoy. The Software System and Technology Division of Control Data Corp. has begun work on a $13 million contract to develop the Ada Language System/Navy for the U.S. Navy. Ada Language System/Navy will be an expandable set of programmer support tools for large-scale Ada software systems for Navy standard computers. The contract will be in effect for four years.

■

Short stuff. Data General said Relational Database Systems, Inc.'s Informix family of relational DBMS tools will be available for DG's Eclipse MV superminis and its DS line of engineering workstations. DG will market and support the products.

Plexus Computers, Inc. will market and support R Systems, Inc.'s R Office, R Desk and R Word office automation software, and Access Technology, Inc.'s 20/20 spreadsheet package for Plexus' Unix-based multiuser computers.

Global Software, Inc. and Applied Data Research signed a complementary development and marketing agreement that provides for the joint development of ADR Datacom/DB compatible versions of Global's business applications.

Oracle Corp. said IBM will be selling and supporting the Oracle relational DBMS on the IBM System/88 line of fault-tolerant computers. Oracle's compatibility with IBM's SQL/DS and DB2 allows applications written for those systems to run on the System/88 under Oracle.

Applix, Inc. is porting its Alis office software to run on Apollo Computer, Inc.'s family of Domain workstations and server processors. Stratus Computer, Inc. will comarket Retrieval Systems Associates' Gensoft electronic publishing software with its minicomputers.

■

The case for CASE. Softool Corp. and Sun Microsystems, Inc. inked an agreement whereby Softool will provide three of its computer-aided software engineering (CASE) packages for the Sun line of workstations. The packages are Change and Configuration Control Environment, Fortran Programming Environment and C Programming Environment.

Lotus on a VAX?

SpellStar on a PRO?
MailMerge on a PDP-11?
PMS II on a VAX?
dBASE II on a PDP-11?
Lotus 1-2-3 on a PDP-11?
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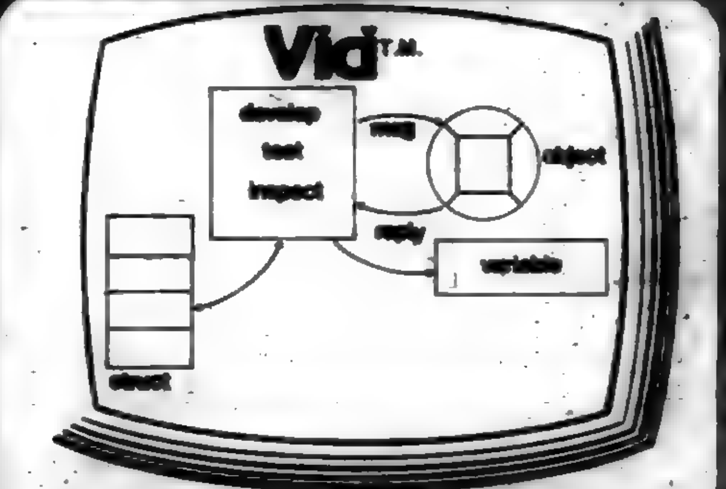

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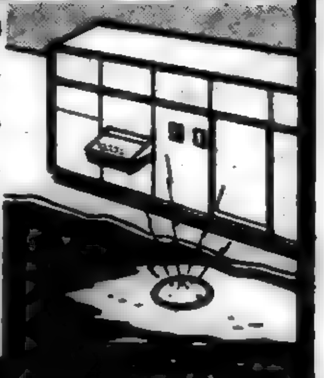

Spreadsheet users prefer SQL Calc

From page 31

The Citibank user told *Computerworld* he was spending a great deal of time typing data into the 1-2-3 spreadsheet. To enter data manually into 1-2-3 tables took six man-days once per month for one Citibank application, he said. The same task with the test version of SQL Calc used by the bank now takes 30 minutes, the user claimed.

The test version was not without its problems, however. SQL Calc sometimes provided incorrect values because it occasionally failed to assign a zero, or null value, when appropriate, the Citibank user said. He added that the bug had been almost completely corrected by Oracle.

The user found that, except for SQL statements and certain Oracle capabilities, the interfaces of SQL Calc and 1-2-3 are virtually the same.

The Citibank user said he will likely replace 1-2-3 with SQL Calc for his own use. His job is to make recommendations to each Citibank operating department on whether to use SQL Calc.

While a final determination will not be made until he receives another update of the software, the user said he is likely to recommend use of SQL Calc for those departments that need to save time on manual data entry. "I feel it will pay back quickly," the user said.

Compared with 1-2-3, according to EDS' Ann Keiper-Smith, SQL Calc is "easier to read and easier to work with." Keiper-Smith, whose work is classified, uses the spreadsheet to manipulate statistics for applications used by the U.S. Marines and Navy.

> ❞
>
> *Except for SQL statements and certain Oracle capabilities, the interfaces of SQL Calc and 1-2-3 were found to be virtually the same.*

She installed SQL Calc in August on an IBM Personal Computer XT with 640K bytes of memory, used on a stand-alone basis. As a 1-2-3 user, Keiper-Smith was interested in cutting down on time spent manually entering data for spreadsheet calculations and data base updates. With SQL Calc, "I'm really pleased with how easily I can get data out of my data base," she said.

In a typical operation using 1-2-3, Keiper-Smith had to print out a list of files she wanted to manipulate, then manually type the required data into the spreadsheet. Once a calculation was complete, she would print out the results and type in the data that was required to update her data base.

"It was a waste of time," she said of the data entry. SQL Calc allows her to pull data into the spreadsheet directly from the Oracle DBMS with a simple command. An SQL Calc function also allows her to update the DBMS once the calculation is executed.

A capability not offered in SQL Calc that Keiper-Smith would like to see is a command set feature. That would allow a user to group a set of SQL commands together and save them for repeated use.

Files not maintained by 1-2-3 can be transferred to 1-2-3 spreadsheets, but they must first be converted into the Document Interchange Format. "It's a real pain," Keiper-Smith said of the conversion process.

In an SQL Calc bug detected by Keiper-Smith, arithmetic calculations were off by 1% for fractional decimal digits. The vendor has corrected the problem, she said. Also, she found that SQL statements longer than 256 characters would disrupt her processing by corrupting her data base and spreadsheet. In such cases, both had to be reformatted.

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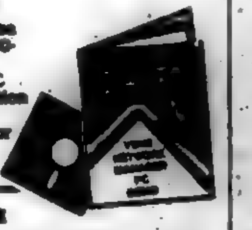

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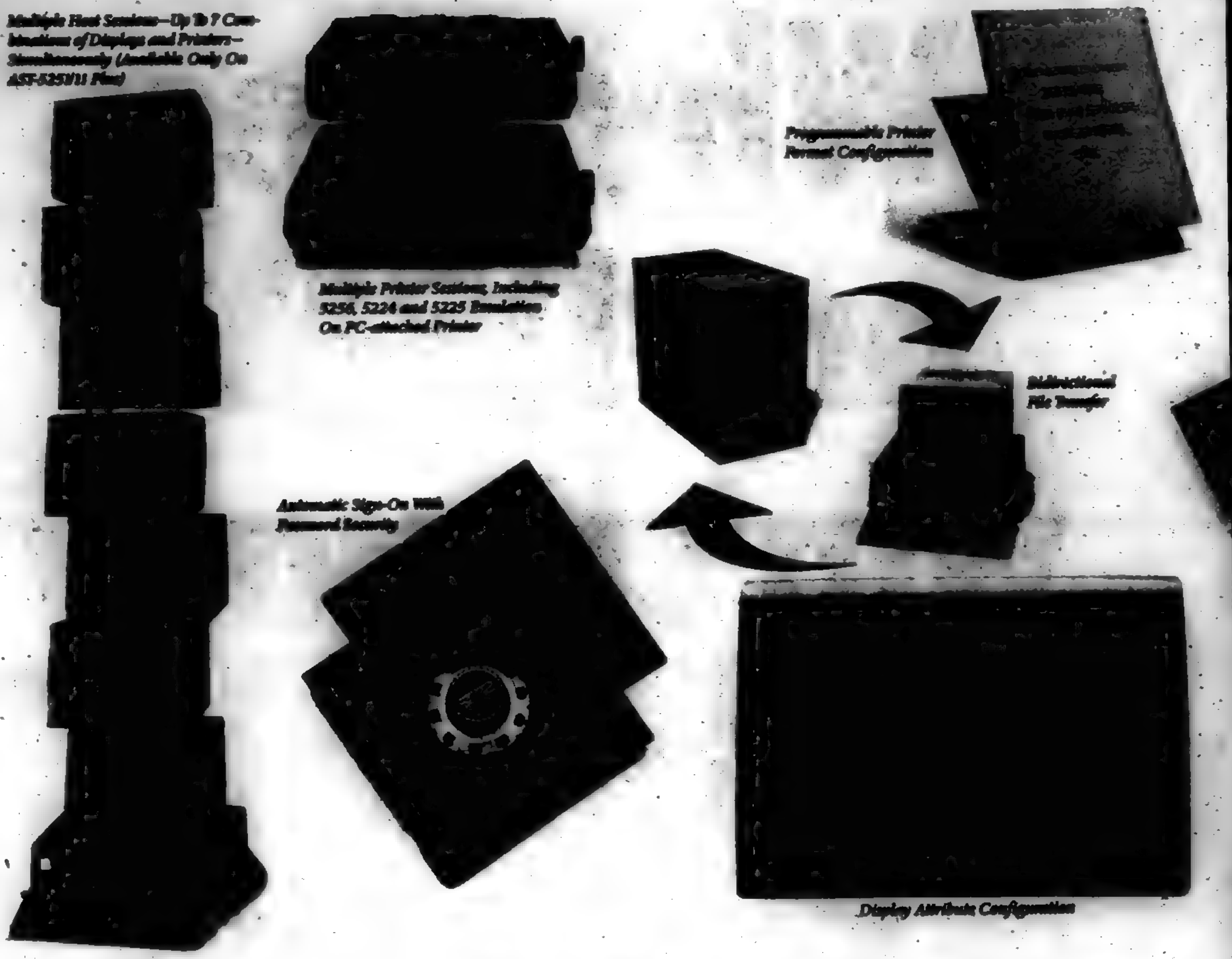
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Our other modem is the IBM Personal Computer Modem—an internal, half-card modem that operates at 0-300, 600 and 1,200 bps asynchronous.

The Non-Identical Twins

In some respects, these two modems are very similar. For example, they both have Automatic Adaptive Equalization—which means they will continuously fine-tune themselves to compensate for changes and noise on the telephone line. The result is, you can receive data over a wider range of phone line conditions. This is one of those features more often found on faster, more expensive modems.

In addition to automatic answering, both modems offer Adaptive Dialing—which means that if you don't specify either tone or pulse dialing, the modems try tone dialing for one digit, and if that doesn't work, they automatically switch to pulse dialing.

Both modems will automatically redial a number as many times as you tell them to. Or if you prefer, they can switch to an alternate number on a busy signal or a no answer. Once a connection is made, the modems automatically detect and adjust to the incoming transmission speed. They can also initiate an automatic log-on sequence including control characters, ID number and password.

And both modems have extensive "Help" screens, a complete complement of built-in diagnostics, a programmable speaker, and two phone jacks on the back so both your phone and the modem can be connected to the same line at the same time. You can even switch between voice and data without interrupting the phone call.

A Modem with a Memory of Its Own

The IBM 5841 stand-alone modem has some additional features you don't usually find on 1,200 bps modems. For example, the modem is switchable between asynchronous and synchronous modes and has a 20-entry Dialing Directory. Kept in non-volatile storage, the directory enables the modem to dial up and log on to systems automatically. This feature is most convenient when the 5841 is used with a fixed-function ASCII terminal such as the IBM 3161 or 3163.

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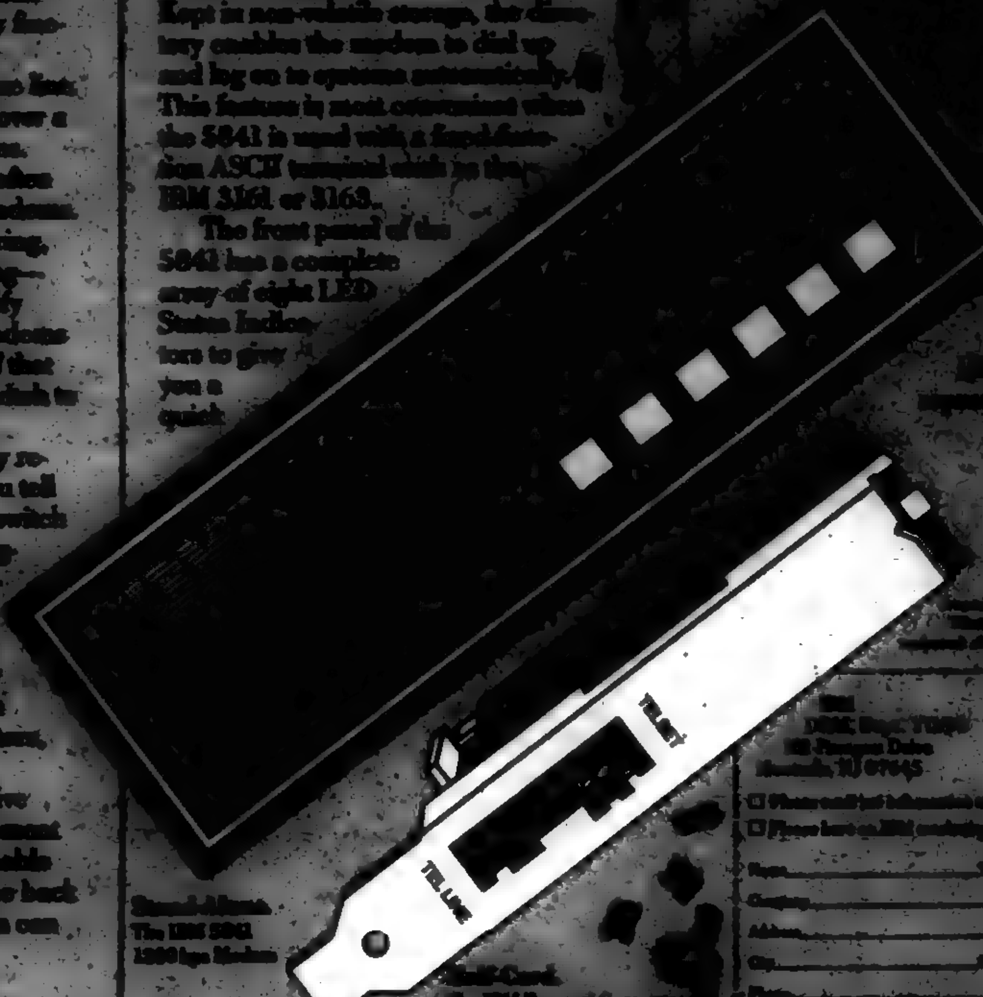

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Languages step back, go ahead

From page 31

commitment to a fourth-generation language is to enhance the performance of "transaction-bound" applications — applications that must execute a set volume of transactions.

Users experienced in developing production applications in a fourth-generation language often prototype and then test. Testing may expose bottlenecks, where the demand for data base access exceeds the volume comfortably supported by the fourth-generation language, slowing response times to an unacceptable level. Those procedural bottlenecks can be implemented in a lower level language such as Cobol or assembler to bring response time up to par.

For less demanding applications such as query and reporting, fourth-generation languages integrated with a data base management system offer clear advantages over Cobol. Instead of requiring an MIS professional to write Cobol programs that extract data from various sources, end users write language statements that perform the extractions and data base calls under the covers. Here is where the astronomical productivity gains of more than 10:1 vs. Cobol are primarily being achieved.

Vendors are responding to user demands for greater performance from the higher productivity languages in a variety of ways. Code is being precompiled or embedded with tokens — which point to subroutines during execution — to cut down interpretation at runtime. In some cases, procedural code is being offered in addition to nonprocedural. But most vendors now say their language will never be as efficient as compiled Cobol code. Most serious users of fourth-generation languages seem to have sacrificed performance in favor of the productivity gains. Performance is not the issue.

As they enter this more mature phase, it is time for the fourth-generation languages to increase market share and further penetrate the user base. If they don't, they risk losing ground to the next generation of application development software that combines a fourth-generation language with other tools like an application generator and personal computer windowing capability.

A key challenge for vendors is to make their fourth-generation languages truly exploit the power of personal computers. By aiming at this market, the vendors can help data processing managers looking for ways to cut the applications backlog and satisfy end users who have personal computers on their desks but limited ability to solve business problems owing to a lack of software.

Some vendors have full personal computer versions of the languages, and most others are developing such versions. These powerful personal computer software tools are the likely forerunners to packages embued with artificial intelligence that will gracefully guide users through the development steps. Such programs are a long way off.

Except for the medium-size shop with simple needs, users today are not likely to find the total solution in one fourth-generation language product. Morgan Stanley's Abbey advises, "The key is to make sure the products you get can be integrated to provide a single solution to the end user. He just wants to press a button on his terminal and get the answer."

Software out for Cyber processors

From page 31

The tool appears to make a variety of user-developed Fortran applications available to customers interested in running a Cyber 180 system.

FCON will identify code that cannot be automatically converted and generates a listing file with diagnostic messages to simplify manual conversion. FCON is priced between $60 and $150 for a monthly lease or $1,000 to $2,000 for paid-up license.

Software vendors that agree to participate in the ISV program will convert or enhance existing applications to run under NOS/VE in return for CDC's technical and marketing support services and, in certain cases, financial incentives. CDC will provide discounts of up to 40% to participants on Cyber 180 Model 830 development systems and a variety of conversion support services.

The first two packages available to users through the ISV program are Pafec Ltd.'s Program for Automatic Finite Element Calculations (PAFEC) and the Numerical Algorithms Group Fortran Mark 11 Library from Numerical Algorithms Group Ltd.

PAFEC, a tool for use in computer-aided design, allows an engineer to solve complex problems in statistics, dynamics and heat transfer. It is a three-dimensional, multipurpose linear and nonlinear system designed for use with large-scale computers in CAD. It combines engineering key words with free-format input so the system can be used by engineers with different expertise levels. It is priced at $35,000 plus a 12% annual maintenance fee.

The Mark 11 library is a programmer productivity tool that allows a user to choose from the menu of a library of previously tested subroutines. It features more than 500 mathematical and statistical routines for developing and maintaining applications for research engineering, planning and statistical analysis, the spokesman said. It is licensed annually at $1,800.

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SOFTWARE & SERVICES

Aerospace firms join venture

By Bryan Wilkins

WASHINGTON, D.C. — Twelve aerospace companies with large investments in the growing use of software in U.S. defense systems have established a joint research venture called the Software Productivity Consortium.

To be located in Reston, Va., the Consortium aims to develop reusable applications software components and to develop knowledge-based systems. The group's annual budget will be $20 million.

The consortium is composed of Allied-Signal Corp.; Boeing Co.; Ford Aerospace & Communications Corp.; General Dynamics Corp.; Grumman Corp.; Lockheed Missiles & Space; McDonnell Douglas Corp.; Northrop Corp.; Science Applications International, Inc.; TRW, Inc.; United Technologies Corp.; and Vitro Corp.

Harris Corp. and Martin Marietta Data Systems have also indicated their intention to take part in the consortium.

Transfer engineering results

The research facility will initially transfer the results of its work in software systems engineering to its limited-partner member companies. The development of reusable software components and prototyping software will be the first tasks of the consortium, with a two year start-up period expected before products are delivered.

According to a spokesman, the consortium was founded as a way to control the escalating costs of developing software for the U.S. Department of Defense.

The consortium cited estimates by the Electronic Industries Association showing demand for mission-critical software jumping from $5 billion to $6 billion in 1982 to more than $32 billion annually by 1990.

BCS effort targets systems modeling

SEATTLE — Boeing Computer Services Co. (BCS) has embarked on an effort to develop an expert system for mathematical modeling, according to BCS's national product sales manager, John Corrie.

BCS's knowledge engineers are currently interrogating recognized experts in mathematical modeling and are codifying the results for eventual inclusion in the proposed system's knowledge base, Corrie said during a recent BCS press briefing.

When complete, the system will be used in-house by Boeing Co. to support its aircraft design activities and will also be sold externally to the firm's customers, Corrie said.

The system is unlikely to be released commercially for at least another two years.

— Jeffry Beeler

IBM mainframes get file compressor

Prime Factors, Inc. of Oakland, Calif., has introduced a data compression system for IBM mainframes and plug compatibles.

Compact/LZW compresses files for tape and disk storage. The product is independent of operating systems and disk-access method, a spokesman said. Compact/LZW operates under IBM's DOS/VSE, OS/VS1, MVS, MVS/XA and VM.

The system has the following compression percentages: 55% for English text, 80% for Cobol and other source languages and 35% for object code, a spokesman said.

Compact/LZW, available now, sells for $2,500 per CPU.

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End users, DP managers must keep communications open

By James A. Martin

HOUSTON — While end-user programming in many cases is helping to overcome such persistent problems as applications backlogs, a lack of communication between end users and DP and senior managers can create turmoil in a company's efforts to maintain DP standards and to plan accurately for MIS needs, according to Murray Pomerantz, manager of market information and analysis for United Airlines in Chicago.

Pomerantz, speaking at the Data Processing Management Association conference recently, said companies, when planning MIS needs, will often not take end-user programming into consideration. "That's because they aren't aware of what the end users are doing. There needs to be an exchange of ideas on what end users are doing and where they're heading. That is just not happening enough."

A mutually satisfactory approach for end users and DP managers would be helpful because otherwise, Pomerantz said, "no one is happy." End users do not want to be bound by companywide standards, while DP managers do not want to compromise those standards.

"But somehow, you have to come up with some set of guidelines," he added. If an end user develops an application or program that does not conform to the company's standard and has not adequately trained other end users, DP management could be hard-pressed to support that application should that user leave the company, he said.

Keeping current on products

Information centers that serve end users must strive to keep current on what products end users are using, the speaker said. Information center staff "are called in to put out the fire when an end user has a problem with not understanding [Lotus Development Corp.] 1-2-3," Pomerantz said.

"The experts are out there consulting, helping the users out, but they don't program applications themselves. There are end users who have been doing this for years, who have built complex systems and who know more than the company experts," Pomerantz said.

Effective education and support strategies are important in the success of end-user programming, Pomerantz added. Senior and middle managers must also be trained to understand the benefits, costs and risks of end-user programming.

"All too often," Pomerantz continued, "a senior executive finds out about an end-user program because of a disaster occurring, rather than from something positive."

One person must be responsible for overseeing the end users, the speaker said. "It can't be someone from the users' side," Pomerantz said. "It must be someone with a global corporate view so he can help senior management understand what's going on and can oversee the applications development."

In addition, Pomerantz exhorted end users to "expose yourselves. Let senior management know what's going on. Ask for help to control and manage your programming; define more clearly the roles and responsibilities of auditors, the information center and the traditional applications programming people. Educate people at all levels and get top management involved."

Pomerantz said more end-user programmers are moving toward hybrid developments with the DP department.

"There are certain applications that best lend themselves to being done by the end user, while delivery of that data, from which a system is going to live and thrive, is best handled by the DP side," he said.

DBMS upgrade out for VAX

Software House of Cambridge, Mass., has announced Version 5 of its System 1032 relational data base management system for Digital Equipment Corp. VAX processors running under IBM's VMS.

The enhancements are said to include extended reporting facilities with elastic-default and dynamic-join features. The elastic-default feature allows users to call in text, variables or procedures at any report control breaks. Joined printing allows the display and summarization of data from multiple data sets.

The expanded reporting facility of Version 5 is integrated into the System 1032's fourth-generation language. The language is nonprocedural and includes a conversational query language and a data dictionary.

Version 5 of System 1032 also adds automated recovery and record-level security capabilities.

Version 5 of System 1032 also features automated journaling/recovery and extended data security features. The extended data security adds value-based and record-level functionality to System 1032's data set and field-level security features. DP managers can deny access to individual records based on field value.

The System 1032 relational DBMS ranges in price from $8,000 for the Microvax to $80,000 for the VAX 8600.

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SOFTWARE & SERVICES

Comprehensive security system crucial to corporate protection

Inventory, data flow, accounting controls key

By Neil L. Solomon
Special to CW

The issue of computer security — protecting equipment from theft and damage and maintaining the integrity of data both from error and intentional manipulation — boils down to corporate self-protection.

A recent survey of large and small companies conducted by the American Society for Industrial Security showed that 65% of the companies surveyed have some type of computer security program. While this figure indicates awareness of the importance of computer security, it does not measure the sophistication of each company's program. Some say they feel they are sufficiently protected by keeping their mainframes behind locked doors.

Recently, with the explosion in the use of microcomputers and word processors and their increasing capabilities for mainframe uploading and downloading, computer security has become more complex. Sensitive information once stored solely on the mainframe is now found in unlocked offices throughout the company.

And as people become familiar with how computers work and gain greater access — either authorized or unauthorized — to data, the company becomes more vulnerable.

A major problem with most corporate computer security policies is that they are not comprehensive. Also, different people are responsible for different areas. For example, an executive with a desktop can have sole responsibility for the protection of that hardware and a set of storage media while a different person is responsible for mainframe protection.

A primary reason for this is that the company's traditional source of protection, the central security department, is probably not equipped to handle the technological aspects of computer security. In the American Society for Industrial Security survey, only 35% of the companies with a computer security program place the responsibility for it with their security departments. More frequently the responsibility is kept in the hands of information systems personnel.

Developing and maintaining an effective and coordinated computer security program requires the expertise of different specialists. A well-designed security program typically grows out of an analysis of three overlapping factors:

- Physical security. This includes taking inventory of all equipment and assessing its vulnerability in terms of location and access. Surprisingly, many companies do not know exactly how much equipment they have.

Physical security assessment encompasses potential dangers from fire and water damage as well as theft and intentional or unintentional damage by operators or other employees. And it includes the data stored on magnetic tape or disks and printouts.

Controls that come out of the assessment can include locks, guards, equipment isolation, alarm systems and restricted access procedures. Data protection can include off-site storage of backup tapes and tape archives.

- Investigating accounting. This function finds where potential fraud could occur within computer operations. It identifies the sources of data input and retrieval. It also shows on which data areas the company is most dependent and the data that should be considered the most sensitive. Further, it tells which areas of the data input and retrieval should be auditable and to what degree.

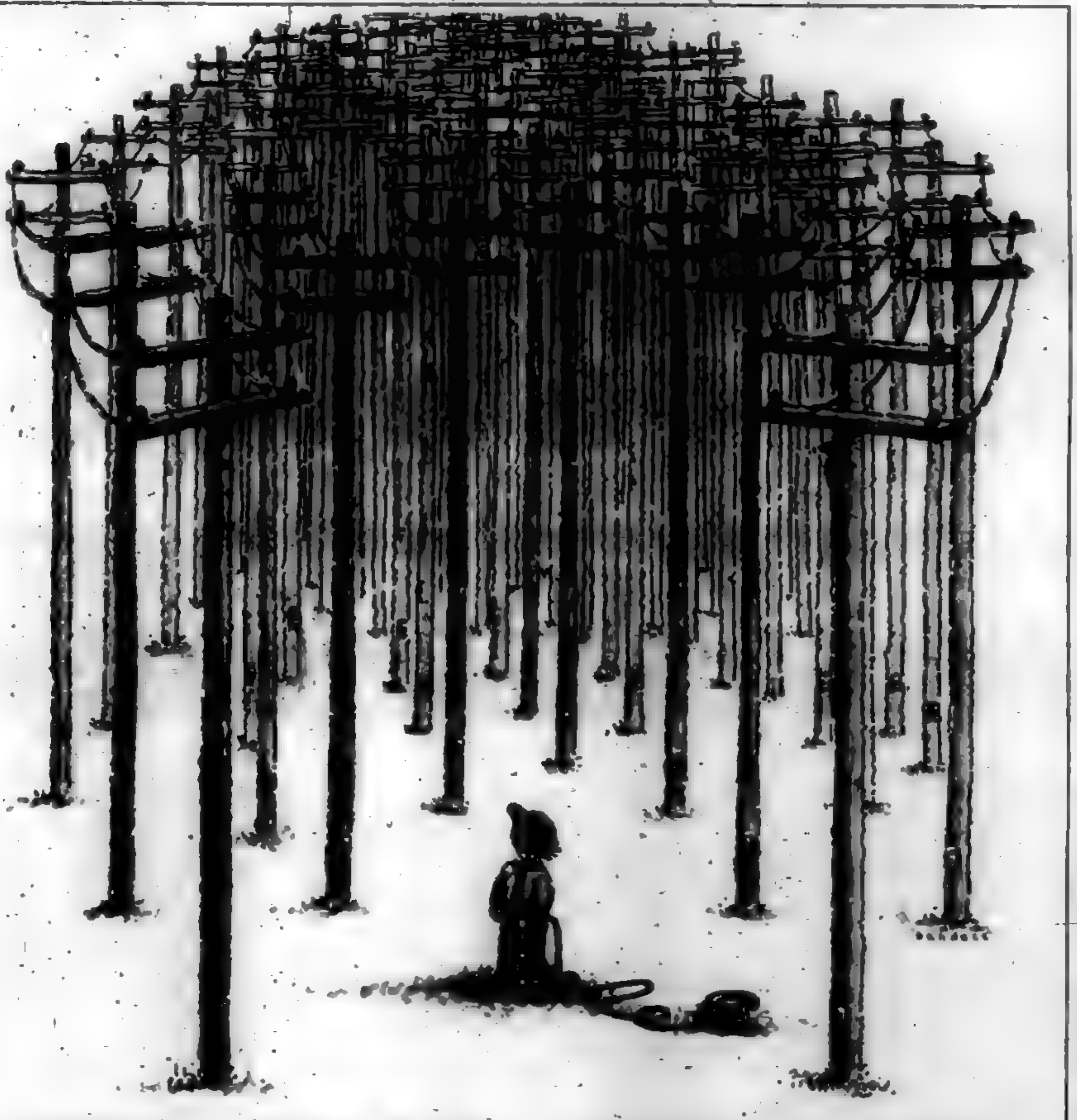
- Data flow controls. Based on the accounting analysis, an assessment of the security weaknesses inherent in currently installed and proposed software is made. Data flow controls are then built into the system, either through software or through data security products.

These controls could include limiting uploading and downloading access through codes and passwords. Or they could track accountability for all input and retrieval on certain files. And, for systems with telephone hookup, safeguards against outside intrusion would be necessary.

The controls that are developed from a computer security audit are people controls. And since about 90% of intentional computer tampering, as well as error, is committed by employees, they are employee controls.

At the heart of every effective computer security program is the careful selection and screening of employees. Background checks should be made on people who will have access to sensitive data. As with any security background checks, however, care should be taken to conduct the investigation so that lawsuits will not result if a prospective employee is not given the job because of information found during the investigation.

Solomon is vice-president of technical services for Guardsmark, Inc. of Memphis, a security service and consulting company.



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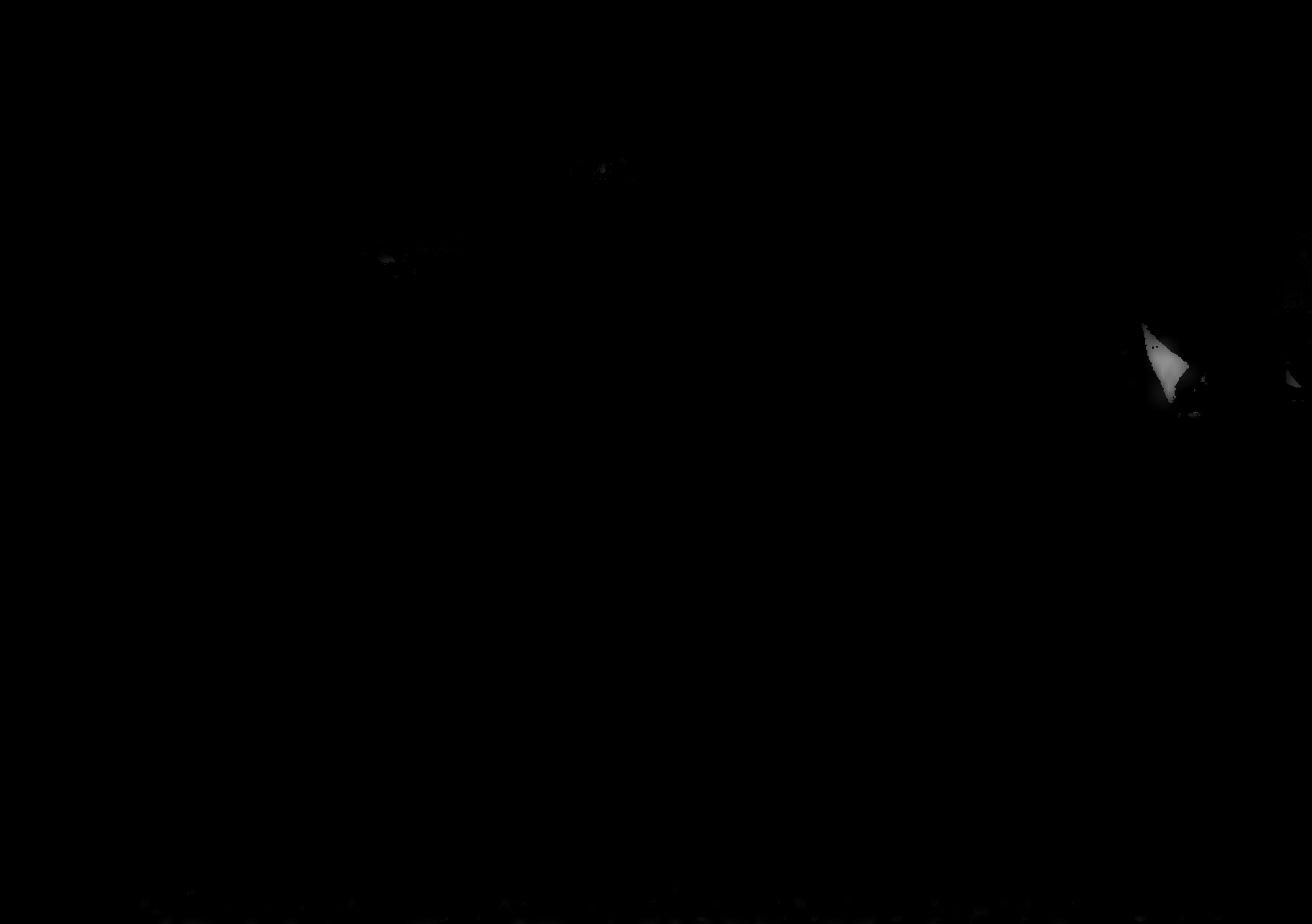

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In the torrid race to claim the fastest high speed modem, many companies advocate basing your buying decision on one thing: speed. What's happened, unfortunately, is that these speed claims are beginning to blind people. So much so, in fact, that modem purchasers are losing sight of the difference between modem speed and data throughput. Between addition and integration. And between out-of-pocket expenditures and intelligent investments.

Codex would like you to take one step back for just a minute. Allow us to submit the following questions.

What level of performance do you really want out of a modem which operates at 19,200 bps? How much more efficient will it make you? How much throughput can you expect? What support, such as line conditioning, centralized network control capabilities and staffing will you need to maximize efficiency and control costs?

These are the *most important considerations* when evaluating a high speed modem. *Any* high speed modem.

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Introducing the Codex 2680

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because the Codex 2680 fully answers the most important considerations. And because it is not a revolutionary design, but rather an evolutionary one, based on the technology of a series of modems which have remained the most technologically advanced in the industry since they first appeared: the Codex 2600 Series.

The new Codex 2680 19,200 bps high speed modem.

High speed modems vs. high speed communications

The Codex 2680 sets new standards for performance and reliability among very high speed modems. By combining the Codex proprietary custom VLSI design and the power of the Motorola 68000 microprocessor, the Codex 2680 provides the highest and most consistent level of data throughput of any 19.2 kbps modem available.

This superior performance is achieved in a number of ways. By utilizing enhanced 64-state 8-dimensional Trellis Coded Modulation (64 x 8 TCM), one encoding bit is interwoven with every 28 bits of the original transmitted stream. The result, quite simply, enables the receiver to both interpret and select the best sequence of bits which most accurately represent the data transmitted. Codex also positions the error-correcting data in a smaller signal constellation, thereby making it less susceptible to line disturbances.

In actual use the Codex 2680 delivers 99.9% error free data over more than 90% of standard 3002 D1 conditioned lines at 19.2 kbps.

The Codex 2680 also incorporates Codex's Adaptive Rate System (ARS). This feature eliminates the need for manual monitoring and reconfiguring of data rates, optimizing throughput under all line conditions.

The big payoff

Speeds of 19.2 kbps allow you to realize dramatic increases in efficiency *and* productivity. Without increasing expenses or staff resources.

You can use D1 lines instead of C-conditioned lines, so you can achieve substantial savings in monthly leased-line costs. From day one.

And these savings add up. Fast. With its standard 2-channel multiplexer, you can eliminate extra lines. For example, by combining two separate 9600 bps circuits into one leased-line at 19,200 bps, typical savings for a New York to LA link are greater than $24,000 per year.* And that's just in leased-line charges. You'll save more on hardware as well.

What's more, the Codex 2680 offers complete network management capabilities for monitoring and fault isolation. It can operate independently or with your present central site Codex network management and control systems, to ensure greater network availability.

In short, it's a modem that's really a true network system resource.

It's all perfectly clear

Another important feature of the Codex 2680 is the fact that it is shipping right now. Not tomorrow. Now.

If you still have questions or would like a product demonstration, simply call **1-800-426-1212, ext. 227.** Or write Codex Corporation, Dept. 707-227, 20 Cabot Boulevard, Mansfield, MA 02048.

The quicker you do it, the faster you'll be achieving what you really want out of a high speed modem.

Performance.

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*Based on average installation and leasing charges for 3002 D1 circuits as of 10/85.

History In The Making

Everyone in the high technology industry knows of, knows about, or at least acknowledges the existence of Leading Edge Products, Inc. The company, which recently celebrated its fifth year in the high tech business, has clearly etched away a chunk of the personal computer market — much to the surprise, and concern, of its competitors.

A closer look at the history of the company, however, reveals a unique marketing approach that has not only survived the toughest years of the personal computer industry, but has grown, gained, and established undeniable credibility.

Way back in the spring of 1980, five people with varying business and marketing backgrounds discussed the opportunities that existed in the then blossoming personal computer industry. They uncovered what turned out to be one of the most productive avenues ever pursued in the entire history of the industry: a single distributorship catering exclusively to the then hundreds (now thousands) of independent retail computer outlets.

The concept was to make computer products more affordable to the public through mass production, very much the way the Ford Motor Company did with the automobile — via economies of scale. The founders of Leading Edge hoped to free the minds of the masses with personal computer products, the same way the car physically freed the bodies of the masses when automobiles became an affordable reality.

They began with a product we all remember, Memorex disks. Using a few phones, a few people, and lots of directory assistance, the fledgling company went into business. Six months later, Leading Edge was the largest distributor of the product.

Hundreds of independent retail outlets, ranging from mom and pop dealerships to multi-store organizations, absolutely loved the convenience of the over-the-phone sales representative. Orders were shipped fast, no time was wasted watching live sales pitches, and each call represented a direct connection to the company. Although selling high tech equipment over the phone was considered ludicrous at the time, it proved to be a very accurate, economic, and effective strategy.

The product line began to grow. The Elephant Memory Systems Division was formed to sell Elephant brand floppy disks in 1981. Later that year, Leading Edge began selling C.Itoh printers, and was soon granted exclusive distribution rights.

The dealership network grew tremendously, and so, consequently, did the company. By mid 1981 there were over 30 telemarketers calling nearly 4,000 dealers. The annualized sales volume had exceeded $60 million by the end of Leading Edge's third year in business.

The next year brought on some changes for Leading Edge, all of which were part of the company's long term plans.

First, Leading Edge began producing software. Millions of dollars went into the research and writing of Leading Edge Word Processing to make it powerful, easy to learn, and affordable. The successful package became all three.

Then Leading Edge sold the C.Itoh printer division to C.Itoh and the Elephant Memory Systems Division to the Dennison Manufacturing Company. These moves were made, as part of the corporate strategy, to make the transition from peripherals to personal computers.

Late in 1983 Leading Edge announced its first personal computer, the IBM compatible Leading Edge Personal Computer. The Model "M" was the first Japanese-made IBM compatible ever to sell into the United States.

Daring advertising claiming "The day the IBM PC Became Obsolete" began appearing in every computer-related publication on the face of the earth. Because of its superiority over the IBM PC and the low price tag, sales figures multiplied exponentially. Reviewers raved, dealers were delighted, and consumers rushed. Shelves emptied faster than deliveries filled them.

Earlier this year, Leading Edge announced a co-design and exclusive manufacturing and marketing agreement with the multi-billion dollar Daewoo Corporation of South Korea. Leading Edge product marketers and Daewoo manufacturing engineers sat down and designed what industry specialists now call one of the best designed machines in the history of the industry. (See: Consumer Reports 10/85, PC Week 10/8/85, PC Magazine 9/18/85)

Leading Edge will never be content resting on its laurels. Although the Model "D" is forecast to be one of the most successful personal computers of the year, research goes on at Leading Edge. The company continually monitors the market via their established dealership and responds with the products in demand.

Support Proves Critical To PC Sales

A few short years ago, when Leading Edge Products, Inc., was a young and growing personal computer product company, someone thought up the idea of offering the end-user support.

From that precedent-setting day on, Leading Edge has remained an industry leader in the support arena. A look back tells the story.

Elephant brand disks, one of Leading Edge's earlier products, were the first to be guaranteed for life.

Later, Leading Edge printers were the first to come with a full-year warranty during a time in which most vendors didn't concern themselves with post-purchase difficulties after 90 days.

Repair centers were authorized by Leading Edge to honor the warranties at a rate of several per day, until there were hundreds spanning the continent.

Support became such a major selling point for Leading Edge, it soon carried over to their other product lines.

Leading Edge software, for example, comes with a phone number which you can call if you have a problem. The service is free, and so is the phone call. Both come with the software as a standard feature, and last a lifetime.

When Leading Edge began marketing personal computers, the support tradition continued.

Again, while most other vendors don't offer any warranties and others charge for it, Leading Edge offers a full year at no charge.

And the company's new Model "D" Personal Computer comes with an unprecedented 15 month warranty.

The technical support hotlines carried over to the personal computers too. End-users can now call, toll-free, and talk to qualified technicians about their hardware products, whether it be about something as simple as plugging it in or as complex as adding an internal disk drive.

Leading Edge was a pioneer in the support end of the industry. Today, they continue with this spirit, out supporting most other companies. Even though they don't charge extra for it, the service is priceless.

Product Definition: Know Thy Market

The success of Leading Edge Hardware Products Inc., designer and marketer of personal computer products, can be attributed to the company's thorough understanding of the marketplace.

While most other high tech firms try to muscle new products into the market with large advertising budgets, Leading Edge carefully monitors the market and provides only the products that are in demand.

Leading Edge utilizes its established nationwide dealer network to keep in touch with the consumer market. Each day Leading Edge telemarketers receive an average of 3000 phone calls, while placing 3000 of their own. Every single piece of information is listened to, analyzed and evaluated.

Leading Edge has also implemented what is known as an "information agency," where an entire staff is dedicated to the research of the high tech market. The researchers scrutinize every single high tech publication from around the globe. Their PCs tap every available database, and their phones are constantly ringing. The information they have compiled rivals that of a good-sized library.

continued

Advertisement

Then there are the product evaluation and quality assurance people. These people rigorously test everything, both from what Leading Edge sells and what the competition is selling.

They melt chips, crash programs, and drop boxes until they understand everything there is to understand about a product. Their thorough understanding of every single product is relied upon by Leading Edge marketing people religiously.

All of this constant and thorough contact with the marketplace provides Leading Edge with fresh, accurate, and otherwise unobtainable information upon which sound marketing decisions are based.

The fact that Leading Edge has yet to market a flop, and that their problem tends to be keeping products on the shelf — not moving them off — proves this method highly effective.

Take a look at Leading Edge's newest personal computer, the Model "D". The design of the Model "D" addressed the needs of the marketplace so accurately, sales figures are exceeding even the wildest forecasts. Predictions have already been made that Leading Edge will assume one of the top three spots among personal computer manufacturers.

With anticipated 1986 calendar year sales of $250 million, predictions have already been made that Leading Edge will assume one of the top three spots among IBM compatible personal computer marketers.

All that really matters is that Leading Edge is one high tech company that is in tune with the market. Keeping in tune keeps this company at the Leading Edge.

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Product Mix Readied, Aimed, Fired At Defined Market

Leading Edge personal computer products are unlike any other in the high tech industry. Not because of technical wizardry and useless bells and whistles, but because they break the barrier that the two distinct and separate market giants, namely Apple and IBM, have imposed on the rest of the world.

Leading Edge products simply offer IBM performance at Apple prices — something no other manufacturer has ever done.

Apple had been doing a fantastic job catering to the home and educational markets because of the low price and simplicity of their products.

IBM, on the other hand, moved into the business segment of the market — where some managers trade price considerations for security — capitalizing on their mainframe stronghold and product sophistication.

Leading Edge took advantage of this market segmentation by offering inexpensive products that could outperform IBM standards while adhering to IBM compatibility.

The decision to emulate the industry standard allows Leading Edge to capitalize on the thousands of IBM software packages and peripherals that already populate the market.

But Leading Edge products often take the compatibility one step further by outperforming the products they are butting heads with.

Leading Edge's new Model "D" PC, for example, is priced far below the IBM PC, yet the Model "D" comes with several features the IBM doesn't.

The "D" is built around a unique motherboard which houses monochrome and color graphics output, parallel and serial ports, and room for expansion up to 640K — all of which are usual extras in the world of IBM and compatibles.

The Model "D" exceeds IBM performance standards while remaining as affordable as the non-IBM compatibles, like the Apple.

People by the thousands are beginning to understand the impact of that accomplishment on the personal computer market.

Homes, schools, small-size businesses, medium-size businesses, large-size businesses, local, municipal, state and federal governments, and fortune companies alike, appreciate what Leading Edge has done. In fact, 40 Fortune 400 companies already own Model "D"s.

Another Leading Edge personal computer, the Model "M" is similarly positioned. The Model "M", a bigger and faster unit than the Model "D", also upholds the Leading Edge price/performance philosophy.

Retailing at a price palatable to the lower end of the market, the Model "M" again outfeatures the IBM PC. The high speed microprocessor and six expansion slots are a couple of reasons why.

The same can be said about software. Leading Edge Word Processing is priced at about half of what the market will pay for a similar package.

Yet, Leading Edge Word Processing stands up, feature-for-feature, against any of the other big-name packages. On top of that, it's as easy to use as the inexpensive ones.

Nutshell Information Manager, another powerful Leading Edge software package, costs little more than a metal file cabinet and is almost as easy to use. The critics have had nothing but good things to say about it.

The list goes on.

And to make things worse for the competition, Leading Edge always backs their products with the best support in the industry.

The hardware, and software, warranties plus the free lifetime technical support for both product lines, make Leading Edge the undisputed leader in terms of support.

The market strategy of Leading Edge becomes sparkling clear: make the best IBM compatible products, sell them at the best prices, and back them with the best people.

Who's Who At Leading Edge

There is something different about the people at Leading Edge products.

Embellishing the staff of hard core "techies," marketing bigwigs, and seasoned sales supervisors, are ordinary people.

Behind some keyboards, desks, and telephones are not your typical computer-type people, but instead ex-teachers, ex-Marines, ex-policemen, and other unusual ex-backgrounds.

Supporting staff members are hired for their communication skills, ability to learn, and eagerness to grow, not MIT degrees. This strategy seems to make sense when one considers that 90% of this company's business is communicating.

As the company continues to grow, a greater diversity of people accrue. The success of Leading Edge indicates that this unusual approach has garnered some of the best professionals in the industry.

Professional-Level Power

*Consumer Reports says:

“The Best Buy among the IBM-compatibles is the Leading Edge Model "D". It comes with a high-resolution monitor and the circuitry necessary to display very sharp text as well as monochrome and color graphics. And it has enough ports and expansion slots to build just about any computer system you might want in the future.”

*Consumer Reports is not affiliated with Leading Edge Products, Inc. and does not endorse Leading Edge's products or any other products.

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The Leading Edge® Model "D" Personal Computer
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MICROCOMPUTERS

SMALL TALK
Morton Rosenthal

New answers from Q&A

We've heard a lot about the merits of artificial intelligence. Now, finally, we're seeing AI incorporated into a highly touted software product that purports to make personal computing not only easy but fun. Has AI actually arrived — or does it still need work?

Q&A from Symantec Corp., a $299 package for IBM Personal Computers, is a file manager with a built-in word processor that has potential to bring new meaning to the term "user friendly." This new package has the simplicity of Software Publishing Corp.'s PFS series — or the IBM Assistant series, which is nearly identical. It even employs a similar user interface.

But what makes this new product really different is its Intelligent Assistant, a natural language front end that lets you query and manipulate the data base by making your requests in plain English.

For example, the Intelligent Assistant will allow you to retrieve data by typing in the statement, "Show me all Midwest region sales representatives whose sales are greater than their quotas."

The cursor then flashes across your words, pauses where necessary to ask for a clarification or additional information and displays a formal interpretation of your request. The request above would generate the command, "Create a report showing sales repre-

See NEW on page 50

Rosenthal is chairman of Corporate Software, Inc. of Canton, Mass., a leading supplier of personal computer software to large corporations.

Guru AI environment out

Expert system shell links to standard applications

By Eric Bender

LAFAYETTE, Ind. — Widening the horizons of the all-in-one microcomputer software program, Micro Data Base Systems, Inc.'s (MDBS) new Guru program adds an expert system shell and a natural language front end to the usual collection of applications.

Priced at $2,995 and scheduled to ship this month for the IBM Personal Computer, Guru is "an artificial intelligence environment for business systems," claimed company President Gary Koehler. The software is designed to let users create small, easily modified expert systems for typical business problems and to link those systems tightly with standard desktop applications.

Guru avoids five major drawbacks to most other expert system shells, according to Koehler. These include the requirement to work in LISP or Prolog, which he called "elitist languages"; a lack of integration with normal business processing; a need for specialized hardware; insufficient flexibility; and a demand for special training.

"We don't feel there should be 'knowledge engineers,' " Koehler said. "We're not limiting ourselves to the professional expert; we feel that everyone in the company is an expert."

As one example, Koehler noted that "when you think of an expert, you don't think of a shipping clerk," but MDBS used Guru internally to build an expert system that takes the load of answering questions off its overnight shipping manager. "The system has about 15 rules, and it handles about 75% of the problems he's hit with," Koehler said.

This setup "makes a company's intangible assets tangible, and it gives consistent advice," Koehler commented.

In another internal application a Guru program expedites order entry, which MDBS handles on micros. "Our big, hairy

See GURU on page 51

Compact disk data base debuts

By Mitch Betts

WASHINGTON, D.C. — Datext, Inc., a new firm in the data base industry, made a splash at the Information Industry Association's annual convention recently when it introduced the first comprehensive business data base stored on compact optical disks. The company also introduced hardware and software that would enable users to retrieve the data.

The Datext data base is presented to users in compact disk read-only memory form.

The Datext product, targeted at financial researchers and Fortune 500 firms, is a data base of detailed information on U.S. businesses, delivered to users in compact disk read-only memory (CD-ROM) form, with monthly updates for an annual subscription fee. The data can be transferred to a personal computer — and such popular programs as Lotus Development Corp.'s 1-2-3 spreadsheet — for analysis, manipulation and reports.

Subscription prices range from $9,600 to $19,600, depending on how much data the user wants. For the fee, users get a CD-ROM disk drive, a controller card and cable, maintenance, software license, documentation and one to four CD-ROM disks.

An IBM Personal Computer AT, XT or

See COMPACT on page 50

INSIDE

Video-7 launches a graphics board compatible with both the IBM Enhanced Graphics Adapter and the Hercules Graphics Card/48

NEW THIS WEEK

- Hewlett-Packard introduces a daisywheel printer
- Unisource Software ports Ryan-McFarland's RM/Cobol to Venturcom's Venix/86 operating system
- For more on these and other new products, see pp. 111-138.

INSTANT ANALYSIS

"IBM does not talk about things like site licensing, although the rest of the world may be kicking and screaming about it."

— Kathleen Lane
Dataquest director of software services

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IBM SQL/DS and DB2 relational DBMS now on PC

ORACLE, the relational DBMS compatible with IBM's SQL/DS and DB2, is now available on the IBM PC/XT and PC/AT. While SQL/DS and DB2 run only on IBM mainframes, ORACLE runs on IBM mainframes as well as on DEC, DG, HP and most other minis and micros. Any application written for SQL/DS or DB2 will run without modification on the complete range of systems supporting ORACLE, including PCs.

SQL/DS and DB2 are relational database management systems; ORACLE is a relational DBMS plus an integrated set of 4th generation software tools for application generation, report writing, color graphics and network communications.

Oracle Corporation introduced the first relational DBMS in 1979. Now, ORACLE provides the only complete implementation of the IBM-standard SQL language available for the PC.

Oracle Corporation cites three principal application areas for its product's capabilities:

■ The ORACLE Application Development Center provides a PC-based development center for the creation of DB2 and SQL/DS applications. The flexibility of the personal computing environment is made available to programmers creating applications for use with IBM's relational database products.

■ The ORACLE Personal Information Center extends the Information Center concept to the Personal Computer. ORACLE's application generator, graphics, spreadsheet and other end-user tools provide a SQL/DS and DB2 compatible Information Center on the desktop.

Users can become acquainted with the facilities and power of the Information Center in the personal computing environment, and transfer their knowledge and skills as the MIS Information Center facility evolves. The ORACLE Personal Information Center provides the facilities for MIS to develop the cooperative relationship with end users so vital to the success of the Information Center.

In addition, with ORACLE on departmental superminis, users can create identical Information Centers at the department level.

■ The ORACLE Distributed Information Center provides an intelligent set of communication links among multiple systems, with ORACLE running on IBM mainframes and various minis and PCs.

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ORACLE is currently installed on over 1000 supermini and mainframe systems around the world, as well as on thousands of PCs and compatibles. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and many government agencies.

For further information, contact Oracle Corp., Dept. C, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350.

Video-7 rolls out graphics board for IBM Personal Computers

Compatible with IBM EGA, Hercules card

MILPITAS, Calif. — Video-7, Inc., a manufacturer of high-resolution video and graphics products for personal computers, has announced the Vega, a $599 graphics board for the IBM Personal Computer family that Video-7 claims is a complete functional replacement for the IBM Enhanced Graphics Adapter (EGA).

Video-7 Chief Executive Officer Don Bryson said the Vega is available in either short- or standard-slot versions.

The device comes with 256K bytes of random-access memory and provides a resolution of 640 by 350 pixels in monochrome mode and 640 by 350 pixels with 16 colors from a palette of 64 in color, high-resolution mode.

Compatible with older IBM adapters

Bryson claimed that the Vega is first to be fully compatible not only with the IBM EGA but also with IBM's older display adapters — the Color Graphics Adapter and the Monochrome Display Adapter — as well as with the Hercules Computer Technology Co. Graphics Card.

According to Bryson, the Vega supports all popular IBM software without special drivers, including Microsoft Corp.'s Windows and Word, Ashton-Tate's Framework and Lotus Development Corp.'s 1-2-3 and Symphony.

He said that the card will support all future software offerings for the Personal Computer.

Bryson predicted that as the cost of color monitors and color printers decreases, the emphasis on the appearance of screen displays will grow.

Word processors, for example, can take advantage of the color now available in different fonts. The Vega, Bryson added, will be significant in applications that mix text and graphics, as does desktop publishing.

Among other applications, a Personal Computer AT with an EGA "becomes an attractive [computer-aided design] system at the low end," according to Bryson. Other cards, he claimed, emulate but do not duplicate the IBM functionality.

Also this month, Video-7 made public a joint venture with Quadram Corp. of Norcross, Ga., for co-manufacturing and marketing the Vega. Quadram said it will distribute Quadega+, a $595 long-slot version of the Vega designed for Personal Computer ATs, through its retail channels.

Video-7 plans to ship the Vega in volume this month. Quadram will start shipping the Quadega+ in December.

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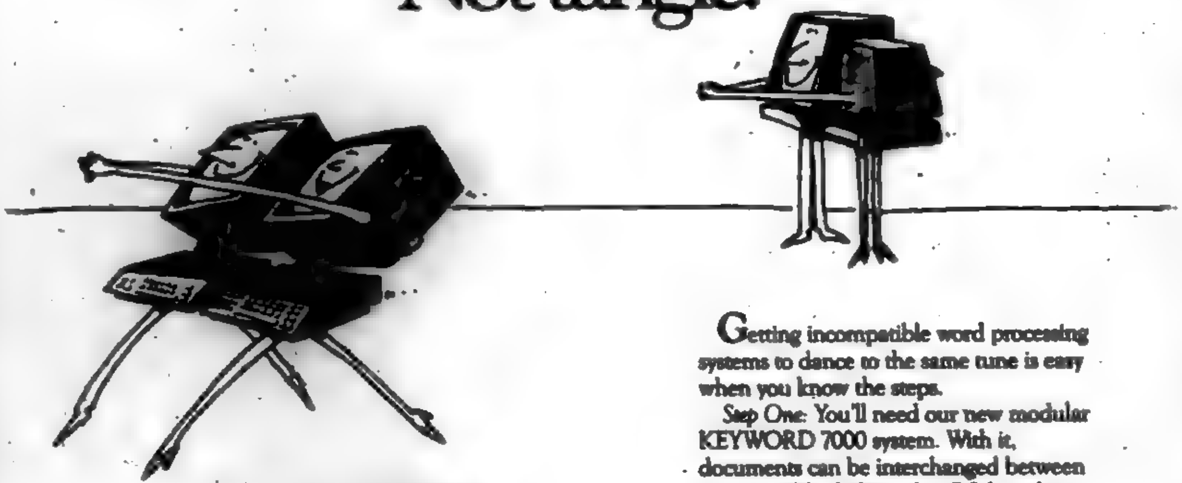

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Framework II begins to ship

Ashton-Tate recently began shipping its Framework II integrated software program for the IBM Personal Computer and compatibles and introduced an add-on financial modeling package. The Culver City, Calif., firm also announced a price reduction for its Runtime Dbrun products.

Announced in September and priced at $695, Framework II replaces the original Framework. The new package features ease-of-use enhancements and strengthened spreadsheet and word processing functions, the vendor said. Through the end of the year, users will be able to upgrade for $140.

The Financial Management package provides financial models to help users in retail or wholesale, manufacturing and service industries to conduct financial planning analyses, according to Ashton-Tate.

The software performs cash flow analysis, listing sources of capital and available cash; does break-even analyses, calculating how many units must be sold to make a profit and studying alternative forms of production and retailing; and monitors budgets and revenue performance against projections, the vendor said. Results are displayed through graphs and reports.

The Financial Management module will be available in first-quarter 1986 at a cost of $69.95. It is the third package in the Decision Maker series for Framework II, the other two being Project Analysis and Decision Modeling modules.

Separately, Ashton-Tate announced a price reduction for its Runtime Dbrun products, which are compatible with the company's Dbase II and Dbase III Developer's Release.

Both Dbrun II and Dbrun III will now be priced at $50 per unit, a reduction from the previous prices of $100 and $150, respectively.

Dbrun II and III are execute-only versions of the Dbase products, which allow the use of custom applications encoded with Runtime utilities based on Dbase II and Dbase III Developer's Release. The Dbrun products are targeted to value-added remarketers and corporate developers.

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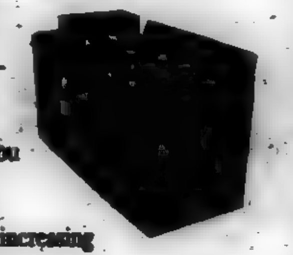

EMC has just added a feature to add-in memory for IBM's System/38 that's been sorely lacking.

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New answers from Q&A

From page 47

sentative and sales and quotas on the forms on which region is Midwest and sales are greater than quotas."

If the program has read your request incorrectly, you can keep rephrasing it until the program gets it right. Then you give the go-ahead to retrieve the information.

Besides making your queries easier, the Intelligent Assistant does several things that until now were found only in relational data base managers but are just as appropriate for a single-file manager.

The Intelligent Assistant understands Boolean logic, which means it can handle "or" requests — such as "List all houses with swimming pools or tennis courts." It allows you to modify a field throughout your entire data base — such as, "Raise selling price by 5%" — or to redesign your data base at will.

And it can search based on a calculated field or a character string within a field — such as, "Show me all products with selling price twice cost," or "List all companies beginning with 'General.' " These capabilities make Q&A far more versatile than other programs in its class.

Just plain fun

On top of everything else, the Intelligent Assistant is just plain fun. It's the only data base product we've seen that's truly interactive. And there's something downright enjoyable in giving the program plain English commands and watching it come up with the results.

The Intelligent Assistant makes working with a data base simple, but the program is not magic. It can't respond if it doesn't understand the words you've used in your request, and with a few exceptions the program knows only the words that you've taught it. Unless your queries are extremely simple, you must first educate the Intelligent Assistant by going through a multistep process to define the words that you're likely to use.

A typical lesson is to define every possible name by which you might refer to a data field. For example, "houses" should also be defined as "homes," "dwellings," "properties" and "locations."

For advanced inquiries, the education process is a little trickier. Instead of asking for houses that have "monthly rents" of $600, you might find yourself asking for house that "lease for" $600. The program handles this request only after you've defined the phrase "leases for" as referring to the field "monthly rent."

Fortunately, if your query contains a word you've failed to define, the Intelligent Assistant does not refuse your request but instead gives you a chance to add the word. Thus you can start using the Intelligent Assistant without providing it with any formal education, and as your queries become more advanced you can train it on the job.

The data base module and Intelligent Assistant are certainly the flashiest aspects of Q&A, but the word processor should not be ignored. It's as easy to learn as PFS:Write and offers box drawing, improved temporary margins, better centering and very fast execution.

Micros to the masses?

Is Q&A a product designed to bring personal computers to the masses? No.

Mastering Q&A requires a modicum of computer savvy — no more than that needed for PFS, perhaps, but not much less either. This program is definitely not for computer dummies.

For whom, then, is Q&A best suited? We suggest two classes of potential users.

If you're a Lotus Development Corp. 1-2-3 user with an occasional need for list management or word processing, you'll find Q&A an ideal second product. It's easy to read 1-2-3 data into Q&A, and it's far easier to maintain your lists and create your memos with Q&A than it is to force 1-2-3 to perform tasks that it wasn't designed to handle. You can even transfer spreadsheet data to Q&A, manipulate it and transfer it back to 1-2-3 for further analysis.

The other group that will like Q&A is made up of PFS users, both present and prospective.

Like any other product, Q&A has its drawbacks, but it's quite impressive as the first package to bring AI to life in a practical way.

Compact disk data base debuts

From page 47

compatible, equipped with 512K bytes of random-access memory and Datext's menu-driven software, retrieves the information from the optical disk.

The business data base includes financial statistics and article abstracts on more than 10,000 companies.

"Just as spreadsheets have allowed the personal computer to become a financial analysis tool, Datext now enables the personal computer to become an information analysis tool," claimed Datext Chief Executive Officer David Roux.

Company officials, however, stressed that they see their data base as only a first source for business researchers and do not expect it to replace all other business data bases.

Datext, based in Woburn, Mass., is a subsidiary of Cox Enterprises, Inc. of Atlanta.

DON'T JUMP WIT

Guru program introduced

From page 47

discount schedule was reduced to nine rules," Koehler said. "It fit right in with our data base and text processing capabilities."

Guru beta users included a number of General Electric Co. MIS professionals who developed prototype applications. One system configured data communications for a mainframe installation (see story this page).

The expert system shell supports forward and backward chaining, gives several ways to handle certainty factors and provides a variety of environment controls. Rule sets can be stored as text and compiled for fast execution. When consulted, the expert system asks for more information when needed and explains its reasoning on request, Koehler said.

Four interfaces are available throughout Guru. The natural language interface has a vocabulary of 600 words, which users can expand. A menu-guided interface, a somewhat-English-like command language and a procedural programming language are the other options.

The horizontal applications, which can be used within the expert system environment or independently, include a relational data base manager, an ad hoc inquiry facility patterned after IBM SQL, a spreadsheet, a forms management facility, statistical and mathematical capabilities, a report generator, a business graphics facility, a text processor and a remote communications feature.

Tight integration of these features with the expert system permits Guru, for example, to access information automatically in an external data base for processing by the expert system's inference engine and then print out the results, Koehler said.

Guru also supports a range of security features and can execute standard Microsoft Corp. MS-DOS applications within its environment, Koehler said. The package requires a minimum of an IBM Personal Computer XT with 512K bytes of internal memory and 5M bytes of disk storage. A runtime version will be offered, but pricing was not available.

Various site licensing options also will be offered, including ones that let customers copy the package, Koehler said. He emphasized that customers must come up with an unambiguous definition of the site.

Early next year, MDBS also will deliver Guru for various personal computer local-area networks. Later in the year, a version for the Digital Equipment Corp. VAX-11/780 running under Ultrix will be offered. Micro Data did not release price information for these products.

Founded in 1979, Micro Data employs about 230 people and also sells data base management and integrated business software, including the Knowledgeman line.

■

AI tool suited for development

Micro Data Base Systems, Inc.'s Guru package proved well suited for creating small prototype expert systems, according to Brian Dearing, who manages systems programming for an IBM 3090 installation at a General Electric Co. site in Schenectady, N.Y.

As part of a course on artificial intelligence at Purdue University, Dearing and several dozen other GE managers "built prototype applications, using Guru software to do something related to our specialties," he said. Among the applications were systems designed to assist customers in selecting products, to help managers order parts and to plan salaries, he said.

Dearing decided to develop a program that aided in configuring IBM system software products for data communications and ended up with a system including "something on the order of 40 rules," he said. "It's conceptually similar to [Digital Equipment Corp.'s] XCON but obviously much smaller."

The prototype's results "are virtually identical to what the human expert came up with," Dearing said. He cautioned, however, that the problem had been circumscribed to cover only nine software products.

"One concern that I have is size," he said. Running on a micro, Guru may be effectively limited to systems with roughly 400 rules and may prove unable to "do anything really comprehensive," he speculated.

Dearing praised Guru as a development tool for solving problems that "are very intractable for a conventional MIS approach." The software allows authors to specify a problem "in exactly the way you would do it if you were writing it down," he said. "You don't have to cut any Lisp code." Guru can take "a two-step approach to the problem," reaching preliminary conclusions that a developer can modify while building the program, he added. "You can build a system incrementally, which made it much easier to work with a human expert."

"Guru tries to integrate itself with MDBS' Knowledgeman product, which is one of its strengths," he said. He described the software's performance as "surprisingly fast, with very little perceptible delay."

He also listed several minor criticisms, one centering on the problems of setting confidence levels. "It was difficult to specify confidence as a factor of anything — you end up writing multiple rules to specify that," he said.

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New 1-2-3 is designed to support the Intel 8087/80287 math coprocessors so users can perform many calculations faster. And it incorporates a wide range of added functionality from string functions and string arithmetic to easier range and error handling.

1-2-3 Release 2 has 40 advanced macro commands, so it's easier to develop customized applications from the simplest to the most complex.

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Lotus is offering a 1-2-3 Upgrade program to all registered users. For $150, registered users can purchase a special Upgrade product. Copies of 1-2-3 Release 1A purchased on or after April 24, 1985 can be upgraded for free.

Individual users can register by returning their 1-2-3 Warranty Registration Card to Lotus or by calling 1-800-TRADEUP.* Upgrade instructions will then be forwarded by Lotus.

Companies who want to order more than 100 copies of the upgrade product should contact their local Lotus sales office or call 617-253-9186.

For everyone who upgrades, there's also a $40 rebate offer on Intel's Above™ Board, the first expanded memory board certified by Lotus.

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*In Canada call 1-800-447-4700.

Suggested retail price of 1-2-3 Release 2 is $495. 1-2-3 Release 2 requires 256K RAM. Minimum requirement for 1-2-3 Release 1A is 192K.

123.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

Pushing for a tape standard

Code-named Ocotillo, IBM's cartridge tape drive replacement for its popular 3420 reel-to-reel drive was eagerly awaited for five years before it debuted as the 3480 in the spring of 1984.

That 3480 was fairly well received by the mainframe customers who wanted to dump 10-in. reels of tape in favor of higher capacity, faster, sealed cartridges. With its announcement on March 22, 1984, IBM left open a wide area of growth for the 3480 technology — the many levels of smaller systems ranging from microcomputers to superminicomputers and non-IBM mainframes. IBM itself raised the question of how to fill that market by stating that the 3480 technology advancements "form the basis for IBM's direction in magnetic tape development."

Now a manufacturer is moving to address that market, and although it isn't IBM, the vendor apparently has IBM's blessing.

Cipher Data Products, Inc. is developing a 3480-type, cartridge-based tape drive for the small systems market and is kicking off a publicity tour this week to convince Cipher's OEM customers of the need for such a product.

But whether that product, due to be introduced next year, sells or even works isn't the primary question today. Of greater interest is Cipher's concurrent effort to encourage standardization of tape technology, a standard that Cipher, naturally, hopes will be based on its and IBM's 3480-type cartridge.

"It's basically an effort to stabilize the market," said Cipher Vice-President Larry D. Hemmerich of the five-city tour in which the company will outline a product strategy for the 1990s and discuss the need to standardize the ½-in. tape market around the 5¼-in. 3480-type cartridge.

Cipher has an agreement with IBM under which Cipher can use IBM's 3480 technology. What the San Diego-based

See PUSHING on page 56

Alliant's FX1 receives high marks from MIT researchers

By Donna Raimondi

CAMBRIDGE, Mass. — A computer the size of a large suitcase is creating a stir in an MIT laboratory.

The geophysics research group directed by Prof. Thomas Jordan has discovered that a modeling program took seven days to run on its Apollo Computer, Inc. DN460, which roughly approximates the power of a Digital Equipment Corp. VAX-11/750. That same program runs seven times faster on the lab's new Alliant Computer Co. FX1 processor, according to David Krowitz, system manager for the research group. He added that those figures came from subsets of the data that ran on the Alliant without that data being optimized first, so in reality, the performance could be better.

The tests were run on an Alliant FX1 with one computational element board on it. The computational element board runs on the back end of the Alliant. It has a Motorola, Inc. 68000 instruction set, on top of which is an Institute of Electrical and Electronics Engineers, Inc. instruction set on top of which is a vector instruction set, Krowitz said.

> *'It is not a workstation, not a microprocessor-based system and not a mainframe.'*
>
> — Thomas Jordan
> MIT

The system's vector unit, for applications like the lab's problems that have code that is able to be vectored, will hit a peak rate of about 11 million operations per second, which is twice that of a VAX 8600.

Jordan said that it is beyond his ability to identify the type of system based on classic specifications. "It is not a workstation, not a microprocessor-based system and not a mainframe," he said.

Whetstone benchmark tests that the lab ran on a VAX-11/780 and on the FX1 showed the Alliant system ran four times faster than the VAX-11/780. With matrix

See FX1 on page 56

Factory of future depends on past

Human, technological integration key

By Hal Mather
Special to CW

Manufacturing systems will change more in the next 10 years than they have in the past 50. These changes will be technology driven: computer-integrated manufacturing (CIM), artificial intelligence and mathematically optimized scheduling routines are among the many technologies on the horizon.

If manufacturing firms are to return U.S. manufacturing to its past level of preeminence, past performance dictates that they must learn from past mistakes — to date these have been more manufacturing failures than successes. As an example, few companies are enjoying the benefits touted by manufacturing resource planning (MRP II) systems although many have invested heavily in the concept.

To avoid failures when implementing today's new technologies, management must promote coordination between the various internal specialty groups within an organization. As it is now, manufacturing companies are broken down into functional groups. This allows specialists to concentrate on one aspect of the business, for example, sales, accounting, engineering or manufacturing. Within each of these functional specialties, subgroups of specialties are found, for example, marketing, advertising, industrial engineering, production and inventory control and so on.

This functional specialization is beneficial in the sense that expert attention is focused at key segments of the organization at all times. It is detrimental in that no one person, other than the general manager

See FACTORY on page 60

Mather is president of Hal Mather, Inc. of Atlanta, an international management consulting and education company.

INSIDE

Falco Data Products announces its first nonemulating terminal and is reworking its distribution plans/54

Bull Peripherals unveils its first large-system printer to the U.S. end-user mart/54

NEW THIS WEEK

- Tallgrass introduces its Flextor series of hard disks
- Ampex shows DEC-compatible monitors
- For more on these and other new products, see pp. 111-126.

INSTANT ANALYSIS

'The IBM 3270 market is so big that nobody could be too late getting into it.''

— John King, consultant, on AT&T's debut of a 3274-compatible controller.

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*Based on [illegible] inventory of Hilton Hotel Corp., which does business in the U.S.A. Source: New York Times article, week of 4/1/85.

Falco announces nonemulation terminal

By James Connolly

SUNNYVALE, Calif. — In a shift from its earlier product design and sales strategy, Falco Data Products, Inc. has announced its first nonemulation terminal, which will be sold through distributors as well as the firm's established OEM customers.

The Falco 500, scheduled to be displayed at Comdex/Fall '85 this week and available next week, eventually will replace much of the existing Falco line of emulation terminals. The company said the Falco 500 was designed to address the entire ASCII marketplace and to allow support for products such as local-area networks and multicommunications port devices.

"Our earlier products were designed to be modified by OEMs. The Falco 500 can't be modified except for some software changes. It was designed to go out as a single product," said Falco President and Chief Executive Officer Edward Browder. "Our role has changed. No longer can we be content to simply emulate existing products. We have reassessed the marketplace and our design philosophy while taking into account the changing technological environment of our customers. Our extensive research of the communications and terminals marketplaces has allowed us to introduce a product that has the power and flexibility to accommodate existing requirements and requirements into the future," Browder added.

The Falco 500 is said to feature a multihost windowing capability allowing users to display data from six hosts with six protocols. It also features a flat-profile CRT with soft white, standard green or amber displays, a 10- by 16-pixel letter-quality character and 64K bytes of random-access memory.

The Falco 500 reportedly is compatible with ANSI X3.64 protocols, terminals such as the Digital Equipment Corp. VT220, VT100 and VT52 and terminals from Televideo Systems, Inc., Wyse Technology, Inc. and Applied Digital Data Systems, Inc.

The Falco 500 costs $795.

DOS/VSE
WITHOUT UCCEL SYSTEM MANAGER PRODUCTS

IS WORKING WITHOUT A NET.

Bull unit shifts sales approach

By James Connolly

SUNNYVALE, Calif. — Bull Peripherals Corp., a subsidiary of Groupe Bull of France, has shifted its U.S. marketing approach from strict OEM sales to a combination of OEM sales and sales under its own name.

The first product to be distributed in the U.S. and Canada under the Bull Peripherals label is Bull's MP 6090 nonimpact magnetic page printer.

Bull Peripherals announced recently that the MP 6090 will be distributed and serviced by Technet, Inc. of Dallas, an association of 13 independent regional distributors, under a $10 million agreement extending through 1986 with an option for renewal through 1989.

The MP 6090 was designed to handle high-volume printing in data processing environments, printing 90 page/min, the equivalent of 6,000 line/min on continuous form paper. Bull Peripherals officials said the MP 6090 is intended to provide better reliability than laser printers and more speed than impact printers, which print 600 to 3,000 line/min.

"This agreement will allow us to sell our magnetic printer directly to the end user, supplementing our current OEM sales activity.

"The MP 6090 fills a need in the data processing market for a printer designed for both high-duty cycle printing and high reliability. The agreement with Technet will help us to penetrate this market," according to Farid Neema, president of Bull Peripherals.

The OEM price for the MP 6090 is $55,000 in single quantity.

Camax unwraps Unix-based CAD/CAM tools

Camax Systems, Inc. of Minneapolis has introduced a line of mechanical computer-aided design and manufacturing software and systems based on AT&T Unix.

The Camand products were designed for applications in mechanical manufacturing engineering, tooling and complex machining with an emphasis on plastics molding, the vendor said.

According to Camax, the systems are available on a variety of workstations with prices beginning at $30,000.

Camax said the products run on most 32-bit superminicomputers and workstations, such as the Data General Corp. DS/4200 and Silicon Graphics, Inc. Iris 2400, and minis and personal computers such as the IBM Personal Computer AT.

The Camand package consists of a three-dimensional modeler, a design documentation module for drafting and bill of materials generation and a multiaxis numerical control programming module for automated numerical control programming of 2½-axis through 5-axis milling machines, according to the vendor.

The Avatar MPA6000 enlightens communications between virtually any ASCII device and IBM or Sperry mainframes.

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The MPA6000 provides support for up to 28 asynchronous, ASCII-based terminals, printers and PCs—local or dial-in; emulation of IBM 3270 and Sperry UTS terminals; and IBM 3287 or Sperry hardcopy printers. Plus a variety of line protocols, including IBM SNA/SDLC, Bisync and Sperry Uniscope.

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FX1 receives high marks

From page 53

arithmetic functions, including additions and multiplications, the FX1 ran 10 to 20 times faster than the VAX-11/780, Krowitz said.

With a vector processor, Krowitz said, the FX1 system runs at twice the speed of the VAX 8600. Where the 8600 price is in excess of $350,000, the Alliant costs about $160,000, he said.

The MIT lab is one of the first users of the Alliant FX1 machine. The FX1, with one interactive processor, 8M bytes of memory and 67M bytes of storage, arrived at 5 p.m. delivery day, was plugged into the wall outlet and was running an hour later, he said.

The lab is planning to hook up its Apollo Computer, Inc. Domain network of six Apollo workstations to the Alliant via Ethernet interfaces, Jordan said. After some initial problems in getting Apollo's and Alliant's Ethernet software packages to communicate, the system is working well.

"When it takes seven days to run [a program], you don't do many models," Krowitz said of the programs that make a model of the Earth, calculate the ways it might vibrate and compare the data against actual earthquake data.

Because it only takes a day to do the same kind of model it took seven days to do before, the lab is investigating running more kinds of models. The staff is even considering running a proposed modeling effort it had not attempted before because it would take 14 weeks on a VAX-11/780, Krowitz said. The Alliant will bring the time down to two weeks.

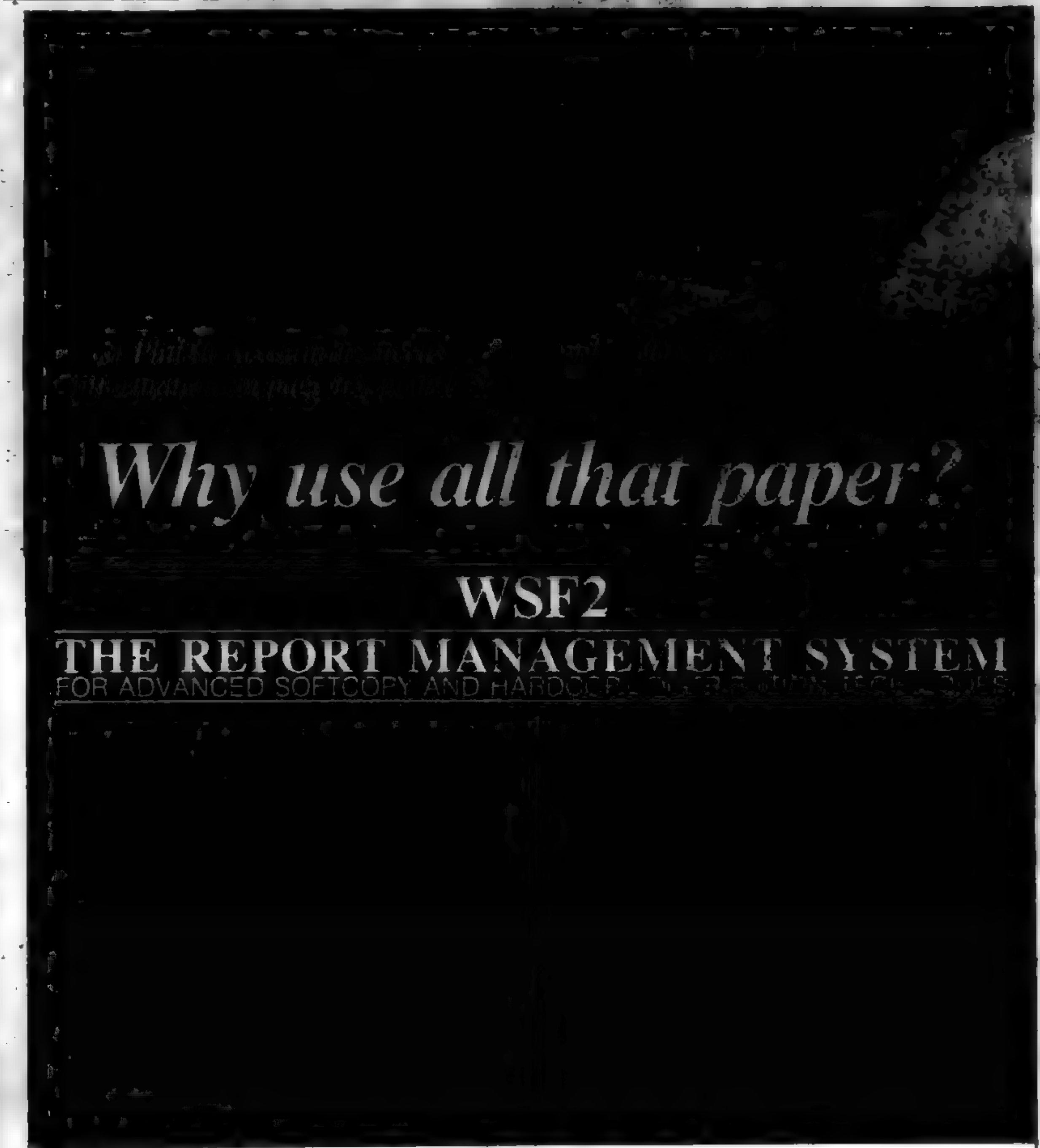
One research project within the lab ran a test program on the DN 460 and then on the Alliant. On the Apollo machine, the test ran in 60,000 CPU seconds, according to Krowitz. On the Alliant, the same test ran in 3,000 seconds. Then Krowitz remembered that he had left out a compiler optimization switch, so the group ran the program again after optimizing it. The last test run took 2,300 seconds.

Part of that time savings is because of the processor, part of it because of the larger memory that the Alliant has — 8M bytes as opposed to 4M bytes on the Apollo — and part of it is because of the optimization of vector portions of a program run, Krowitz said. After running the tests and being pleased with the results, the same researcher doubled and then tripled the size of the test. At that point, "We ran out of disk space," Krowitz added.

As soon as the system was delivered, the staff wanted to do more projects. They soon had to decide on upgrades, and they have ordered an additional 167M-byte 8-in. Winchester disk drive, another interactive processor and an expansion cabinet. Between the time Alliant quoted MIT the $160,000 purchase price and delivery day, the company dropped its prices by $20,000, which allowed MIT to upgrade without running over its original price of $160,000.

Alliant is "pretty good" about support, Krowitz said. The company, which is located only a few miles away in Acton, Mass., is still fairly small. They have built diagnostic systems into each of the five kinds of processors found on the system, but so far the lab has not had any hardware-related problems.

Alliant can tie in remotely to the FX1 terminals to help iron out software bugs. The lab has come up with a few compiler bugs, Krowitz said, but nothing a user would not expect in a company's first product.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Pushing for a tape standard

From page 63

peripherals vendor plans to offer is a ¼-in. tape cartridge to support supermicrocomputers in the class of Sun Microsystems, Inc. Sun workstations and the Digital Equipment Corp. Microvax II. Cipher said it hopes to develop similar cartridge drives for both smaller and larger systems at a later date.

Hemmerich reported that his company's first cartridge product will use the small computer system interface and will be compatible with Cipher's existing cassette drive that uses ¼-in. tape in small systems.

Although Hemmerich and his staff will be using their publicity tour to boost their own product, Cipher does have a point. The introduction of the 3480, a radically new product, at the high end of the market when there is no tape technology dominating the lower levels, provides an opportunity for standardization seldom seen in the computer industry.

Disregarding the question of whether the 3480 technology has already become the de facto standard for tape and whether Cipher or any other vendor can deliver small systems products using that technology, there is an argument to be made for setting some standard in the tape business.

Even if that standard isn't the 3480, vendors should strive for and users should demand standardization of at least one area in a business where new types and classes of computers are continually expected to communicate with other systems. Anyone who doubts that need should listen to users who deal with aspects of DP other than storage, people who have had the misfortune to attempt to network multiple vendors' microcomputers, minicomputers, superminis and mainframes.

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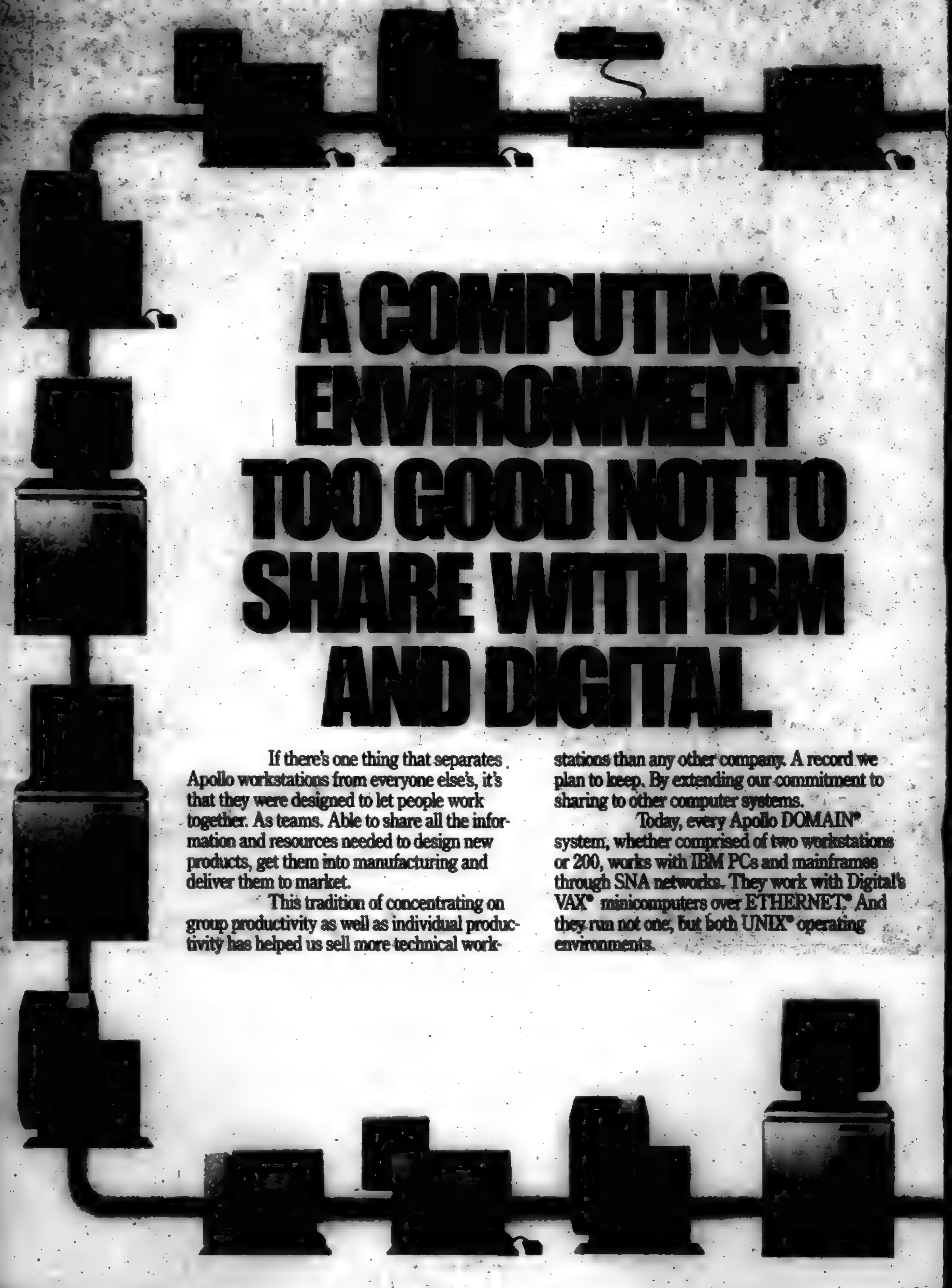

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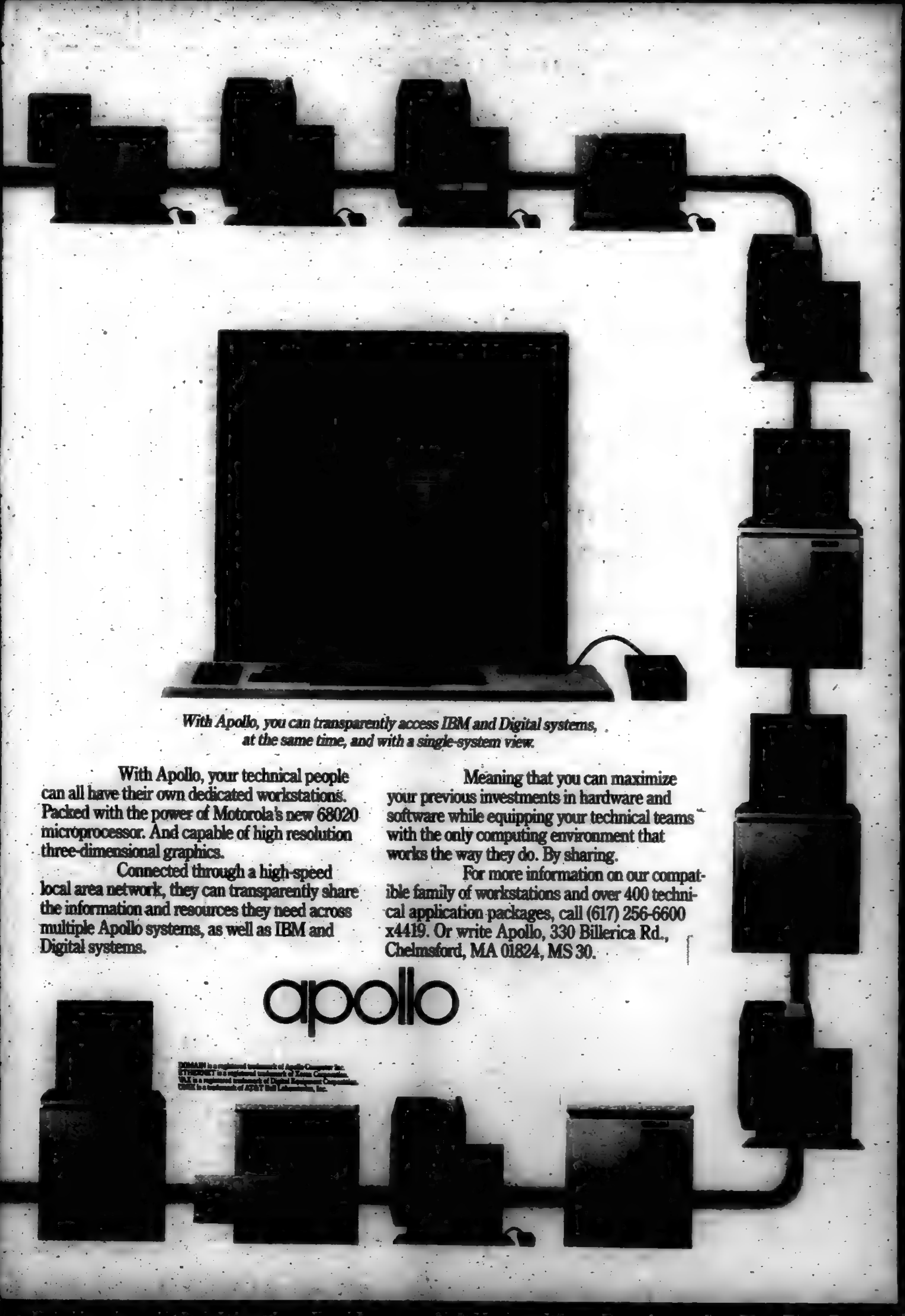

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Factory of future depends on past

From page 53

and possibly the MIS or DP manager, concerns himself with the coordination of all these isolated functions into a smooth-running whole.

The early attempts at implementing material requirements planning (MRP) show clearly the functional specialization problem. Implementations of MRP failed in many companies because MRP was treated as a production and inventory control technique.

Companies did not see the need for structured bills of materials from engineers, forecast data from sales and an operating business plan called a master schedule. But more important, management failed to elicit the help of the various business specialties in forging a comprehensive system for the business. Therefore, specialty groups did not contribute their expertise and local data for the benefit of all.

The few companies that successfully implemented MRP and progressed on to MRP II avoided these mistakes. They realized the need for coordination between functions and worked to get it. Senior management steering committees and multifunctional project teams were established, which forced specialists to broaden their horizons to the total business.

This broadened view of the business caused other changes in these companies. Organizations were modified, responsibilities and accountabilities were changed, and a team approach was fostered. These changes contributed as much, if not more, to the benefits than the new system.

Manufacturing firms face similar challenges with today's new technologies. Computer-aided design and manufacturing, robotics, computer-aided process planning (CAPP) and CIM are new technologies that are part of the factory of the future. But frequently, these technologies are being developed in isolation without regard for the plant as a whole.

The factory of the future will receive a customer's order, design the product on a CAD system, develop the best routings based on current machine work loads and available capacities on a CAM system, direct the procurement of needed raw materials, instruct the various machines and processes how to produce the product and guide the automated materials handling and storage equipment to move the product through the plant to the shipping dock.

Data will be entered once into the system at order entry time; all other data will be created as needed and will move electronically between these various subsystems.

As companies move toward this process, it becomes necessary for data to shed its parochial image. Data must be accessible to all. It is also obvious that organizational distinctions between functions will blur.

Realizing true data integration will not come easily. Companies will face many hurdles along this path. The current use of personal computers, where users control isolated segments of data, will give way to an integrated data approach. Local-area nets and better data standards will provide this capability. Integrated networks moving data between subsystems as needed will be the norm.

The push for data integration will come from advancing technology, and it will revolutionize manufacturing, just as farm machinery revolutionized agriculture.

> ”
>
> *The key to the factory of the future is MIS or DP managers. They alone have an overall company view; they are not bogged down in functional specialties.*

Artificial intelligence, now in its infancy, will have a huge market in manufacturing. It is obvious that today's simplistic, and to some degree, illogical, planning and control systems will not be able to run the factory of the future.

Companies with foresight will view data as a corporate asset, to be used for the benefit of the total business. They will manage this resource, just like any other company resource.

The key to the factory of the future is MIS or DP managers. They alone have an overall company view; they alone are not bogged down in functional specialties. It will not be necessary for these managers to take a project leadership role in the factory of the future — far from it. Companies should have operating managers in charge to decide how best to run the business.

The MIS or DP manager's role will be to encourage a coordinated business team approach to manufacturing and to guard against separate functional systems. The MIS or DP manager must work with top management to assure that data is used and safeguarded as a business resource.

Companies have failed before with this task. Manufacturers cannot afford to fail again — our country's economic well-being is too important for any more false starts.

Unless companies learn from the past, they will fail to have factories of the future — and they will leave a legacy of many factories without a future.

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Lattice C Compilers for Your IBM Mainframe

Two years ago...
SAS Institute launched an effort to develop a subset of the SAS® Software System for the IBM Personal Computer. After careful study, we agreed that C was the programming language of choice. And that the Lattice® C compiler offered the quality, speed, and efficiency we needed.

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Development had progressed so well that we expanded our efforts to include the entire SAS System on a PC, written in C. And to insure that the language, syntax, and commands would be identical across all operating systems, we decided that all future versions of the SAS System—regardless of hardware—would be derived from the same source code written in C. That meant that we needed a C compiler for IBM 370 mainframes. And it had to be good, since all our software products would depend on it.
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Features of the Lattice C compiler for the 370 include:

- [illegible]
- [illegible]
- [illegible] MVS/XA.
- [illegible] MVS and CMS [illegible]
- Complete libraries. [illegible] Kernighan and Ritchie [illegible]

[illegible] Unix™-style I/O [illegible]

- Built-in functions. Many of the traditional string handling functions are available as built-in functions, generating in-line machine code rather than function calls. Your call to move a string can result in just one MVC instruction rather than a function call and a loop.

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C supports structured programming with superior control features for conditionals, iteration, and case selection. C is good for data structures, with its elegant implementation of structures and pointers. C is conducive to portable coding. It is simple to adjust for the size differences of data elements on different machines.

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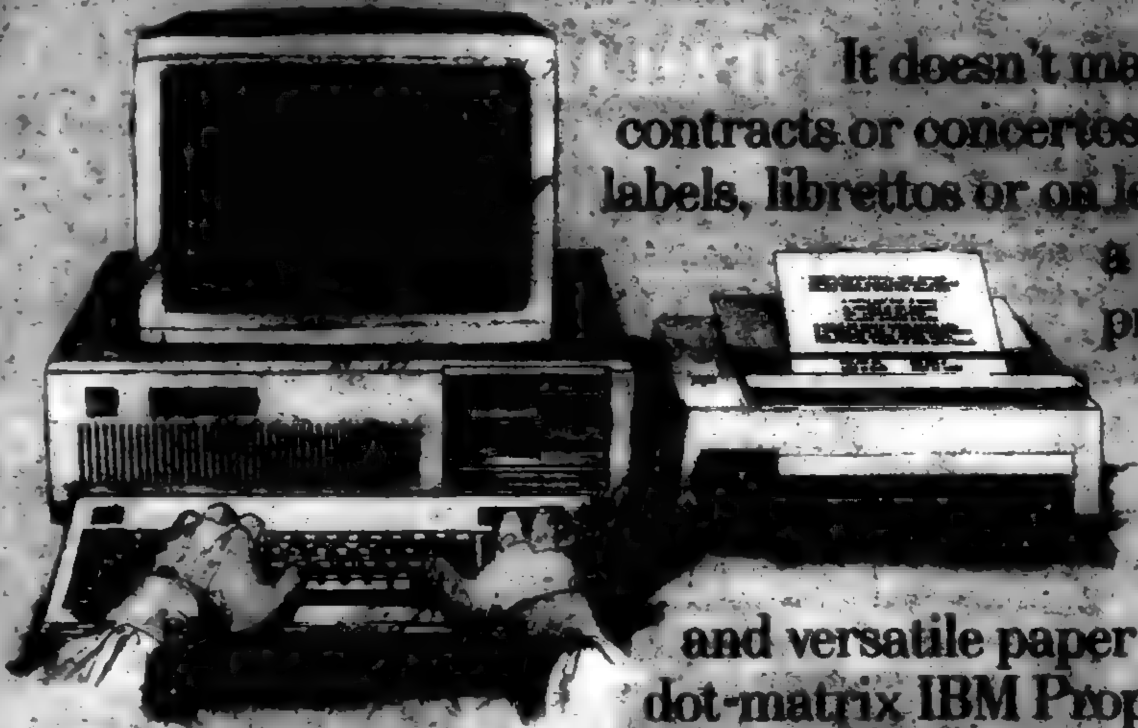

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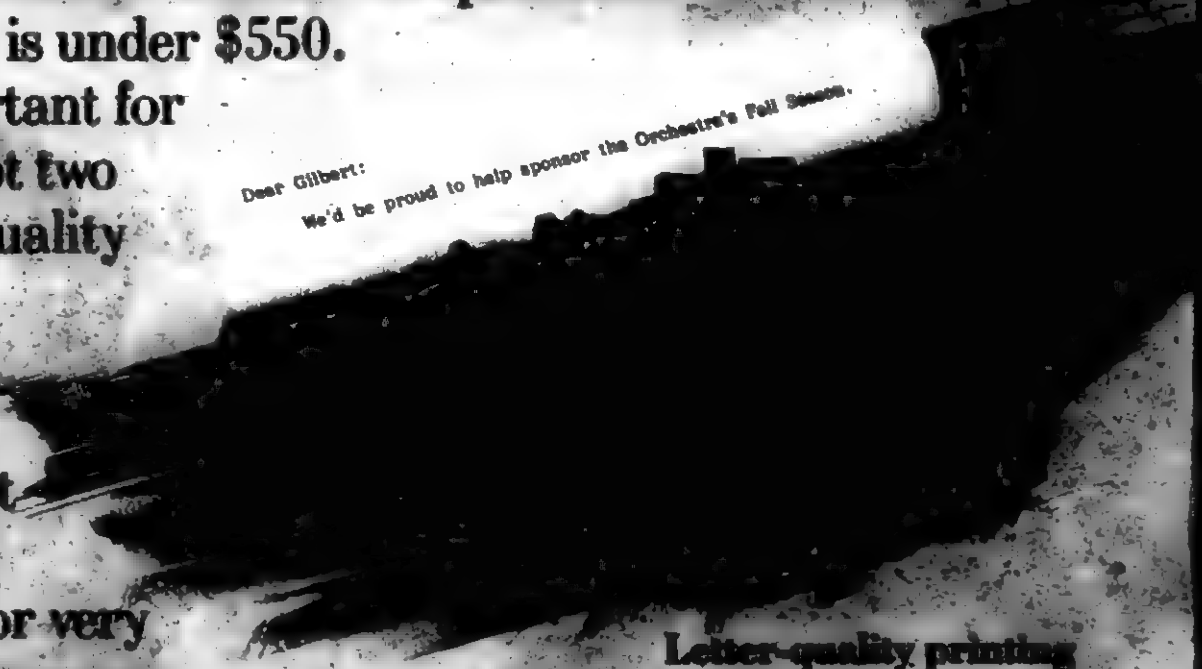

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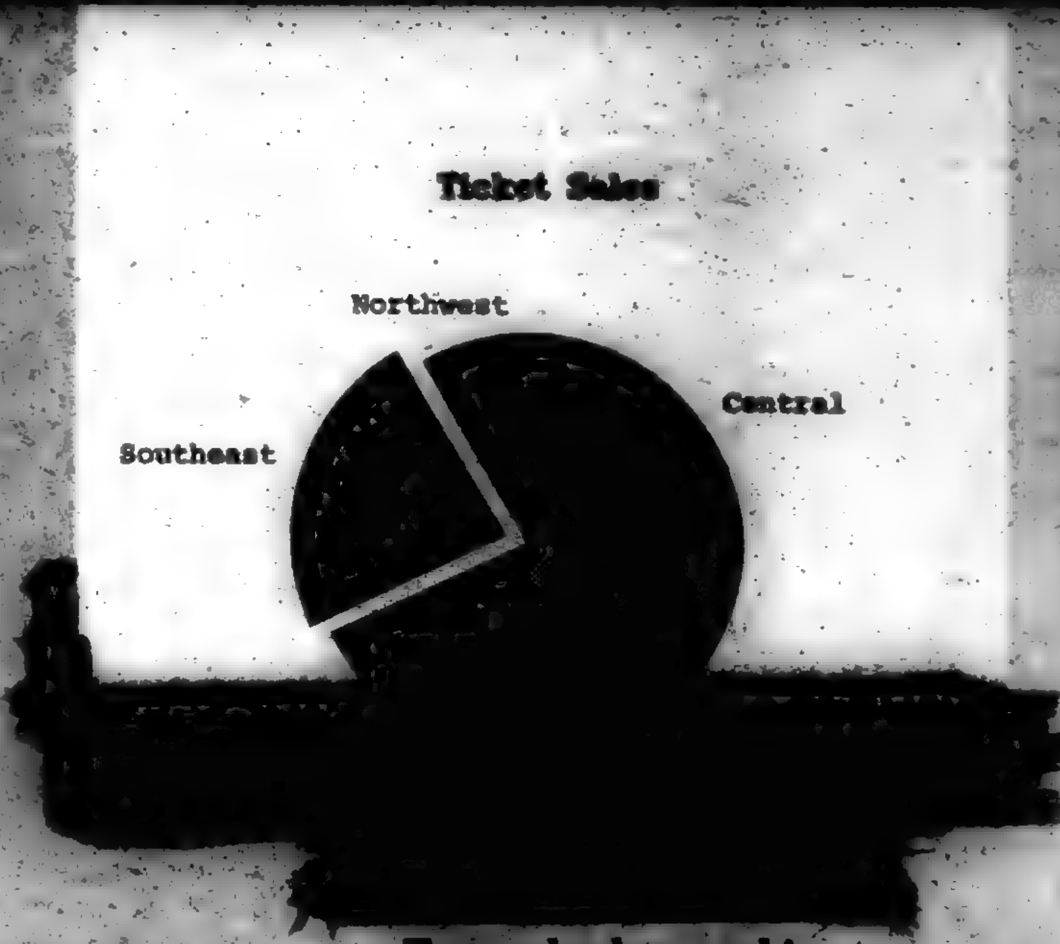

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A family of controllers,

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printers, processors and terminals fully compatible with IBM, yet flexible enough to adapt to changes in 3270 technology.

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ITT Courier is one of five different ITT Telecommunications companies specializing in office automation technology.

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Technologies we're prepared to make work for you rather than against you.

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It's not enough to sell just terminals anymore. One now has to sell business *systems*.

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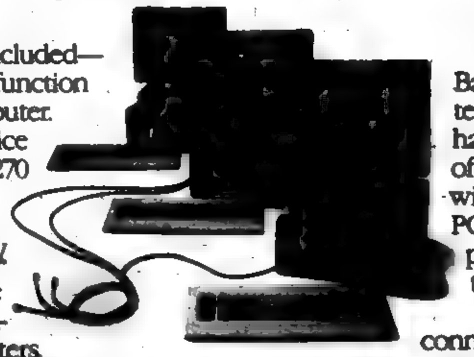

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Say "I do" to an integrated business system from ITT Courier and you can quit worrying about how to integrate your office.

You can, instead, simply do it.

Not in the "near future." Or at "some point in time." **But *now.***

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It's known as ergonomics, the study of man and his relationship to machine.

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Integrated business systems.

An application processor that brings local processing capabilities to the 3270 workstation.

The most widely accepted PC-networking standard in the world.

And five different companies conducting millions of dollars worth of research and development each year.

This is the family of ITT Courier. And it's one we'd like you to join.

So give us a call when you're ready to settle down. And get serious about an integrated business system from ITT.

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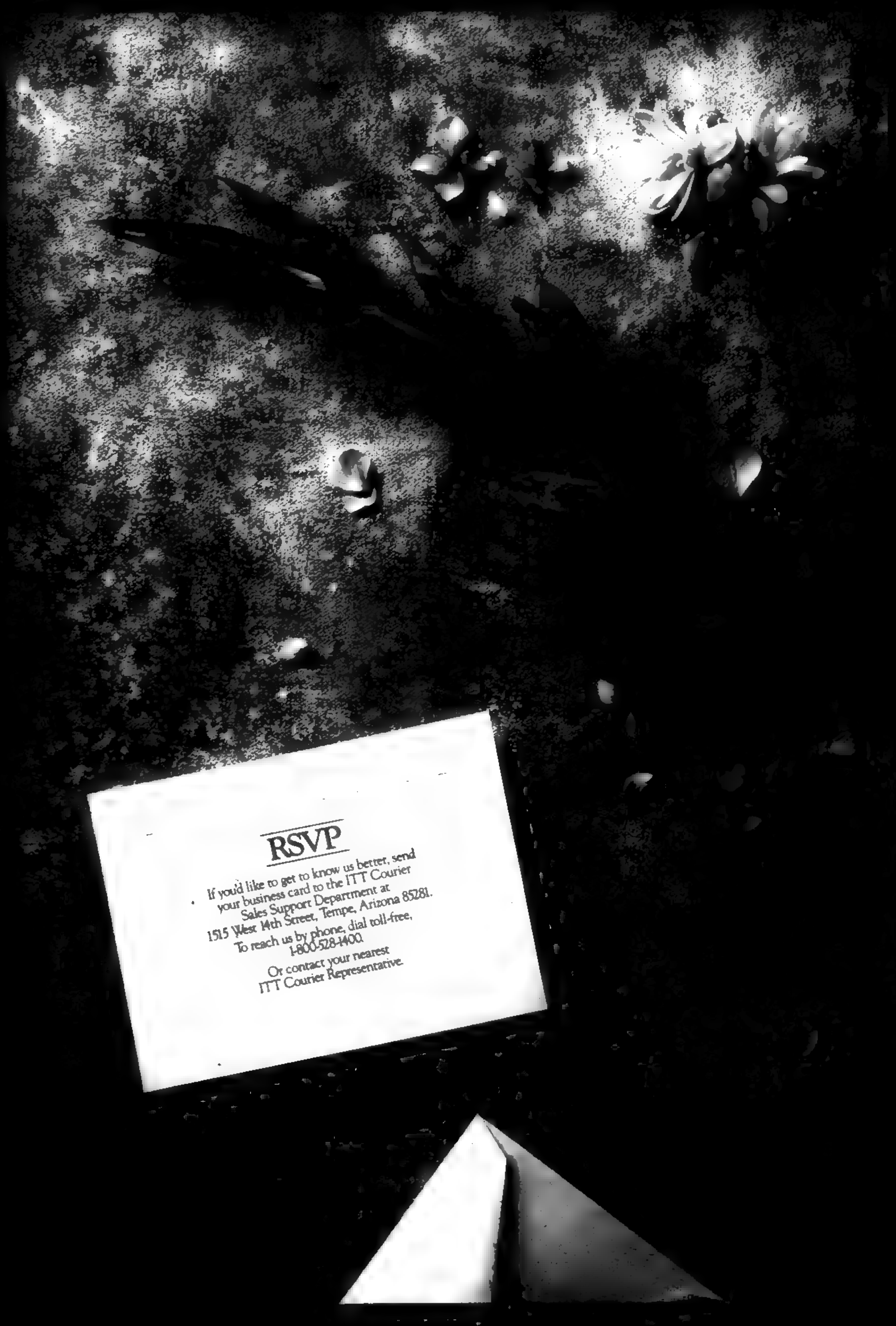

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Universal networking —it's a mirage

What the world needs now, some argue, is a worldwide digital network to integrate the glut of long-haul telecommunications services. But the era of universal networks remains wishful thinking as long as communications firms and value-added network vendors keep playing on different teams.

By Daniel Miller

The proliferation of personal computers, communicating word processors, VDTs and other types of electronic terminals in offices and homes has been turning the telecommunications industry on its ear for several years. More digital devices hanging off long-haul networks are bound to bring more revenues to the makers of digital switches, local-area networks and other communications hardware and software.

What the world needs now, some argue, is a single, robust, end-to-end digital network to hook all of these things together — an integrated services digital network (ISDN).

IBM's announcement of a joint networking venture with Nippon Telephone and Telegraph Corp. (NTT) in late September highlighted the international scope of ISDN development. The prime candidates for providing such services, value-added network service providers, now sell about $585 million worth of service annually in the U.S. With help from international connections, these providers expect revenues to increase at least tenfold over the next five years.

Common wisdom holds that given a telecommunications network with enough bandwidth and functionality — smart nodes on an electronic data superhighway — a universal information network is a certainty. In fact, AT&T dubbed this the era of the "Universal Information Services."

Earlier this year, AT&T began promoting this concept in an aggressive advertising campaign, listing four major benefits:

■ Integrated voice, data and image transport. AT&T asserts that "what telephone companies want is a single network transport architecture that can handle voice, data and image interchangeably and simultaneously."

■ Services instantly adaptive to customer demands. Vendors should provide "a fast, flexible way for businessmen to get exactly the services they want when they want them and ultimately pay for only what they use."

■ Universal access through universal ports. The concept involves locally hooking up intelligent devices in the office.

■ Graceful evolution of current networks. Characterizing all competing network services as "quick-fix" solutions, AT&T sees its network services evolving to serve customer needs over the long term.

Not too practical

All of these claims reflect a level of optimism worthy of the theory that an infinite number of monkeys with an infinite number of typewriters have a good chance of writing the "Gettysburg Address." The goal is valid but the methods unlikely.

A universal network is the Information Age's answer to the Tower of Babel. Building it will require participation from firms that typically do not cooperate or work together closely. The firms belong to several different but related industries.

Daniel Miller is president of Opus Research, Inc. a San Francisco consulting firm specializing in communications issues. He has done strategic planning for [illegible] Resources, Inc., Pacific Telesis Group and Warner Communications, Inc.

- Network operation and information transport.
- Computer, switch-gear and peripheral manufacturing.
- Software and electronic service provision.

Standardizing implementations

Picture this: A plenary meeting among these industries' representatives whose agenda consists of developing specifications for network architecture as well as capabilities, interfaces and other attributes. Standardizing all these implementations will be a dream-turned-nightmare. And that's just the beginning.

After separating "must have" from "nice to have" features, future service providers will have to select equipment vendors, develop system and applications software and only then begin construction and promotion campaigns.

While all this is going on, potential customers — particularly large corporations — have been identifying their own very specific needs and developing their own solutions. They have gone shopping for solutions among the growing ranks of value-added networks.

Domestically, the list of value-added network vendors already includes AT&T, GTE Telenet Communications Corp., Tymshare, Inc., ITT Dialcom, Inc., United Telecommunications, Inc. and Compuserve, Inc. as well as special services provided by IBM, Western Union Corp., ADP, MCI Communications Corp. and several other long-haul carriers. Taking into account terrestrial cable and microwave, fiber-optic networks and satellite transponders, there is a growing glut of bandwidth for long-haul telecommunications.

These vendors collectively fuel the development of many different, incompatible product lines, making the task of standardization that much harder.

> ”
>
> *The greatest irony of the communications status quo is that the dominant communications firms regard value-added networks as competitors rather than allies.*

Changing the division of labor

There is a group of firms that provide the building blocks or raw material for the systems of today and tomorrow. Like the providers of steel to the auto industry, "pure" computer companies (such as Data General Corp., Perkin-Elmer Corp. and the like) and "pure" carriers (such as MCI, Western Union and some of the small, independent telephone companies) sell commodities.

The types of companies that must provide the raw material for the computer and communication revolution are the following:

Network providers. These companies really are in the transportation business. They are the telephone companies, long-haul carriers, satellite system operators and, tangentially, CATV operators that own physical plants for delivery of communications from a point of origin to its destination for a fee.

Equipment manufacturers. These marketers offer private branch exchanges (PBX), switches, computers and terminals. Their challenge is to coordinate simultaneous development of hardware and software to fulfill expressed needs of existing and potential customers.

The other side of the coin involves these companies' support for work done on their behalf by other companies or individuals. In the jargon-rich world of communications, these third parties are most often referred to as "value-added (fill-in-the-blank)s." The top computer manufacturers rely on value-added resellers to make their products attractive to specific customer groups. Value-added networks refers to everything from cheap long-distance carriers to integrated service networks carrying voice, video and data.

The greatest irony of the communications status quo is that the dominant communications firms regard value-added nets as competitors rather than allies forging new markets in computers and communications. Previously regulated telephone companies have been given a green light to enter competitive markets and seem pleased to be out of the commodity business. Apparently, they would rather take credit for the shiny sports car coming off the assembly line than for the steel that went into the chassis.

The international arena

There is a scene in a Preston Sturges movie where the hero, played by Dick Powell, has put in a very long day at the office. On this particular night, when the door to the elevator opens, a black cat strolls out in front of him. Playing the fool as only he can, Dick Powell asks the night watchman, "Jimmy, does a black cat crossing your path bring good luck or bad luck?"

Jimmy responds, "Well . . . that all depends what happens afterwards."

The door of the elevator to Universal Information Services has opened and, lo and behold, IBM is already standing there along with AT&T and its Japanese counterpart, NTT. Whether their presence is good or bad for universal networking all depends on what happens next.

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1985, when laws liberalizing the Japanese telecommunications market went into effect. Three months later, AT&T announced a new value-added network venture in Japan.

A top marketing executive explains, "AT&T believes that, as we move in the future, we will need a worldwide, enhanced network to supply customers needs. This [value-added network] is the beginning of what we hope are many networks that will be tied together."

In all, 18 Japanese companies are involved in the joint venture with AT&T, including the Industrial Bank of Japan, Mitsui and Co. (a huge trading company), Nippon Steel Corp., Nippon Life Insurance Co., Kokusai Denshin Denwa Co. (KDD — Japan's Western Union), Sony Corp., Fujitsu Ltd. and Hitachi Ltd.

It wasn't until late September that IBM and NTT announced their joint venture. The joint firm's first project represents something of a baby step. Roughly $3 million is allocated to providing integrated data communications services in Japan via a combination of the two companies' resources. NTT's domestic value-added network will get to carry IBM's Information Network Services (INS) to IBM computers, terminals and compatibles nationwide.

The quid pro quo for IBM lies in an agreement with the Japanese ministry of international trade and industry, allowing IBM to buy patents and technology developed by Japanese companies. The patents are actually owned by the Japanese government. New products based on these developments are sure to be introduced to the North American market soon.

Just as in the automobile industry, Japan may emerge as the spawning ground and beta test site for products for which the largest market is in North America. There is bound to be an information services equivalent to the Dodge Colt — Japanese-manufactured with a private American label. Both AT&T and IBM would have no qualms about marketing products that are the fruit of joint ventures with their respective Japanese partners.

Both must also beware of biting off more than they can chew. A "universal" solution consisting of an integrated service data network and universal smart nodes provided by a single company may work in the relatively small Japanese market. Common sense and economic realities show that would be prohibitively expensive in North America.

What happened to Mitel?

Telecommunications joint ventures with international scope are not new to IBM. Prior to its marriage with Rolm Corp., IBM had quite a romance going with Canadian-based Mitel Corp. The product of that joint effort was to be a third-generation programmable PBX produced by Mitel with technical assistance from IBM.

Rave reviews of Mitel's SX-100 and SX-200 lines of digital PBXs for small businesses persuaded Mitel that its next area for growth lay in marketing larger switches to larger companies. It set out to develop a much larger SX-2000, offering more features ("functionality" in popular switch-talk) to more telephones.

When Mitel announced the pending introduction of the SX-2000, industry experts viewed it as an attempt to leapfrog industry leaders such as Northern Telecom, Inc. by being the first to introduce a third-generation PBX.

Apparently, the most distinguishing feature of third-generation PBXs is that they will carry voice and data at the same time, but there is much more. The switch is designed to be the heart of a very sophisticated communications network that, in essence, keeps track of the character, needs, preferences and desires of all the instruments that are hooked up to it, including IBM Personal Computers and bisynchronous terminals.

For the SX-2000, Mitel has added many more features to those made popular by the SX-200. The housekeeping work that the switch has to do has expanded geometrically. A larger number of a wider variety of instruments (including computers, synchronous terminals and integrated voice/data terminals) performing more functions require the central switch to do more and more polling, file storage and record-keeping in addition to just putting the calls through.

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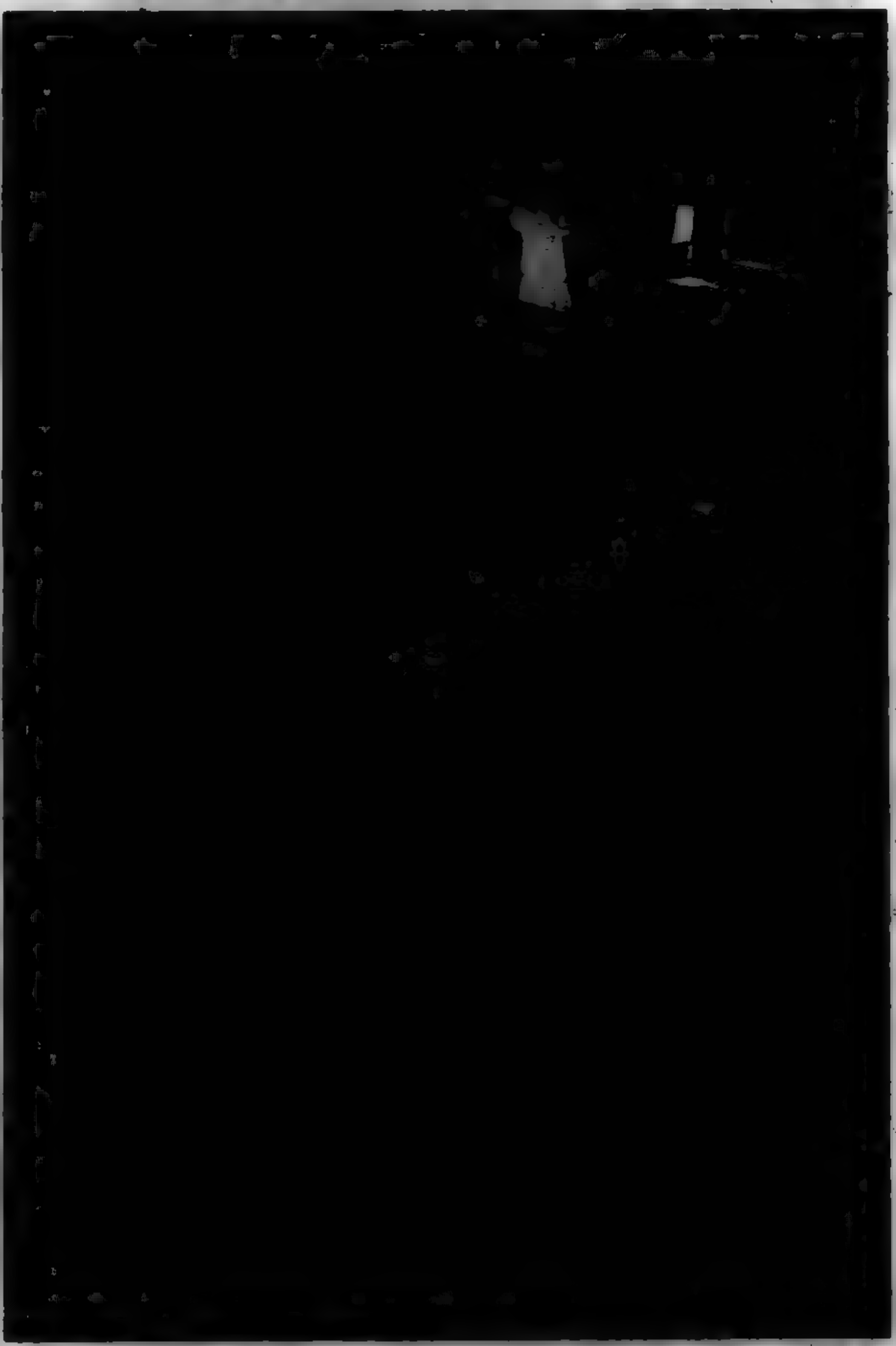

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a powerful superminicomputer capable of processing a few million instructions per second (MIPS). However, the switch was burdened with so much computing overhead that it was tough to get it to process more than two telephone calls per second.

What implications does this level of performance hold for a nationwide network? If attempting to be the universal solution for a limited number of terminals in an office setting could do this to a multiple-MIPS machine, what will happen in the attempt to offer universal access through universal ports? Switches will need to process 2 billion instructions per second to do all that housekeeping.

One of the oldest saws from Marketing 101 comes from Professor Theodore Levitt's *Harvard Business Review* article entitled "Marketing Myopia," in which he attributes the demise of passenger railroads to the companies' failure to realize in what business they are.

Good old competition

Railroad executives, he says, remained concerned solely with operating a railroad when they should have realized that they were in the transportation business. Because they were myopic, they did not see themselves in the same business as the passenger airlines and eventually gave up the lion's share of their long-haul customers to the faster, less expensive means of transportation.

Firms in the "communications" business suffer from the opposite problem. In 1985, the telecommunications industry encompasses such a wide variety of enterprises that the term is meaningless in both a semantic and a strategic sense. Hallmark Cards, Inc. now considers itself in direct competition with AT&T in the communications business. It sells "communications" purchased in stores and transported and delivered by private common carriers (dressed in blue hats and grey sweaters).

AT&T's "Universal Information Services" monicker, too, is funny. The term is broad enough to mean AT&T supports the development of, while not actually providing, end-to-end universal service.

However, it could also mean that the phone company is driving its own standard — unilaterally developing its universal, end-to-end service without regard for numerous North American companies with whom the company needs to play ball. It must be hard to have to say, "If you don't play my way, I'll take my ball and leave," when you used to own the whole ballpark.

The Federal Communications Commission's Nov. 1 announcement may strengthen AT&T's individual position even further. After lifting restrictions that required AT&T to maintain a separate subsidiary for marketing end-user equipment, the FCC approved two business phone services that will go far to make AT&T the single source of low-cost communications services to large businesses. The first, called Megacom, is a lower rate direct connect service for high-volume users.

Of greater interest to data communications users is the approval of Software Defined Network service, which gives large businesses the opportunity to pay for only the data carriage capacity used rather than leasing a line on a monthly basis, leaving the line always open.

These pay-as-you-go services represent two significant steps toward AT&T's umbrella concept of Universal Information Services. However, there is still a long way to go.

In the U.S., AT&T has been promoting mainstream telephone service for more than 100 years. But in Japan, AT&T is playing with an expansion club, taking sides with a group of upstarts that are making a run at NTT. At the same time, IBM is showing that it can provide network services using the physical plant operated by the historically dominant common carrier.

To stretch the baseball metaphor further, Japan serves as the farm system, producing ball players (in the form of products and alliances) for both pennant contenders. The farm team is turning out some good players, and we'll have to wait until another, future season to see which team can take the World Series. The result will be several years of good old-fashioned competition between two seasoned rivals — not universal information services. ■

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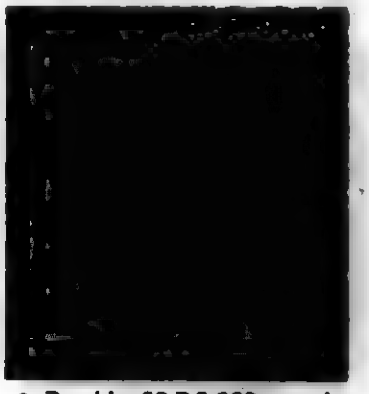

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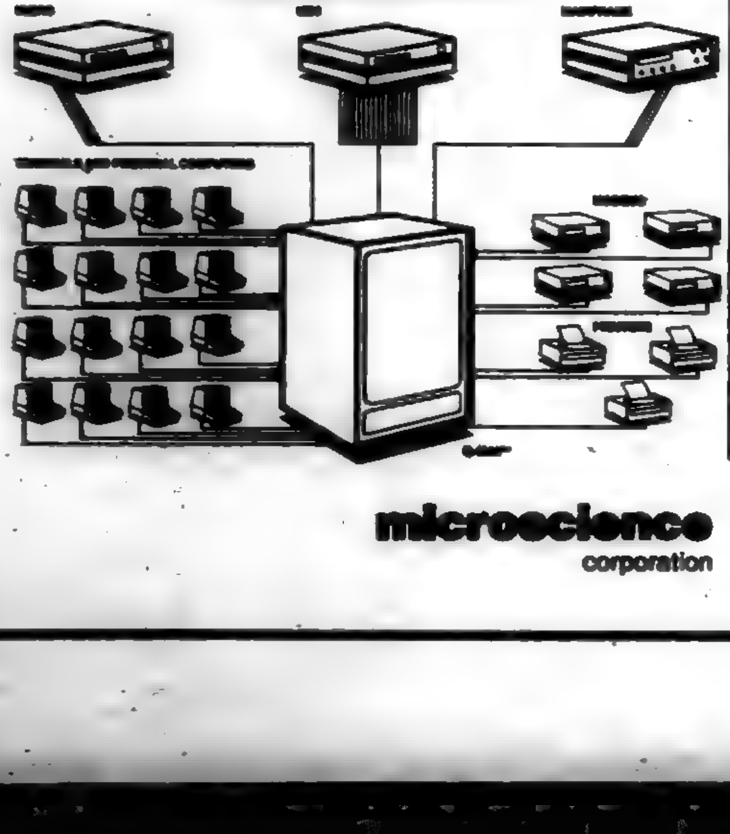

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IN DEPTH

Users press Icon into commercial service

This public domain language represents an advance in state-of-the-art nonnumeric computing: more powerful than Pascal, faster than Unix shells and easier to write than C or LISP.

By O. Richard Fonorow

The Icon programming language is emerging from its origins at the University of Arizona. This powerful language represents an important advance in state-of-the-art nonnumeric computing.

Originally developed for academic use, Icon recently spawned versions for AT&T Unix and Microsoft Corp.'s MS-DOS and now runs on a variety of commercial computers. The Unix port in particular indicates that Icon bears watching.

"Programmers like it," says one user, AT&T's Jerry Nowlin. "When they [learn Icon and then] graduate to the business or engineering world, they're going to want to program in the language with which they're most comfortable."

Icon is closely associated with the SNOBOL4 language, but its string-handling facilities are more extensive, combining several novel ideas with properties similar to those in languages as diverse as Prolog, LISP, C and Pascal. Nowlin calls it "the closest thing to programming in English I've been able to find."

The language was designed in 1977 by Professor Ralph E. Griswold and his colleagues and students, with support from the National Science Foundation, and resides in the public domain. For years, Icon suffered from the image attached to public domain software: "If it's free, it can't be any good."

Indeed, a full-blown implementation of a language and support system in the public domain is a rarity. But now that the language has been ported to Digital Equipment Corp.'s VAX/VMS machines, AT&T's 3B20, Sun Microsystems, Inc.'s Intel Corp. 68000-based Sun workstation and other high-performance systems, its use has begun to spread through the commercial world.

Icon fills a particular gap in the language hierarchy of Unix. "The combination of shell and C leave a large middle ground that Icon is perfectly suited to fill," Nowlin explains. "C leaves much to be desired when it comes to string manipulation and pattern matching" — two of Icon's strong suits.

Another strength is Icon's ease of use. Enthusiasts claim an average person familiar with programming languages can pick up the Icon text and start writing useful programs after the first 50 pages. The particular advantage in a Unix environment lies in Icon's low program development costs.

Joe Hall, a member of the technical staff at Bell Laboratories, points out, "When algorithms coded in Icon are found to be less than optimal, they are discarded and completely rewritten. In other, harder-to-write languages like C, less-than-optimal algorithms are modified and tweaked forever because the investment put into the original work was so high."

Very Basic

In this light, Icon looks like a good candidate for becoming the Basic of the high-performance environment: It is an easy-to-learn, easy-to-use language for the one-time, throwaway programs that at the same time contains sophisticated capabilities for the more dedicated software developer.

At present, the University of Arizona, which distributes Icon and its documentation, has sent out approximately 1,000 copies of the software. But the university's department of computer science reports a great increase in requests

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O. Richard Fonorow is a member of the technical staff at AT&T Information Systems Laboratories in Naperville, Ill. He learned Icon as a student at the University of Arizona, spread the word at AT&T and now serves as the laboratories' resident expert.

> *In contrast with more conventional languages with ALGOL-like syntax, Icon relies heavily on the notion of success and failure and comes with a large repertoire of built-in string manipulation functions.*

for the language since the MS-DOS version was released in September.

As it happens, thousands more copies already lie in the hands of users, who may not even know they have it. Icon is distributed as user-contributed software on the University of California at Berkeley 4.2 version of Unix itself, and the MS-DOS version has shown up on several electronic bulletin boards. Icon is becoming available and widely distributed, but its power and efficiency are just beginning to be tapped.

The name Icon was chosen to denote that the language was new and not simply another version of SNOBOL4 recast with a more modern syntax. Nevertheless, Icon was influenced by its predecessor and there are some similarities.

In SNOBOL4, goal-directed evaluation provided the basis for — but was limited to — pattern matching. Icon's reach is broader. It is a procedural language with expressions that are capable of producing multiple results. The uncommon programming mechanisms that drive these expressions are called generators.

Success and failure

After discovering generators, Icon's inventors abandoned the basic SNOBOL4 framework in favor of one that made it possible to incorporate these new programming mechanisms. Icon's generators extend the realm of automatic goal-directed evaluation throughout the entire language, opening a wide variety of interesting new programming techniques.

In contrast with more conventional languages with ALGOL-like syntax, Icon relies heavily on the notion of success and failure and comes with a large repertoire of built-in string manipulation functions. It automatically allocates and withdraws storage for variables; local scope declarations are optional.

According to Bell Laboratories' Hall, "In Icon, the string is a true data type of the language. Thus, strings are handled in reasonable ways in all contexts." Variables can assume any type during program execution, and type conversions are performed automatically. Icon, from a programming perspective, is exceptionally "friendly."

Unix applications

One reason Icon may become a regular member of the Unix system programming environment is that it is an elegant procedural language. Experienced programmers will find many familiar concepts as well as thought-provoking new ones. More compelling still, nonprofessional Unix system users requiring a general-purpose programming language may find that Icon suits their needs.

Unix has at times been labeled "unfriendly." One reason for this may be the use of expressions such as *sed*, *awk* and *expr*, which are commonly used inside Unix shell scripts that operate on strings. Although it is not the fault of the operating system, these scripts are notoriously hard to read and understand and are part of the environment associated with the Unix system. They can be particularly painful for inexperienced users.

Apparently, the problem with these shell scripts is caused by a programming niche that neither the Unix shell nor the C programming language seem to fill. To illustrate this, consider the actual Unix System V basename command that is written as the shell script:

```
# @(#)basename.sh 1.4
AQQQ=$ [1-.]
AQQQ='expr //$AQQQ :")/
"AQQQ'
BQQQ='expr//$AQQQ :'.*/)"
expr $BQQQ : ")$2$" $BQQQ
```

This script was written and routinely is used to solve a basic string-scanning problem. It produces the name of a file by stripping the leading directory names and slashes from a single argument that is expected to be a full path name.

Icon programs that use generators to scan strings often resemble high-level pseudocode. The following is a possible Icon version of a base-name command. This version consists of a single Icon procedure:

```
# basename.icn
procedure main(arg)
get (arg) ? {
 while tab(upto('/')) &
 move (1)
 write(tab(0))
 }
end
```

It uses Icon's string-scanning facility to examine the argument passed to the main program. While the program can tab up to slash "/" characters, the *upto* generator keeps moving the cursor past them. The remainder of the string is then written to standard output.

Icon, as illustrated, can provide efficient string-scanning solutions to problems that are otherwise routinely solved on Unix systems by writing shell scripts containing cryptic editor sequences. Even experienced shell programmers may have difficulty understanding these scripts.

Yet, like shell, Icon-executable files are smaller than C *a.out* files. Additionally, Icon programs are easier to write and debug.

AI tool

There is another application for which Icon might prove valuable. Icon's generator-driven, goal-directed evaluation mechanism and powerful string-scanning facilities make the language suitable for use with intelligent software tools.

Artificial intelligence researchers in Canada understand this potential and recently combined Icon and Prolog into a hybrid language they call Logicon. (see "Logicon: an Integration of Prolog into Icon," Guy Lapalme and Suzanne Chapleau, University of Montreal.)

Icon might become a regular member of the Unix programming environment because of another, unrelated reason. One question many people ask is, "Can I get Icon for my home computer?" There will probably always be a need for an easy-to-use, general-purpose Unix programming language because casual or beginning users will find it too difficult to master the shell or C.

Icon's SNOBOL-like features make it a prime candidate for the role Basic currently plays on MS-DOS systems. Should people find it easy to use Icon as the de facto replacement for Basic,

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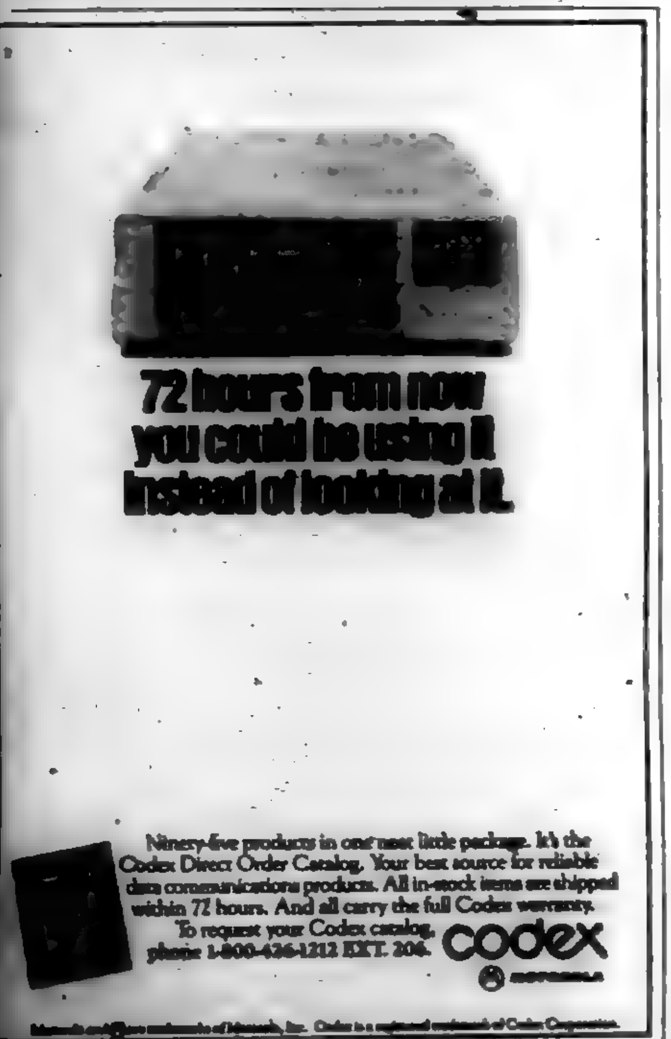

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They will provide detailed information about products on display and answer inquiries about computer equipment available from Australia.

Details about Australian exhibitors can be obtained from the Senior Trade Commissioner, Australian Consulate-General, 28th Floor, Commerce Court North, Toronto, Ontario M5L 1B9 (Tel. (416) 367 0783. Telex: 06 219 762) and the Senior Trade Commissioner, Australian Consulate-General, 3550 Wilshire Blvd, Suite 1718, Los Angeles, California 90010-2481 (Tel. (213) 380 7661-2-3. Telex: (230) 18-1125).

Other companies already have representation and are seeking to expand their sales in North America.

The following are details of some of the Australian computer equipment available. Examples are:

- ☐ First exhibition of the Datataker data logger in 1984 in Las Vegas followed by widespread recognition in North America.
- ☐ A subsidiary of Westinghouse has bought an Australian-designed and developed CAD/CAM system.
- ☐ A data communications specialist is seeking Canadian distributors for its products.
- ☐ BIS Banking Systems of New York, Chicago, Los Angeles, Miami and Toronto markets a portfolio investment management system.
- ☐ New York, Chicago and West Coast distributors are sought for software systems for the home building and transportation industries.

Other products include printer interfaces, in-house computer systems for the automotive industry, mine planning systems, data encryption technology, software for NC machines, a fourth generation computer language, a lap computer, software for governments and government agencies, an advanced microcomputer accounting package, a software finance and insurance program for car sales outlets, low cost computer boards, a full duplex synchronous and asynchronous modem for standard data communications, mining software, resource management software, software to assist people with reading difficulties, software to connect remote and local IBM PCs, financial modelling software, a microcomputer touch-typing system and a computer tutorial system.

READER REPLY CARD

A postage-paid reader service reply card is enclosed.
If you need more product information:

- ☐ Check the numbers next to the names of the companies in which you are interested.
- ☐ Mark the numbers on the reader reply card and mail it.

You will receive literature on the companies you nominate.

Where a company has a North American representative, you will be contacted and offered additional assistance from this source. If a company has no North American representative, the Australian company will contact you direct.

① Integrity Business Software Australia Pty Ltd

A business computer software company offering comprehensive packages for small to medium-sized businesses seeks US distributors for its products.

With an office in Buffalo, New York, Integrity Business Software Australia Pty Ltd is well placed to provide support services for distributors of its Accounting One and Horizon software packages.

The business accounting software operates on more than 250 makes and models of microcomputers, including Hewlett-Packard, Sirius/Victor, Apple, Altos, IBM, Televideo, Corona, ICL, Digital and NEC.

Software covers facets of business from sales, purchases and inventory to general ledger and order entry. It includes comprehensive reporting and graphical analysis, and caters for four levels of operator experience, from beginner to computer specialist. Modules of the software can stand alone or can be integrated. Separate company data can be kept on the same disc for easy access, making the business system ideal for accountants or companies with subsidiaries.

The Horizon series is a complete and detailed accounting package incorporating a fully-integrated hard disc-based accounting system. The system is fully integrated to dBaseII, Framework, Lotus 123, WordStar, Symphone and Microplan, and is designed to work with the latest operating systems, including Windows.

The software is suitable for businesses including building suppliers, furniture stores, florists, clothing and apparel stores, liquor stores and pharmacies, and for service industries including advertising, architecture, medical and legal practices, travel agents, hotels and restaurants, and a variety of distribution and wholesale operations.

INQUIRIES: Integrity Business Software Australia Pty Ltd, 582 St Kilda Road, Melbourne Vic. 3004, Australia. Tel. (03) 529 4600. Telex: AA 36620. Contact: Mr Kim Irvine, Group Marketing Manager.
IN THE USA: American Integrity Systems, Suite 236, 1552 Hertel Avenue, Buffalo NY 14216. Tel. 716 834 3634. Contact: Mr Mike Fowler.
IN CANADA: Lintex Computer Group Inc., 206/730 Yonge Street, Toronto, Ontario M4Y2B7. Tel. 416 968 0800.

② Wilkinson Computer Services Pty Ltd

A specialist in IBM systems has developed new software which, used with a protocol converter, connects remote and local IBM personal computers to host computers.

Wilkinson Computer Services Pty Ltd is launching the software — WILTALK — through AccuSoft, of San Rafael, California. The company says it is less expensive, more versatile and easier than the IBM communications adaptor.

As well as connecting IBM PCs to IBM systems/34-36-38, WILTALK can be used to connect low cost asynchronous ASCII terminals and serial printers via auto dial, auto answer modems plugged into standard telephone wall outlets.

A separate version of software is available for the NEC/APC advanced personal computer.

Applications for the WILTALK software cover the business person at home, allowing access to files from the host computer and the ability to input data from the personal computer to the host computer.

Sales people can record orders from the PC to the host computer and, combined with another Wilkinson product, WILTEL, the system allows telephone dialling to review telex messages and input replies.

Other major applications include software support personnel and software developers for remote connection of malfunctions and ongoing support for new installations, particularly in applications where 24-hour processing is involved.

The company has been marketing its word processing package, Z WORD, and WILTEL, on the US West Coast for three years.

INQUIRIES: Wilkinson Computer Services Pty Ltd, 2/140 Barkers Road, Hawthorn, Vic. 3122, Australia. Tel. (03) 818 1301. Telex: AA 38460. Contact: Mr M Wilkinson, Managing Director.
IN THE USA: AccuSoft, 136 Alto Street, San Rafael, Ca 94901. Tel. 415 459 7640. Telex: 172941. Contact: Mr Howard Harrison.

③ Engineering and Scientific Computers Pty Ltd

Coral Ridge Properties, a Florida-based subsidiary of Westinghouse, USA, has bought an Australian-designed and developed computer aided design and computer aided manufacturing (CAD/CAM) system for its development projects.

The EASINET system, developed by Engineering and Scientific Computers Pty Ltd, was chosen because the program could be tailored to individual requirements.

In addition to this capability, the system combines a number of functions usually provided separately in other systems.

The system is based on a three-dimensional engineering relational data base and, because of integrated intelligence, offers a complete CAD/CAM package.

Its three main areas of application are civil engineering and mapping, manufacturing and architectural engineering and construction. The user needs only to insert a sketch of work requirement.

From the sketch the system can provide finite element analysis, detail plans, a three-dimensional data base model, plans and specifications. The transfer of the bill of materials to a commercial data management program enables the production of accounting, invoicing and inventory. Pack and despatch details also can be provided if required.

In land development, engineers, architects and planners can obtain a three dimensional look at a site from any angle including contour detail.

In detail planning and execution, the system can be used for all stages of development from ground survey and topographical planning to design and construction of roads, utilities and buildings, plus costing and financing.

The package includes software and hardware based on Data General computers and peripherals.

INQUIRIES: Engineering & Scientific Computers Pty Ltd, Highland Centre, 7-9 Merriwa St, Gordon NSW 2072, Australia. Tel. (02) 498 2144. Contact: Mr John Boetelman, Marketing Director.
IN THE USA: SYSCOMP Corporation of America, 2042 Broadway, Santa Monica, California 90404.

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④ Engineering Computer Services Pty Ltd

A company producing planning systems for large mines has developed a system for smaller mines:

Engineering Computer Services Pty Ltd decided to produce the new system, the ECS Micro MINEX, after a market survey of the mining industry in the USA.

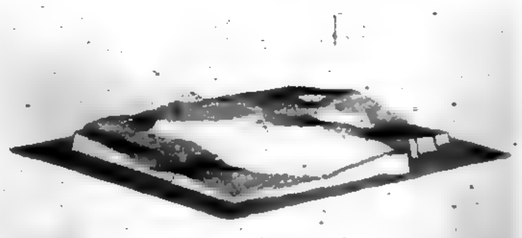
The study indicated that a large number of small US operators mine approximately a half a million tonnes a year. In contrast, large US open-cut mines produce approximately 2.5 million tonnes a year.

ECS based the Micro MINEX on an existing small computer system, Micro VAX.

It has established a division, Exploration Computer Services, in Dallas, Texas.

The company opened its first North American office at Victoria, British Columbia, Canada, in 1983, and in that year an order for a world-wide licensing system was placed by EXXON, Houston, Texas.

Orders followed from other companies, including the Broken Hill Proprietary Co. Ltd, one of Australia's largest miners, which acquired a world licence to the bigger ECS system, MINEX, in 1983.



3D View of Pit and Spoil Pile Configuration.

Micro MINEX, designed to achieve cost-effective evaluation and planning of single and multi-seam mining operations, is available in the USA, with hardware, for less than $US100 000.

Features of the system include interactive graphics for which users do not need detailed computer experience, and a multi-disciplined system for mining engineers and geologists concerned with modelling, planning and operations.

Micro MINEX is compatible with MINEX, plus optional components.

INQUIRIES: Engineering Computer Services Pty Ltd, ECS House, 590 Moss Vale Road, Bowral NSW 2576, Australia. Tel. (048) 61 2122. Contact: Mr Tony Cram, Managing Director.
IN THE USA: Exploration Computer Services, Regency Centre 11, Suite 500, 5501 LBJ Freeway, Dallas Texas, 75240. Tel. (214) 480 0133. Contact: Mr Bob Orgain.
IN CANADA: Exploration Computer Services, 301-3440 Douglas St, Victoria BC Canada V8Z/3L5. Tel. (604) 381 2126. Telex: 049 7273. Contact: Mr Peter Salloway.

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⑤ Sybiz Software Pty Ltd

A leading business accounting software supplier, Sybiz Software Pty Ltd, seeks North American software publishers to distribute Sybiz Plus, an advanced microcomputer accounting package.

The package represents some of the latest thinking in window technology with the capability of instant viewing and instant calculations within the data base at any time without interruption of the program.

Although totally integrated into a single data base Sybiz Plus can be purchased economically on a module-by-module basis.

Modules are General Ledger, Accounts Receivable/Sales, Accounts Payable/Purchasing, Inventory, Job Costing, Report Generator, Advanced User Module (provides integration with other software), Payroll and Bill of Materials.

The company believes that the system, which is push-button operated, is fast, flexible, foolproof and fail-safe. Fully-integrated and function organised, Sybiz Plus makes it possible to search for and look at any account in the data base at any time without interruption to work.

A view function key enables a change to any ledger, search for accounts and scrolling forward and back through accounts.

A 'CALC' function key is always available to open a calculator window on the screen — it is no longer necessary to search for a pocket calculator and type the results into the computer.

The company would consider a publishing agreement with royalties or a joint venture arrangement preferably with a West Coast publishing house.

INQUIRIES: Sybiz Software Pty Ltd, Syber House, 168 South Terrace, Adelaide SA 5000, Australia. Tel. (08) 51 4031, Telex: AA 88585. Contact: Mr M Boyd, Managing Director.

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⑥ Mincom Pty Ltd

Mining software manufacturer Mincom Pty Ltd uses its Atlanta, Georgia, office to supply geological and mining software to North American coal companies.

The office, opened in early 1985 after a number of visits to the market by company personnel, already has made sales in the USA and Canada.

Packages can accept raw geological data from geologists and mining engineers. They are user-friendly and enable exploration, evaluation, development and production of natural resources to be computerised.

Mincom specialises in developing technical and commercial application software for mining and petroleum companies. Products range from geological data base, deposit modelling and mine scheduling to handling supply, maintenance and accounting problems for producing mines.

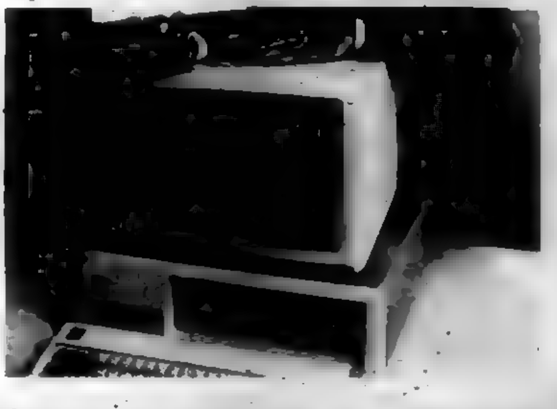
Marketing Director, Mr Gordon Jardine, says the company's objective is to establish "the same long-term dominant position we have in Australia".

Mincom's latest product release is MINESTAR (Mine Scheduling System), a language based system with high graphic content. It can be user tailored to model any mining operation.

Other packages available in North America are GEOLOG, a geophysical log display system; GEODAS, a geological data management system; and MINER 2, for coal deposit mining. MINER 2, a fully interactive system for modelling multi-seam coal deposits of up to 60 seams, can produce pictorial representations for use by geologists. It also can model coal extraction and processing operations for mining plans described by engineers. The system has been proved on many Australian coal deposits and also is applicable to a variety of other mineral types.

All software development has been carried out on Prime computers but the company invested heavily in designing 'transportability' into all software products. Software is available on IBM, PRIME, DATA GENERAL and DEC.

INQUIRIES: Mincom Pty Ltd, 12th Floor, AMP Place, 10 Eagle Street, Brisbane Qld 4000, Australia. Tel. (07) 229 4300. Contact: Mr Gordon Jardine, Director of Marketing.
IN THE USA: Mincom USA Inc., 15 Technology Parkway South, Suite 225, Norcross GA 30092. Tel. (404) 449 0610. Telex: 550272. Contact: Mr William Hodgson.



⑦ bbj Computers Pty Ltd

Australian software house bbj Computer Services Pty Ltd has launched a revolutionary fourth generation computer language called Today which will be promoted by its Santa Clara, California, office.

The language provides a self-contained environment for developing business applications under UNIX and UNIX-compatible operating systems.

The company plans to use the language to meet what it terms the 'UNIX explosion' and the challenge of quickly developing applications for the UNIX market.

Manager, Marketing Services, Ms Laurie Clark David, says the Today package took approximately 20 man-years of research and development over two and a half years.

Most of a Today application is built by defining data structures, painting screens and reports and defining logic through processes, functions and decision tables.

Definitions are held in private or global dictionaries. All application components are generated into efficient 'P-code' files which execute rapidly during run-time.

Ms David says a 'painter' approach to screens and reports enables developers to generate screen or reports quickly.

'In typical programming this would take a much longer time.

'You don't have to know anything about the operating system UNIX.'

INQUIRIES: bbj Computer Services Pty Ltd, 70 Park Street, South Melbourne Vic. 3205, Australia. Tel. (03) 699 5622. Telex: AA 33989. Contact: Ms Laurie Clark David, Manager, Marketing Services.
IN THE USA: bbj Computer Services Inc., 2946 Scott Boulevard, Santa Clara, California 95054. Tel. (408) 727 4484. Telex: (25) 5101012118. Contact: Mr Paul Mount, Vice President.

⑧ QCOM Pty Ltd

Australian software manufacturer QCOM Pty Ltd hopes to open a joint venture operation in the US Mid-West and will follow the initiative with the appointment of distributors throughout the USA.

The company regards governments and government agencies as the main target for its products and prospective distributors should already be marketing in this sector.

Participation by the company in recent trade shows in Las Vegas and Toronto has resulted in significant sales of the Text Retrieval System (TRS). The system can retrieve any form of processed data and is suited to most 16 bit micro and mini computers as well as mainframe computers.

The TRS catalogues text from any input data such as word or data processing and indexes every word in the text other than User Defined Words such as 'and', 'if' and 'the'. The resulting potentially large text data base can then be searched by using simple English commands.

The FIND command, for example, locates documents in which either a nominated word, phrase, or logical combination of words and phrases occur. The LIST command displays the name, titles and number of occurrences of the nominated phrase and the BROWSE command allows the user to examine the original text of the document, usually within two seconds.

Applications include simplification of library reference systems, skills inventory, hazardous chemicals register, records management, retrieval of legal opinions and precedents and any other tasks requiring the storage and retreival from text files.

INQUIRIES: QCOM Pty Ltd, 457 Upper Edward Street, Brisbane Qld 4000, Australia. Tel. (07) 839 3544. Contact: Mr R Worthington, Managing Director.
IN CANADA: The Harrow Group Limited, 4th Floor, 3 Church Street, Toronto, Canada M5E 1H2. Tel. (416) 367 0800. Contact: Mr K F Dunmow. Business Information Processors Ltd, Suite 104, 116 Lisgar Street, Ottawa, Canada, Tel. (613) 230 6702. Contact: Mr R Hookham.

⑨ DataNetComm Inc.

A data communications designer and manufacturer is seeking distributors for its latest product developed for the North American market.

DataNetComm Inc., which has supplied products to Apple in the past, has developed a 1200 and 2400 full duplex synchronous and asynchronous modem for standard data communications over the world-wide telephone network.

The modem can cater for both Bell and CCITT standards. It can be used with any personal computer, microcomputer or mainframe that has an RS232C interface and permits access to data bases outside the USA and Canada.

It is effectively five modems in one and includes advanced features such as auto dialling and auto answer. The product will allow communications in three speeds to many hosts.

The features and controls are all supported by software routines that may be incorporated into a user's program. It connects directly to a telephone exchange.

The internally mounted modem is fast and secure. Direct connection eliminates acoustic interference and it has a high throughput with full data security provided.

The company has an office in San Francisco and plans to open a North American outlet for the direct supply of its products to distributors.

INQUIRIES: DataNetComm (Australia) Pty Ltd, Centrecourt, 25-27 Paul Street North, North Ryde NSW 2113, Australia. Tel. (02) 888 5533. Minerva/dial comm: 58: DN C002. Contact: Mr Bruce Reid, Sales and Marketing Manager.
IN THE USA: DataNetComm Inc., PO Box 881263, San Francisco, California 94188-1263. Contact: Mr Chris Howells, Chairman.

⑩ Typequick Pty Ltd

An award-winning microcomputer touch typing system marketed successfully in the USA soon will be available in Canada.

Developed by Typequick Pty Ltd it is marketed by the sale of a corporate training licence at a cost of $US600 entitling the purchaser to train 100 people to touch type. A single user training licence is available at $US69.

The course consists of 10 discrete lessons. The first six teach the 33 main keys on the keyboard. The next two cover the 10 numeric keys on the main keyboard.

Lesson 9 concentrates on speed building, introducing words on the screen at a slightly faster rate than the student's average speed.

It aims to increase the student's speed by 20 per cent and is repeated until the student achieves that goal. The maximum speed goal is 120 words a minute.

Lesson 10 aims at improving accuracy at the speed attained in lesson 9.

A separate course of three lessons teaches the numeric keypad.

The program motivates the student to strive to reach each objective. It helps when small difficulties are experienced and provides more exercises for weak areas.

It can be run on almost any microcomputer using MS-DOS, PC-DOS, Apple DOS, CP/M 80 or CP/M 86.

INQUIRIES: Typequick Pty Ltd, 14 Cecil Street, Gordon NSW 2072, Australia. Tel. (02) 498 7428. Contact: Mr Noel McIntosh, Managing Director.
IN THE USA: Typequick, 12821 Wilshire Blvd, Suite 219, Los Angeles, California 90025. Contact: Mr Chuck Carr.
US DISTRIBUTORS: Softeam, Los Angeles. Tel. (toll free 800) 847 6383. Software Resources, San Francisco. Tel. (toll free 800) 8619010.
Software Control International, Washington DC. Tel. 202 337 2880.

ap

AUSTRALIA PRODUCES

Office of the Australian Trade Commissioner

Gentlemen,

If Australia can produce for my business, I'd like to know more. Please send me more information on the companies I have indicated.

Subject: Computer IV

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26		

Your Name ....

Your Title ....

Company ....

Street Address ....

City ....

State .... Zip Code ....

Telephone ....

Please indicate your status ☐ **Importer/Distributor** ☐ **Retailer** ☐ **Other (Specify)** ....

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IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
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POSTAGE WILL BE PAID BY ADDRESSEE

Office of the
Australian Trade Commissioner
Suite 800, 3 Post Oak Central
1990 Post Oak Boulevard
Houston, TX 77056-9990

⑪ Computerized Tutorial Systems Pty Ltd

A text book-priced computer tutorial system provides instruction in maths, physics and English for students in final year examination levels leading to university.

Produced by Australia's Computerized Tutorial Systems Pty Ltd, it is available for Commodore 64 and Apple data base systems. IBM is being added. The company is seeking North American distributors and will consider manufacture-under-licence or joint venture proposals.

As a home tutor it is valuable where a student falls behind in a subject or an aspect of a subject and needs individual tutoring. In the classroom it can be used as a complete teaching method or as a supplementary teaching aid for individual students.

The system also keeps records of student progress and recommends what they should do next. The information is stored on disc and updated progressively.

The student does not require computer expertise. Once the program is loaded he can select from a menu either a tutorial, quiz or practice problem.

An accompanying manual suggests where the student should start and from then on he [illegible] instructed by the computer.

The tutorial is formated in much the same way as a text book. It presents the subject and then asks question but unlike a text book, a subject not understood is reviewed, and explained and advice given on errors. The program returns to the question when it is satisfied the student understands.

INQUIRIES: Computerized Tutorial Systems Pty Ltd, Suite 204, 55 Mountain Street, Ultimo NSW 2007, Australia. Tel. (02) 212 6888. Contact: Mr John Peynter, General Manager.

⑫ Infolink Software Pty Ltd

North American distributors are required for an unusual human resource management software package.

Infolink Software Pty Ltd has developed the product, Manplan, which is released on Wang VS computers.

Managing Director, Mr Len Baker, says the distributor should have an interest in human resource management and planning and an understanding with Wang.

'It would be an organisation with a reasonable consulting and software profile that would have the authority to be able to sell Manplan at board room level in corporations. There also would have to be involvement with the end user.'

The company has established an architecture of software, specifically aimed at human resource management, and not tied to existing payroll/personnel systems.

Main applications supported are personnel administration; salary administration; human resource management and planning; recruitment; selection and staff development; succession and career planning; payroll; workers compensation; and superannuation.

Accurate, up-to-date personnel data facilitates human resource planning and control at all levels of management, reduces to a minimum the time spent on routine administration tasks, and has an innovative human resource management facility, based on carefully planned mathematical and processing techniques.

INQUIRIES: Infolink Software Pty Ltd, 82 Christie Street, St Leonards NSW 2065, Australia. Tel (02) 438 3033. Telex: AA 74317. Contact: Mr Len Baker, Managing Director.

⑬ Summit Communications Pty Ltd

Summit Communications Pty Ltd, a data communications specialist, seeks Canadian distributors for its products. Negotiations are under way with distributors in the USA.

The company will be among the exhibitors at the Canadian Computer Show in Toronto in November and display three different pieces of hardware — the Summit Universal Network Switch (SUNS), a completely general purpose communications network switch for large networks; a remote polling unit/concentrator for enhancing performance in airline or similar reservation systems; and a telex interface that connects a word processor or computer to the worldwide telex network.

SUNS, recently installed in one of Australia's largest banking companies, is capable of instantly changing network configuration under automatic or user control, either on site or remotely.

It is designed for uncompromising reliability, with fully duplicated critical internal parts for backup, and high performance software. This includes facilities for exhaustive fault diagnosis with location display, background self-testing and remote testing.

The 2705 RPU/concentrator is a network performance and cost reducing remote polling unit to PARS/IPARS networks using Sabre code. It requires no software modification to terminal controllers or the host computer.

The device is used to improve the performance of data communications networks in reservation systems.

INQUIRIES: Summit Communications Pty Ltd, 95 Hunter Street, Hornsby NSW 2077, Australia. Tel. (02) 476 5233. Telex: AA 71341. Contact: Dr Paul Jackson, Managing Director.

⑭ Eracom Pty Ltd

A company specialising in data encryption and providing tailor-made products and services to create total security for all information services is seeking agents in the USA.

Eracom Pty Ltd, a world leader in encryption technology, uses the Data Encryption Standard (DES) of the American National Bureau of Standards (NBS).

The main product areas are the Eracom PC Encryptor incorporating a card and supporting software, the Eracom Security Module and the programmable line encryptor/converter.

An integral part of Eracom's encryption is a secure key management and distribution system. Keys are stored in a special non-volatile memory which is lost if attempts are made to tamper illicitly with the system.

Products can be modified to specific customer requirements.

The encryptor card encrypts the data, programs and the operating system, making software piracy impossible.

Software support combines with the PC-DOS and MS-DOS operating systems and uses the NBS Data Encryption Standard algorithm, implemented on a high speed integrated circuit chip, to perform encrypt/decrypt functions.

The Eracom Security Module (ESM) is a micro-processor based device designed to protect the electronic funds transfer system and comply with the necessary security standards of shared networks.

Telephone line encryptor/converters are the 2007 line scrambler and the 3007 multi-channel programmable device. Both maintain protocol integrity.

INQUIRIES: Eracom Pty Ltd, 28 Greg Chappell Drive, Burleigh Heads Qld 4220, Australia. Tel. (075) 56 0811. Telex: AA 43943. Contact: Mr W Caelli, Technical Director.

⑮ Dataflow Computer Services Pty Ltd

Educational software suppliers are sought as North American distributors for a software package to assist people with reading disabilities.

Dataflow Computer Services Pty Ltd will display the product at the Canadian Computer Show in Toronto in November.

According to a director of the company, Dr Jeffrey Tobias, one in every 10 people in the Western world has reading disabilities ranging from mild to the extreme form where a person is classed as dyslexic.

The DIRECT Helper Scheme program runs on Apple, Commodore 64, IBM PC and Tandy TRS-80 personal computers and is suitable for children from seven to adult age.

The scheme can be used in the home or school and the parent or teacher who is supervising does not need computer knowledge.

Its aims are to establish word decoding, story reading and spelling skills; to develop good reading habits, with special emphasis on the left to right sequence of letters and words; to motivate the student to enjoy reading; and, through success, boost the student's self esteem.

The scheme is in use in Australian schools, other government bodies and various remedial reading centres.

INQUIRIES: Dataflow Computer Services Pty Ltd, 134 Barcom Avenue, Rushcutters Bay NSW 2011, Australia. Tel. (02) 331 6153. Contact: Dr Jeffrey Tobias, Director.

⑰ N.C. Computer Systems

An Australian manufacturer of software for numerically controlled (NC) machines is seeking North American agents for its computer aided automatic programs.

N. C. Computer Systems requires agents familiar with numerically controlled machines or who supply machine tools.

The company is one of Australia's largest commercial producers of software for machines used to cut material in the engineering and manufacturing industries.

Managing Director, Mr Gerard Faucher, says agents would be expected to sell the software, demonstrate its capabilities and train customers to use it effectively as well as providing backup information and assistance. Agent training would be either in Australia or in the USA.

The company's main expertise is in the development and implementation of Computer Aided NC Automatic Programming (CANCAP), using its own version of MicroAPT which is being refined continually and transferred to other computers.

The software simplifies programming, provides excellent graphic verifications of the job and has general and specific post processors available for virtually any two or 2½ axis NC lathe, machining centre, flame and wire cutter or punch press.

The software has side applications — the manufacture of small products, in the automotive industry, the sheet metal industry and the timber industry.

INQUIRIES: N.C. Computer Systems, 4 Morobe Street, West Heidelberg Vic. 3081, Australia. Tel. (03) 458 1992. Contact: Mr Gerard Faucher, Managing Director.

⑱ Time Office Computers Pty Ltd

Distributors are sought on the east and west coasts, the Mid-West USA and in Toronto, Canada, for the powerful Kookaburra lap computer and the ergonomic Emu terminal.

Time Office Computers Inc., California, representing Time Office Computers Pty Ltd of Australia, sold more than 600 of the portable computers following the 1984 Comdex display in Las Vegas. The Australian company will be exhibiting again at this year's Comdex.

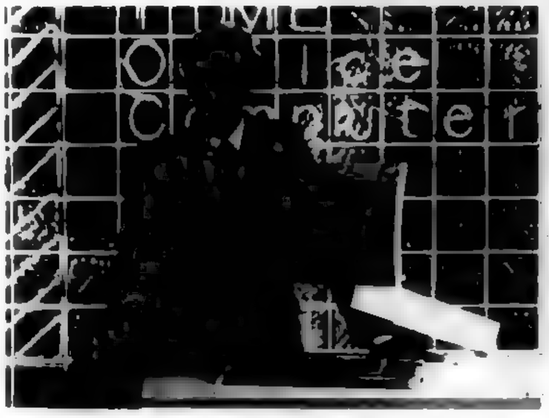
The main market for the Kookaburra is commercial, rural, research, and government bodies.

The company believes the upgraded Kookaburra is the fastest portable lap computer on the market, with its 16 bit microprocessor, the Intel 80186 running at a fast 6MHz, and also the slimmest, at 58 mm.

It comes complete with 96 000 characters of USER memory, a 16 line display and two software packages — a word processing application program and a spreadsheet program. The basic memory can be incremented in 8K modules up to a maximum of 256K.

The Emu computer acts as an intelligent terminal and has the ability to talk to any mainframe in its native protocol.

INQUIRIES: Time Office Computers Pty Ltd, 221 Miller Street, North Sydney NSW 2060, Australia. Tel. (02) 925 0555. Telex: AA 22056. Contact: Mr Ian Hay, Marketing Manager.
IN THE USA: Time Office Computers Inc., 1600 Green Hills Road, Scotts Valley, California 95066. Tel. (408) 438 6500. Telex: (230) 357403. Contact: Mr Don Seale, President.



⑯ JBA International Pty Ltd

The first international sales success for the Australian Portfolio and Investment Management System (PIMS) was to Bermuda re-insurer Colonial Insurance Inc.

BIS Banking Systems Inc. of New York, Chicago, Los Angeles, Miami and Toronto, markets the product in the USA and Canada.

PIMS is a computer-based investment management product which provides hour-by-hour, day-by-day and month or year-end data for improved investment management.

JBA International Pty Ltd, Sydney, developed the product with one of Australia's largest trading and investment companies.

PIMS permits information to be analysed according to the spread of individual portfolios. It caters for a wide range of investment options from commercial properties, shares and equities, interest bearing investments, futures markets, investment trust management and most other forms of single or multiple element investment.

For international investment market operations, the package has multi-currency facility.

PIMS uses the powerful IBM System 38 series and has been written to take full advantage of all its facilities.

Its two sub-systems, deposit and investment, interface with BIS Modular International Dealing and Accounting System (MIDAS).

The deposit sub-system provides for the needs of marketing, investment, broking, accounting and management of a portfolio.

The investment sub-system provides facilities for the purchase and sale of investments, income accrual and realisation, exposure management, maturity and cash-flow reporting, portfolio revaluation, fees and charges and management and audit reporting.

INQUIRIES: JBA International Pty Ltd, 100 Walker Street, North Sydney NSW 2060, Australia. Tel. (02) 922 1900. Contact: Mr Allen Rosenberg, Associate Director.
IN THE USA AND CANADA: BIS Banking Systems Inc., New York, Chicago, Los Angeles, Miami, Toronto.

For more information:
Office of the Australian
Trade Commissioner,
Suite 800
3 Post Oak Central
1990 Post Oak Boulevard
Houston, Texas
77056-9990

⑲ Data Electronics (Australia) Pty Ltd

Data Electronics (Australia) Pty Ltd first exhibited its Datataker data logger at the 1984 Comdex Show in Las Vegas.

First sales into the USA were made immediately and Datataker now has widespread recognition in North America. It has proved to be a low cost and sophisticated solution to data acquisition needs.

The Datataker is distributed in the USA by Zi-Tech Instruments Inc. of Palo Alto, California.

The Australian company claims that the Datataker incorporates the features of more expensive loggers, but costs less than half the price of comparable units.

It usually is operated by a permanent link to a computer but also can be used in a stand-alone mode.

Up to 54 analog and digital channels are selected and scanned at regular intervals, or in response to external events. The data can be returned immediately or stored in memory for later recovery and analysis. A real-time clock controls scan sequencing and may be used to record the time of each scan.

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Up to 15 Datatakers can be networked over one mile.

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The field model has a weatherproof stainless steel case. Laboratory models have a PVC case.

INQUIRIES: Data Electronics (Australia) Pty Ltd, 42 Rutland Road, Box Hill Vic. 3128, Australia. Tel. (03) 890 2422. Telex: AA 38615. Contact: Mr T Schauble, Marketing Manager.
IN THE USA: Zi-Tech, 2151 Park Boulevard, Box 60490, Palo Alto CA, 94306. Tel. (415) 326 2151. Telex: 33447. Contact: President, Mr Geoffrey C Ziman.
IN CANADA: Mandel Data Systems Inc., 143 Dennis Street, Rockwood Ontario NOB ZKO. Tel. (519) 856 9586, (toll free) 800 265 8356. Telex: 069 56851. Contact: Mr Ray Cornell, Manager.

⑳ Business Model Systems Pty Ltd

Software made by Australia's Business Model Systems Pty Ltd has proved so popular with Australian subsidiaries of such multinationals as Coca-Cola, National Panasonic and Johnson and Johnson that the company now is receiving a flow of orders from North America and Europe.

The system blends the use of simple electronic worksheets with the capacity of comprehensive financial modelling systems.

The software package, Business Modeler, may be used as part of a planning process to organise information, to see the results of change, to generate reports and to come to conclusions and maintain controls — all without needing special technical skills.

Business Modeler is easy to use. When performing 'what if' analysis, examining alternative measures or simply changing one's mind, Business Modeler prompts a user to answer any questions presented by the system.

It enables users at all business levels to input data, define and carry out calculations and simultaneously have direct access to decision-making information at the touch of a button. These results may be reported on or off the screen.

Business Modeler is compatible with most 16 bit micros, minis and mainframe computers such as IBM, NCR, Honeywell, Prime, Wang and HP.

Business Model Systems supports the use of its product throughout the world with telephone hotline support, extensive documentation, training and a continual updating of the software.

INQUIRIES: Business Model Systems Pty Ltd, 3rd Floor, 518 Brunswick Street, New Farm Qld 4005, Australia. Tel. (07) 358 4800. Telex: AA 43713 BMS. Contact: Mr Max Beatty, Managing Director.
IN THE USA: Business Model Systems Inc., Suite 138S, 2625 Butterfield Road, Oak Brook Il. 60521. Tel. (312) 789 9180. Telex: 280051 BMS OAKR. Contact: Mr Peter McBride. Business Model Systems Inc., 330 Washington Street, Marina Del Rey, CA 90292. Tel. (213) 821 7728. Contact: Mr Ed Marquis.
IN CANADA: R. J. Percival Ltd, 570 Hood Road 20, Markham, Ontario L3R 4G7. Tel. (416) 474 9277. Contact: Mr Bob Campbell.

㉑ Wilson Computer Services Pty Ltd

Distributors are sought in New York, Chicago and on the west coast of the USA for sophisticated software systems designed for the home building and transportation industries.

Wilson Computer Services Pty Ltd has released the packages through its subsidiary US companies based in Austin and Houston, Texas. The packages will run on Digital, Wang, Prime, Data General and most UNIX-based minicomputers.

The Home Building System is designed to put the builder in complete control. Using reports and terminal inquiries, the user can monitor all aspects of home building, including up-to-date cash flow forecasting, budget performance, purchase optimisation and loan control.

The transportation package covers the complete range of functions for a company running 100 vehicles or more. While designed as a total system, it is implemented in modules which can either operate alone or as part of the overall system.

Modules within the system are fleet management, freight processing, sub-contractors payment and control, accounts payable and receivable, spares inventory and storage management.

A vital module of the transportation suite is the freight system. The package processes and tracks consignment notes, prepares manifests, facilitates load planning at initial transhipment and final delivery points, records customer pricing details and carries out accounting procedures.

All packages have been designed for non-technical users.

INQUIRIES: Wilson Computer Services Pty Ltd, 24 Green Street, Brookvale NSW 2100, Australia. Tel: (02) 938 3756. Telex: AA 27443. Contact: Mr Alasdair Munn, Marketing Manager.
IN THE USA: Wilson Computer Services Inc., Suite 306, 1705 Capital of Texas Highway, Austin, Texas 78746. Tel. (512) 327 9146. Contact: Mr Robert Vinson, Manager.
Wilson Computer Services Inc., Suite 1600, Sage Plaza Building, 5151 San Felipe, Houston, Texas 77056. Tel. (713) 983 9391. Contact: Mr Robert Vinson, Manager.

㉒ Abraxas Computers Pty Ltd

Abraxas Computers is seeking North American agents and distributors for a software finance and insurance program which offers new and used car sales outlets an instant method of calculating finance details to suit individual customers.

The program, for a Commodore 8296 SK, is a complete selling tool which enables quick quotes and contracts to be negotiated on-the-spot.

Contracts do not have to be re-submitted to customers with the often consequent loss of sales.

Abraxas says the program can be customised to suit particular business practices, specific contracts or customary methods of financing and insuring new or used motor vehicles. It also can easily modify the program to suit US documentation, where necessary, on a state-by-state basis. The cost of the program and computer is under $US2000.

The company is anxious to meet Commodore using dealers, finance houses and auto insurance companies to discuss marketing and training of dealers for the introduction of the software products among their customers.

Demonstration tapes are available.

The program has particular advantages in demonstrating to the customer whether it is better to lease, finance or pay cash for the vehicle. It often can convert a cash buyer to finance.

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INQUIRIES: Abraxas Computers Pty Ltd, 151 Hutt Street, Adelaide SA 5000, Australia. Tel. (08) 223 5133. Telex: AA 87509 Abrax. Contact: Mr Fred Firth, Managing Director.

㉓ Mining Computer Applications

Mining Computer Applications intends to increase the sale of its mining software programs in North America.

The company, already represented in Ohio, is looking for representatives in Houston, Denver and St Louis.

Software designed for use in both open cut and underground coal mining operations already has been shown to mines in Colorado, Texas, Ohio, Kentucky, Pennsylvania, Indiana and Missouri.

The programs are orientated toward efficient mining techniques by the combined use of MINEPLAN 2.0, an integrated mine planning system; COAL-BLEND, a coal blending and washplant simulation system; GEOPLAN a geo-statistical ore reserve estimation system; and, to complete the operation, FLEET, an equipment performance database system.

Clients are supplied with a source code which enables them to partially recode and tailor software packages to their specific needs.

The company claims the software is interactive, user friendly and compatible with a number of existing computer systems ranging from 16 bit minicomputers to mainframe systems.

The company provides qualified staff on site or on hand at large and complex installations.

INQUIRIES: Mining Computer Applications, MLC Court, 12th Floor, 15 Adelaide Street, Brisbane Qld 4000, Australia. Tel. (07) 229 6277. Telex: AA 40472 (ref 157). Contact: Mr Alan Key, Director.
IN THE USA: Ohio Automation Inc., 361 Angel Ridge Road, Athens, Ohio 45701. Tel. (614) 594 8296. Contact: Mr Donald Schack.

㉔ Pulsar Electronics Pty Ltd

Pulsar Electronics seeks North American agents and distributors to market its general purpose, low-cost computer boards.

Applications range from stand-alone industrial controllers to 40-user business systems.

State-of-the-art technology has created a compact design that, through compliance with STD Bus, is fully expandable with US systems. End users in the USA can construct systems to meet their specified requirements.

The System 6000 Turbo-Mega-Board single board computer is specifically designed for the small business and hobby computer market. The company believes that by using the integrated features of its 80186, the Turbo-Mega-Board can provide more features than are found on other single board computers.

The firm also wants agents and distributors for the 80186 8MHz CARD-6016 and the Z80B 6MHz CPU CARD-6080. Both have been designed using a state-of-the-art Mil Spec multi-wire technology circuit board and both are fully expandable via compliance with STD Bus.

INQUIRIES: Pulsar Electronics Pty Ltd, Lot 67, Catalina Drive, Tullamarine Vic. 3043, Australia. Tel. (03) 330 2555. Telex: AA 10104. Contact: Mr Philip Delacretaz, Managing Director.
IN THE USA: Infinity Inc., Suite 5, 29429 Southfield Road, Southfield, Michigan 48076. Tel. (313) 557 7230. Contact: Mr Ron Yerman.

㉕ Systime Australia Pty Ltd

A company which recently completed the on-time installation of in-house computer systems in 28 automotive dealerships throughout New Zealand within a year is seeking agents in the USA and Canada.

Systime Australia Pty Ltd is one of the largest suppliers of in-house computer systems for the Australian and New Zealand automotive industries.

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The system's potential for assisting floor-plan inventory will interest insurance and finance companies involved in dealer computerisation.

In the USA, Digital Computer Corporation, a major, Massachusetts-based manufacturer and Plessey Data Systems, Los Angeles, California, have already shown interest.

Systime software is written specifically for application to the automotive industry.

INQUIRIES: Systime Australia Pty Ltd, 89 Smith Street, Wollongong NSW 2500, Australia. Tel. (042) 29 5266. Telex: AA 21906. Contact: Mr E Ainsworth, Managing Director.

㉖ Apollo Computer Equipment Pty Ltd

Conversion of high-speed printers for IBM 34, 36 and 38 data base systems is possible with a specially designed interface marketed by ANZAC Computer Equipment Corporation of Hayward, California.

The company is the US-based marketing arm of Apollo Computer Equipment Pty Ltd, Australia.

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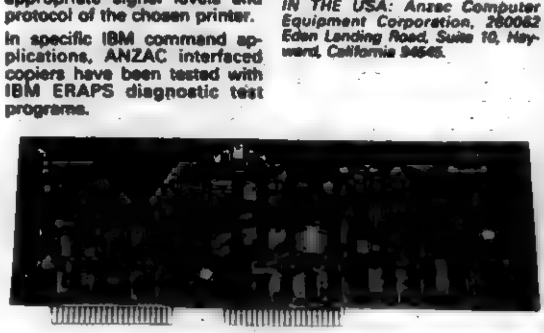
This allows high-speed printing using mainline data system equipment or remote work station equipment.

The interface matches the protocol converter twin axial signal from the IBM System 34, 36 and 38 and converts these to the appropriate signal levels and protocol of the chosen printer.

In specific IBM command applications, ANZAC interfaced copiers have been tested with IBM ERAPS diagnostic test programs.

INQUIRIES: Apollo Computer Equipment Pty Ltd, 188 Pacific Highway, Greenwich NSW 2065, Australia. Tel. (02) 439 4304. Contact: Mr Simon McDonald.
IN THE USA: Anzac Computer Equipment Corporation, 260062 Eden Landing Road, Suite 10, Hayward, California 94545.



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Icon may become an important adjunct to the Unix programming environment.

Language syntax

The Icon syntax resembles that of C and Pascal. Icon is not "block structured," and procedures may not be nested. Programs have one or more procedures that may optionally reside in separate Unix files. Icon procedures are composed of optional scope declarations followed by expressions.

Technically, there are no statements in Icon, so in this sense at least, the language resembles Lisp. Here is the Icon rendition of the familiar "hello world" program:

```
procedure main()
  write ("Hello World!")
end
```

As in C, program execution begins in the procedure *main*. The words *procedure* and *end* are reserved and give Icon syntax its Pascal appearance. *Write* is a built-in function. The term "function" is used to refer to built-in C procedures that are already part of the language. Icon has a large collection of these built-in functions.

Naturally, strings are an integral part of the Icon language. They are a separate data type, and like Basic or SNOBOL4 strings, they can be assigned to variables. There is no limit, other than those imposed by machine architectures, to the length of strings. A two-word descriptor is employed internally to store the string's length and its beginning address in memory.

There are no more special characters in Icon strings (such as the C null terminator), so all characters are equally valid. This contrasts with C, where strings are manipulated at a lower level, and programmers must rely on convention.

Icon operators are inherently polymorphic because variables may assume any valid Icon type during the course of program execution. This allows the same operator or procedure to be used differently, depending upon the type of its argument(s) at the time of expression evaluation.

The same programmer-defined "element counter" procedure could be used, for example, to count the number of lines in a file, the characters in a string or the members in a list.

The size "*" operator returns the size of its argument and is a good example of a built-in polymorphic operator that can be used with different types of data.

Generators

Generators lie at the heart of the Icon programming language. Several languages have limited control mechanisms called generators. Icon's generators are unique because they are interwoven throughout the entire fabric of the language. Although the word "generator" sounds imposing, the concept is simple enough.

Expressions in most other languages are only capable of computing and producing, at most, one result. Some languages, such as SNOBOL4, allow expressions that do not produce any results, and when this happens, these expressions are said to fail.

Generators were developed because expressions that can only produce one result may waste potentially useful information contained in the expression-evaluation mechanism at runtime. Normally explicit means have to be provided for retaining this kind of information. Icon generators do this internally.

> ❞
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> ***Icon's generators are unique because they are interwoven throughout the entire fabric of the language.***

The standard example used to introduce generators is that of finding substrings in a longer string of characters. An expression that contains a function, usually called *find*, is used to look for substrings.

If the substring is found, most other languages can be used to illustrate the conventional methods of looking for the next occurrence of the substring. These languages make it necessary for the programmer either to add constructs to remember the previous occurrence or to find all previous occurrences before looking for the next one.

The Icon *find* generator, on the other hand, allows programmers to find successive occurrences with a single expression until it no longer produces a result (that is, there are no more occurrences) and then fails. It is not necessary for Icon programmers to add extra code for remembering the state that the expression was in when it produced the last result, although they could if they wanted.

The point is that Icon generators make the normal bookkeeping of these details unnecessary, and without these details, programs are more easily coded and later understood.

Although string-related examples are often used to describe generation, Icon generators are not limited to string scanning or manipulation. Every expression is potentially a generator. Some built-in functions are generators.

Generation is inherited, so that expressions with subexpressions that contain generators become generators themselves. The order in which generators produce their results is well defined but may be changed by the programmer by using

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> *Experienced programmers may find Icon programming disconcerting because familiar constructs and control mechanisms work differently than expected. . . . Once [they] no longer think in terms of a single result . . . they become more comfortable with the new semantics.*

a language mechanism called a coexpression.

Semantics

Superficially, Icon's syntax resembles other modern programming languages. Experienced programmers may find Icon programming a bit disconcerting at first because familiar constructs and control mechanisms work differently than expected. However, the novel aspects of the language are easily learned even by those with no programming experience.

The unusual semantics arise from generators and the concept of expressions that either succeed or fail. This concept is somewhat unfamiliar to SNOBOL4 programmers. Expressions in Icon that produce results succeed, and if they contain a generator, they may succeed more than once. Failure is the same as not being able to produce a result.

Once experienced programmers no longer think in terms of a single result (either true or false) and begin to think in terms of producing another result (success) or failure, they become more comfortable with the new semantics.

Icon control structures are driven by the success or failure of control expressions. This has allowed, for instance, the success and failure of pattern-matching functions to drive control structures (for example, *if-then-else*, *while* and so on) embedded in string-scanning. This makes it possible to construct string-scanning expressions that are easier to read and understand than equivalent SNOBOL4 patterns.

Goal-directed evaluation

Goal-directed evaluation is the name for the process Icon uses to produce results during expression evaluation. Many people fail to realize that goal-directed evaluation is automatic in the sense that programmers do not have to do anything special to make it happen.

Theorem proving in Prolog is similar to goal-directed evaluation, but backtracking in Icon during this process is limited to the current expression.

Goal-directed evaluation is responsible for the somewhat unexpected semantics associated with the conjunction operator "&" and the disjunction operator 'I'. With "&", the conjunction fails only after all results of the expression are produced without success.

Goal-directed evaluation has no analogy in ALGOL-like languages without generators. It occurs only in Icon expressions that contain one or more subexpressions with a generator.

If a subexpression fails, previous subexpressions are resumed, if possible, and the process continues until the outermost expression produces a result or fails. This is probably best illustrated with an example.

Consider the built-in Icon function *find (s1, s2)*. It is a generator that produces the numerical positions of its first argument, *s1*, in its second argument, *s2*. The expression

```
find("oo," "look at the book
by the brook")
```

is capable of producing 3 numerical results:

```
Look at the book
2                    27

by the brook
        27
```

The series of results that a given expression is capable of producing are considered its result sequence. This result sequence can be presented as *[2, 14, 27]*.

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Now consider the following expression:

find("oo," "look at the book by the brook!") >10

This expression is asking if there is an occurrence of the substring "oo" after position 10 in the second substring. The answer is yes, and this expression will succeed because of goal-directed evaluation.

The sequence of events is as follows:

— *Find* is activated and produces its first result, 2.

— Since 2 is less than 10, the (greater-than) expression fails, and the *find* generator is automatically resumed and produces its next result, 14.

— Since 14 is greater than 10, the expression succeeds, and goal-directed evaluation ceases.

Note that the final result is not required, so the *find* generator is not resumed to produce it.

Goal-directed evaluation allows programmers to write shorter and more natural programs. Consider the classic "welfare crook" problem from parallel programming. The problem is to find a common name among three separate lists of names. For the purposes of this example, assume the Icon variables L1, L2 and L3 are Icon lists of names created by the following expressions:

L1 := ["paul," "john," "george," "ringo"]
L2 := ["peter," "paul," "mary"]
L3 := ["peter," "luke," "paul", "..."]

Although these lists contain string constants, lists in general can be composed of any valid type, even other Icon lists. It should be pointed out that lists can be created in other ways and that the language is rich with built-in list access methods (such as *push*, *pull*, *pop* and *get*). After these three lists have been created, the following expression

write(!L1 == !L2 == !L3)

uses goal-directed evaluation to satisfy the equalities and will write the first name that is common to all three lists.

The "!" *bang* operator is an Icon generator that produces elements. It is useful to consider "any member" as a euphemism for *bang* when used in the context of goal-directed evaluation. This way, the above Icon expression reads:

write any member of L1 that equals any member of L2 that equals any member of L3.

Most data types (such as lists, records, files, strings, csets, tables or sets) can be made to produce their members using *bang*. List members here are strings that represent names.

The *every* control structure makes all generators exhaustively produce their results so that

every write(!L1 = !L2 = !L3)

produces all the names that are common to all three lists.

Runtime system

Icon is technically an "interpreted" language, but this term is misleading. Although Icon programs execute with the help of an assembly language interpreter, or "decoder," and runtime system, the help is usually transparent. Additionally, Icon programs are not interpreted in in the same way as other classically interpretered languages.

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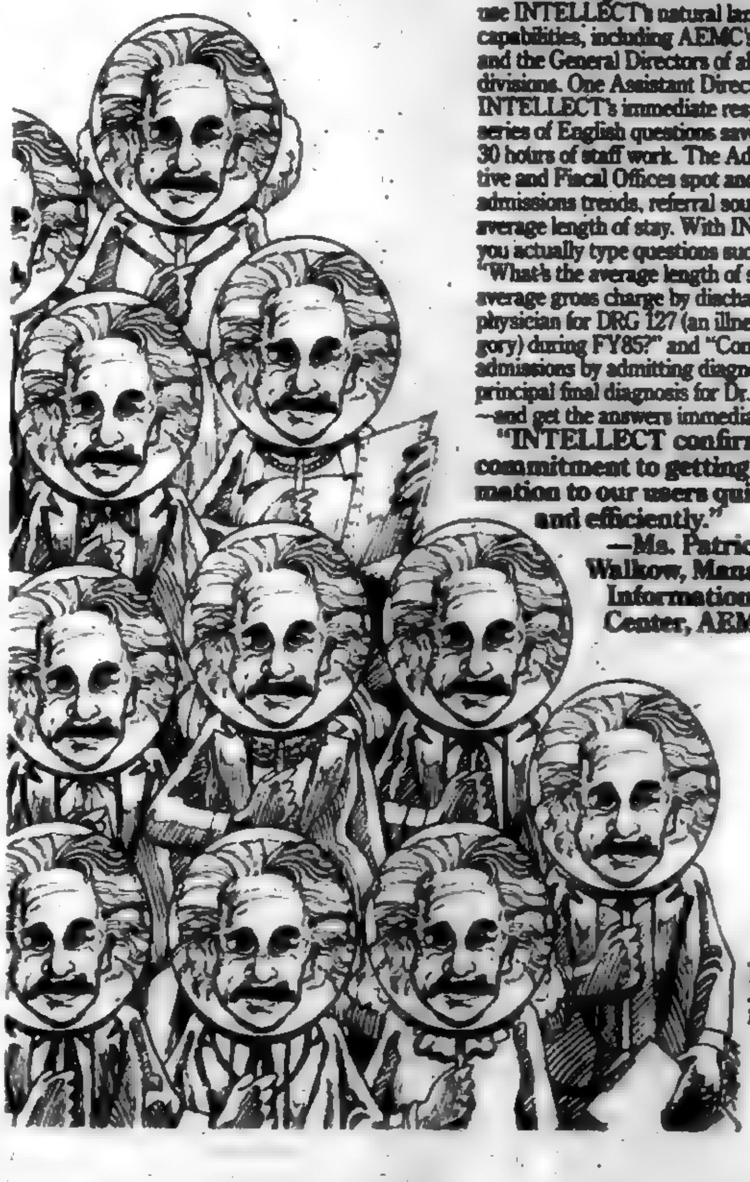

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> ***Both powerful and expressive, with new and often unrecognised properties, Icon can be used to solve a class of string-oriented problems that might otherwise be solved cryptically using the Unix shell.***

Programs are translated before execution in much the same way as a normal compiler. Rather than link-editing and producing executable load modules, programs are translated into an "abstract" intermediate code (similar to Pascal's pcode) called ucode. Ucode files can be linked together to produce another form of the abstract code called icode, with all references resolved. Linking is normally done automatically after translation.

Users consider these icode files to be identical to C load modules (*a.out* files). From their perspective, little difference exists between C or Icon when translating and running programs, except that the time required to link edit (Unix *ld* command) and produce an executable load module is not necessary. This maks the Icon translation sequence faster than normal C compiles.

In order to translate and link the "hello world" program assumed to be in the Unix file *hello.icn*, the user types

```
icont hello.icn
```

Then, if there were no errors, the user simply types in the name of the translated program minus the .icn suffix (in this case *hello*), just as one would any standard Unix command.

When the Icon program is executed, it then executes the assembly language interpreter. The interpreter reads and then executes the program contained in the remainder of the icode file using the binary-encoded abstract instructions.

Regarding program interpretation, it is important to understand that abstract icode instructions cause precompiled built-in C routines to execute. These routines are in memory as part of the runtime system. After the C routine is completed, control returns to the interpreter, and the next abstract instruction is executed. The interpreter also pushes arguments, procedures and local variables on the Icon stack. Other instructions provide the interpreter with current file and line number information used by the tracing mechanism and for runtime error messages.

Icon vs. C

It is interesting to note that Icon icode files are usually much smaller than corresponding C load modules (*a.out* files) because the work at runtime is done by the resident Icon runtime system. Also, C load modules typically duplicate much of what is contained in other executable load modules, particularly the print library. The byte totals (unstripped) from the executable files of the usual *hello world* program written in both languages on an AT&T 3B20S are as follows:

```
1133 a.out
1505 hello
```

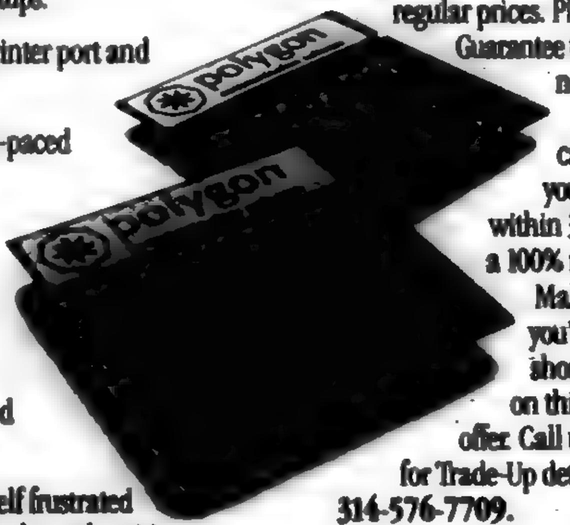
The *hello* file is the Icon icode and the *a.out* file is the C load module.

Presently, Icon is much faster than pure shell. After the Icon runtime system has been loaded into memory, many representative programs run with speeds that compare favorably with C. In those instances where performance seems to suffer in comparison to C, the cause is usually very high-level constructs performing to a multitude of string operations and comparisons, such as associative table lookups.

The other reason Icon's performance can suffer in comparison to C is that Icon is typeless, and type conversions are performed automatically during program execution. Although this feature is an integral part of the language and useful for "one-shot" program development, it also means that type checking must be done, as it is in Basic and shell, throughout program execution instead of when the program is translated.

Icon's combination of power, efficiency and programming ease can be used to advantage in most Unix system programming environments. As a possible replacement for Basic, Icon may become an important addition to the Unix system for small computers. Both powerful and expressive, with new and often unrecognized properties, Icon can be used to solve a class of string-oriented problems that might otherwise be solved cryptically using the Unix shell. In a wider perspective, Icon can be used to solve many other complex problems outside the realm of text processing.

Several colleges and universities now offer Icon in their computer science curricula. Many allow students to write translators, compilers and assemblers in Icon, permitting students to focus squarely on the translation and code generation task without letting the vagaries of a lower level language get in the way. This suggests that Icon translators for new language will be comparatively inexpensive, making it economical to design simple languages for casual computer users. ■



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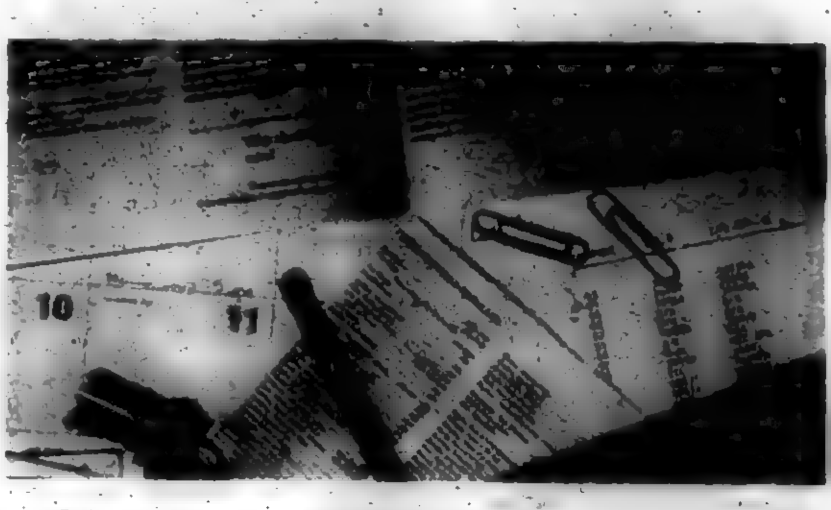

CW PHOTO

Multiple-session software emulates a messy desk

Using multiple-session software can mean up to 100% productivity improvements from nearly instantaneous response time when users switch environments. But some packages are better implemented than others.

By John Kador

A host of new software products that allow parallel activities have raised the state of the art in interactive and on-line systems. Users, no longer content to remain tied to a single environment, can now access other environments on a multiple-session basis.

These new multiple-session software products, all introduced in the last two years, run as applications under mainframe operating systems such as MVS. Transparent to users, the software allows switching between applications and environments with few keystrokes and reduced system overhead.

Packages include Pie from Technologic Software Concepts, Inc.; TPX from Duquesne Systems, Inc.; Multses from Westinghouse Learning Corp.; Sim/Session from Simware, Inc.; Tubes from Macro 4, Inc.; Nova:log from Uccel Corp.; and Ca-vterm from Computer Associates International.

Juggling stacks of paper

Programs such as these have come into demand because information professionals cannot predict the timing of their needs for information or when they will need to switch files in the middle of a task.

Switching environments is analogous to the way most people use their desks at work. People pile a desk with stacks of papers and folders containing information. While reading or writing in one stack, a worker can pause, reach for another stack, work in that environment and return to the original stack without losing his place.

Thanks to a number of multiple-session products, end users can access multiple environments in much the same way. Users can actually

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John Kador is president of Kador Communications in Melbourne, Fla.

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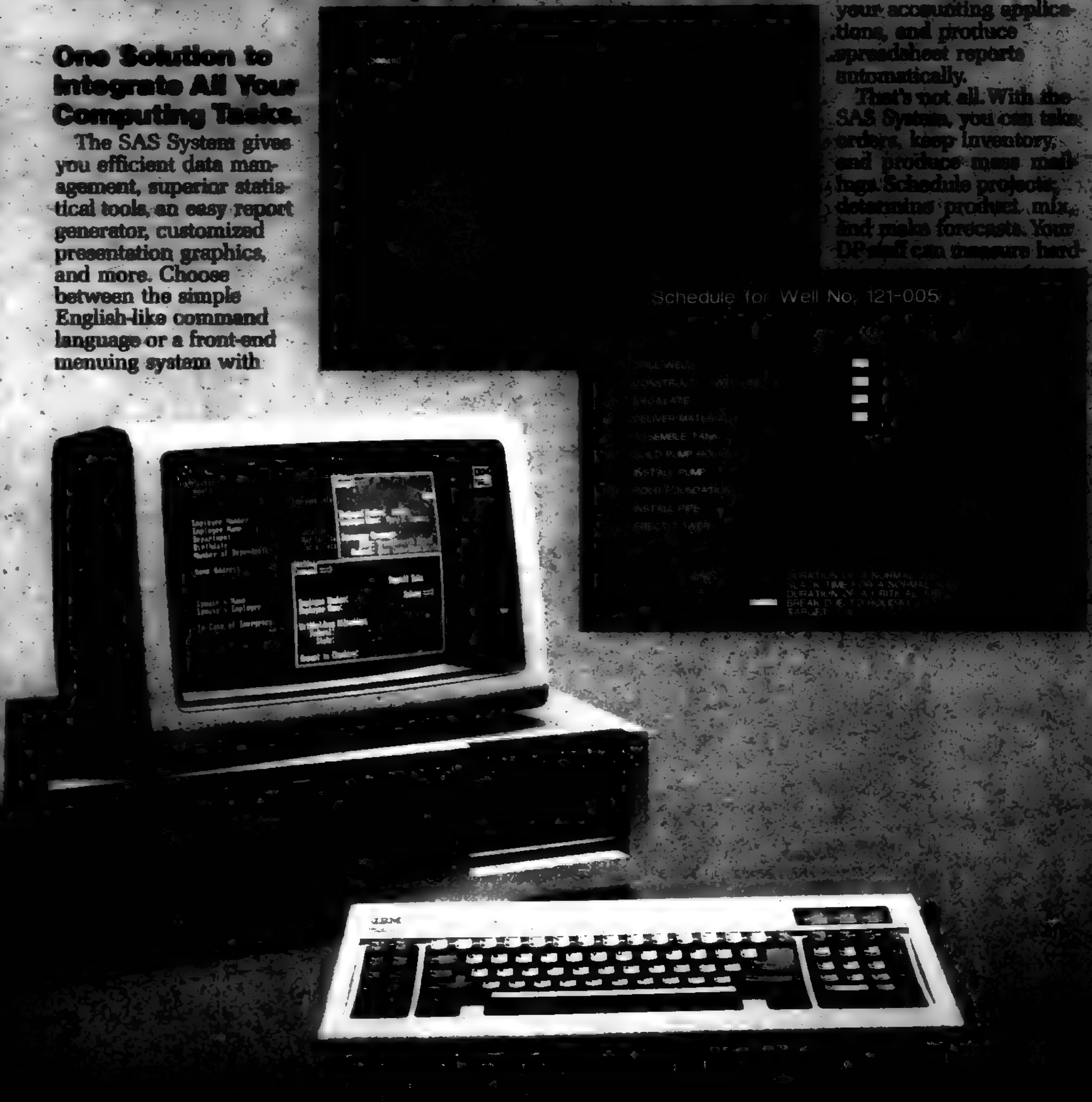

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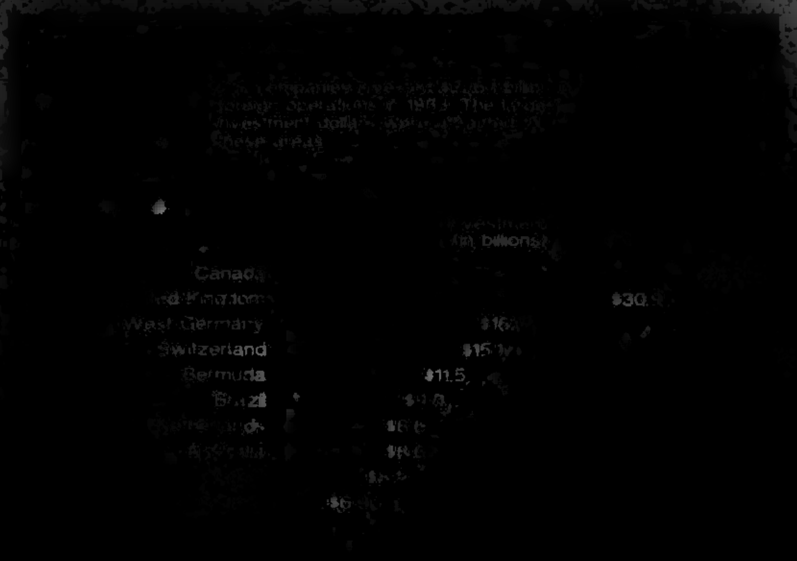

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For instance, a customer representative entering a work order on the computer may need to "pause" the data entry to research a back-order delay schedule that is based on a different on-line system. In another example, an applications programmer testing an application needs to make notes while testing. Without multiple session software, the programmer must log off, go to a data base to make notes and log back on to the application being tested.

Expensive hardware solutions

Before the advent of multiple-session software, the only alternative for on-line access was to give users a separate terminal for each session. Many desks have been burdened with two or more display terminals for this reason.

More recently, new types of terminals such as the IBM 3270 Personal Computer have offered another option — using firmware to allows users to be logged on to four sessions at once via logic built into terminal. But these hardware solutions are costly. Among other things, the $8,000 or $9,000 spent on the specialized terminal only serves one user. The cost of keeping two or more standard terminals in each office must be measured not only in dollars but also in resource consumption, since multiple ports are used to connect the terminals to the mainframe.

Multiple-session software offers more efficient, less expensive solutions. Potential buyers should be aware that there are major differences in design, usability, cost and resource consumption between the available multiple-session products. Certain criteria are fundamental to a sound purchase decision.

One principal requirement for all multiple-session packages is providing user control. Because users control their work and are interruptible, they must be allowed to determine the next action or the proper environment to select. All multiple-session packages provide this control to a degree, but some have more sophisticated capabilities.

In addition, users must be able to tailor their interfaces. User customization options include the ability to decide which keys are designated to perform certain actions (such as switching environments) or even the location and designation of the environments users will use. They could designate one key for an IMS environment in Boston and another key for a CICS in the Toronto branch.

One of the most critical characteristics of any interactive or on-line system is response time. While the actual response time may not be completely under the control of the software designers, the designers must develop a system that provides a level of response time that does not interfere with human processes. Generally, users will tolerate one- to three-second response times, although the actual length of the delay is less important than keeping the response times consistent.

Successful users will feel and adjust to the rhythm of the system. If the rhythm is relatively fast, they will get more work done. Multiple-session software is ideal for users who strive to make maximum use of automation power. In fact, installations using multiple-session software that offers parallel activities report an average of 100% improvement in productivity because of nearly instantaneous response time when users switch environments.

Traffic director

Multiple-session software packages reflect two design philosophies. The simplest approach to design is based on central VTAM switching. A separate switching subsystem in the mainframe serves as the traffic director between all application subsystems and real terminals.

The subsystem is implemented as a started task in a separate address space acting as a primary logical unit (PLU) VTAM application for real terminals and as secondary logical unit (SLU) virtual terminals for the application subsystems.

All data traffic to and from real and virtual terminals must pass through this separate address space to be filtered for switching and transferred to the proper terminal. The PLU/SLU designations put the virtual terminals for applications in the slave position.

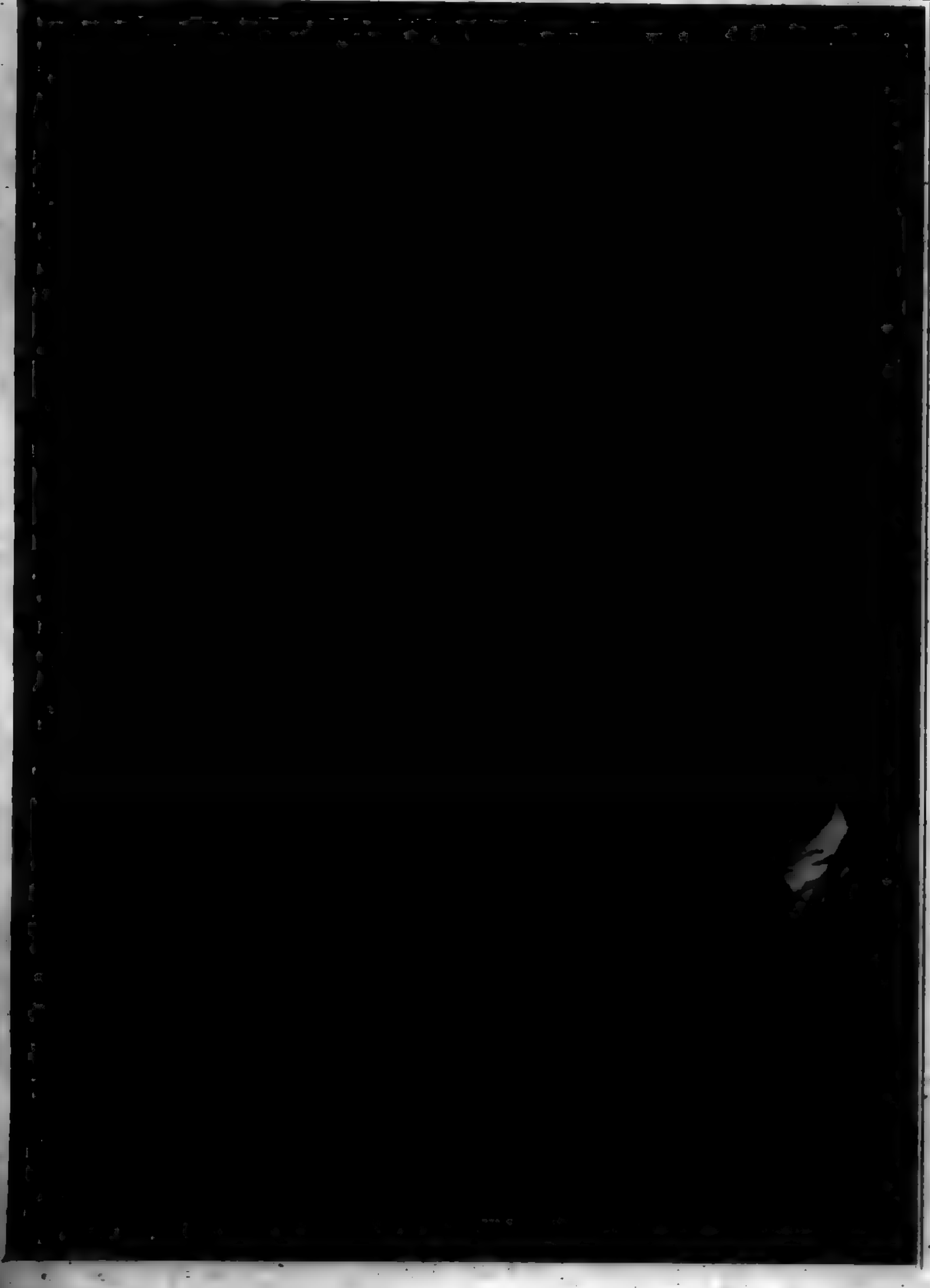
Using a central VTAM switching address space provides VTAM application menus, so terminal users can see a list of available applications. The menus remove the complexity of logon APPLID terminology.

Central switching provides application signon, too. Some multiple-session products provide a language that allows an installation to preprogram conversations that would take place between the terminal and any application. Although this may seem like a complex undertaking at first, the end-user "friendly" result may well justify the effort.

Monitoring and control are other features of central switching. Special control and diagnostic facilities, including status/resource displays and tracing, are available for troubleshooting and performance analysis of the VTAM switching system.

Although the switching approach is extremely simple and is used by most multiple-session packages, it has four major limitations:

■ Administration — Every user, every application and every terminal must be explicitly defined by the program to be assigned address space. For an environment of 100 or more users, doing so requires a full-time administrator. Also, for a user to access an application subsystem such as TSO multiple times, he must have two or more subsystem IDs.



■ Security — Users must add another level of security to protect access to the switching system (to determine who can use which applications). This may mean developing multiple-level interfaces to popular security products such as RACF, ACF2 and SURVEILLANCE. Unfortunately, extra security levels also add enormously to the amount of overhead per end user, since each must log on two times or more. The alternative is to use no security in the switching system.

■ Reliability — Since the switching address space controls all application subsystem interaction, it must be the most reliable component of the network. If any user were to cause a catastrophic error, it would wipe out all users of the switching address space.

■ Performance — An address space of 5M to 10M bytes is not unusual for a small group of users — even 10 to 15 people. Because this separate address space must continually be dispatching work, filtering and so on, it can consume excessive amounts of CPU resources. Benchmarks of systems using this approach show that 100 users will cause significant overhead even on a mainframe as large as an IBM 3081.

For MVS users, there is also a physical restriction on the number of users because of paging considerations. Each time a page fault occurs, this entire switching address space must stop because of an MVS restriction and let MVS satisfy the page fault. During this period, no work can be processed by the switching address space.

Furthermore, the standard CPU overhead imposed by VTAM terminal control is always doubled. The switching address space always processes an application subsystem display interaction through its virtual terminal and then again through its real terminal.

The performance problem of using a separate switching address space can best be understood by analogy. Imagine that every telephone call you now make, whether local or long distance, was suddenly forced to pass through a telephone operator in Japan. A delay would occur not only from the transmission going back and forth to Japan but also from having the operator translate your call after each sentence you spoke.

Techniques of storage fencing, adding more memory, increasing CPU speed, or restricting number of users can be expected to have any effect on response time. But in general, response time to application subsystem users using the switching address space will be degraded considerably over their normal native response time.

In effect, using a switching address space is the same as adding a new on-line system, such as CICS, above all application subsystems. Such an approach brings with it inherent performance, security and administrative concerns.

Playing the percentages

User productivity studies done by the IBM users group, Share, indicate that users who require access to parallel environments spend 75% to 80% of their time in a single environment and "exception out" to a different environment. Which environment is "preferred" depends on the tasks the end user normally performs. Programmers writing programs spend the majority of their time in the editing environment. Customer agents spend the majority of their time in an on-line transaction environment. The preferred environment could be TSO, VM/CMS, CICS, IMS, NCCF or others.

> ”
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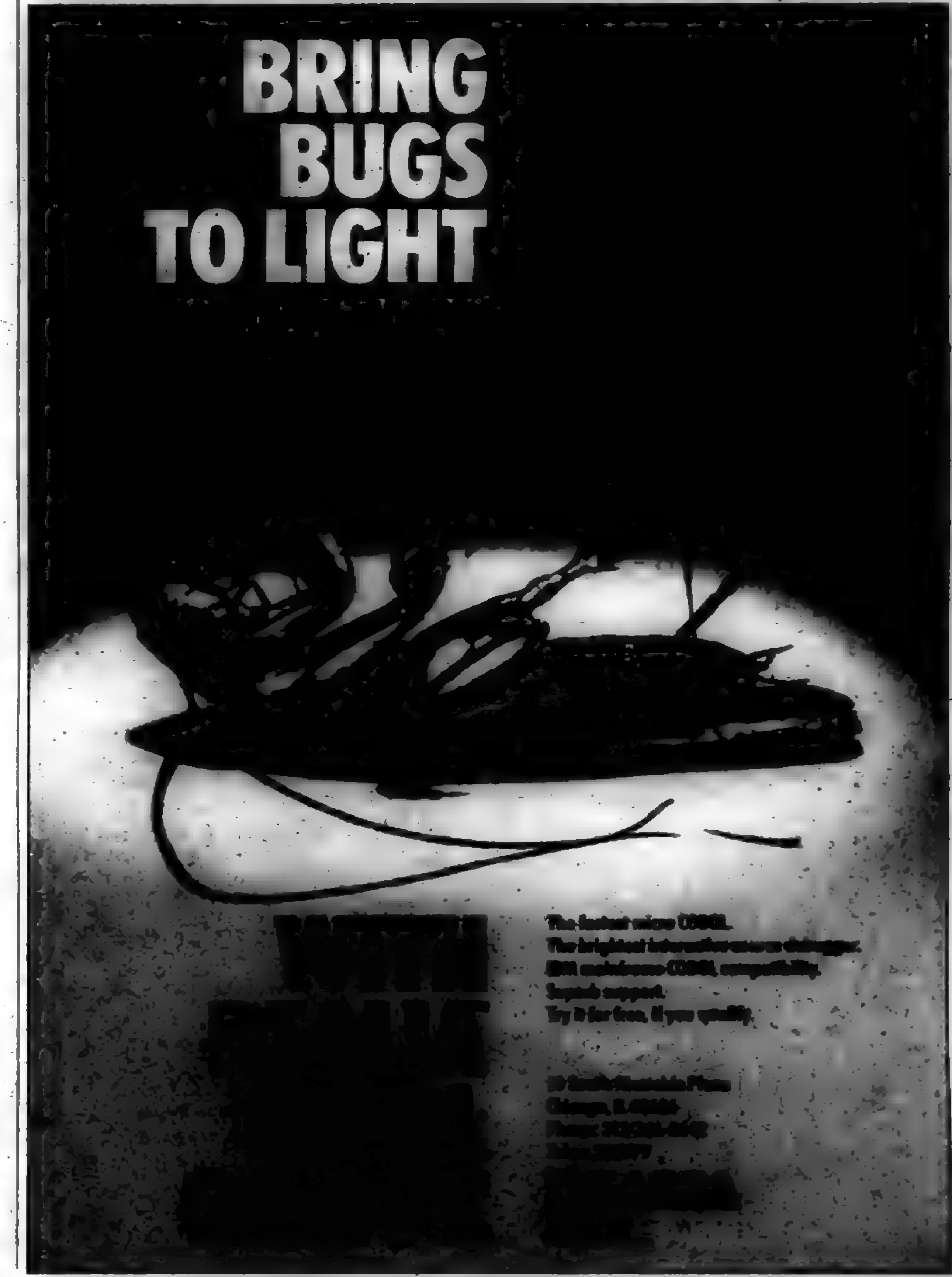
> *User productivity studies done by the IBM users group, Share, indicate that users who require access to parallel environments spend 75% to 80% of their time in a single environment and "exception out" to a different environment.*

The other design approach to multiple-session software, therefore, takes advantage of the slant toward a preferred environment to create a more efficient switching system. Users can switch between applications, transactions or commands in their preferred environment without passing through any separate switching address space.

The PIE series uses this approach. Here, the switching takes place on a local level, since the multiple-session software does not run as an application under the operating system. Instead, it runs as an application under the environment designated "preferred" by each end user. Thus, each user has his own switching system.

This design eliminates the previously discussed problems with overhead and response time delays. Multiple-session capability functions within a user's preferred environment to increase productivity in that area as the user opens multiple applications under that environment. Then, the user can "exception out," for multiple sessions of any applications in any environment.

In a preferred environment, there is no additional overhead for maintaining multiple sessions. The individual switch does not require the extra level of management that the



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IN DEPTH/MULTIPLE SESSION SOFTWARE

central switch requires.

This design approach was originally used by IBM in its implementation of Network Control and Communications Facility (NCCF). For network control operators, NCCF is the preferred environment for using Network Problem Determination Application, Network Logical Data Manager and so on.

The exception environments are accessed by the Terminal Access Facility from one of the preferred environments by a command. The network control operator can switch from any environment back to native NCCF by pressing a single key.

Multiple-session software designers are using this technique for their own designs. The preferred-environment approach solves the problem of fast native access to parallel preferred environments and exception access to any other environment.

The multiple-session software juggles applications in the preferred environment and simply administers network access to the rest of the mainframe system resources.

The current architectures of these preferred IBM environments under PIE, for example, includes the following:

ment, with exceptions out to CICS, IMS and VM/CMS-Professional Office System.

- The VM-preferred environment, with exceptions out to MVS/CICS, MVS/IMS, DOS/CICS and MVS/TSO.
- The CICS-preferred environment, with exceptions out to IMS, TSO and other CICS regions.

Low overhead

Performance benchmark tests show that the resource consumption used by the preferred environment design to switch from environment to environment is quite low. In some cases, switching between environments consumes less than the overhead associated with pressing the ENTER key once under ISPF.

In addition, no measurable extra overhead exists for any activity in the preferred environment. Since the preferred environment consumes 75% to 80% of a user's activities, there is no extra load placed on the system. Response time is not degraded by excessive logon/logoff activities.

Paging is not a problem. The exception environment access is made from the preferred environment and not from a separate switching address space. If the preferred environment is well tuned, then the exception environment will not be hindered in any way.

By using a combination of the preferred environment and exception environments, installations have been able to add hundreds of end users without any increase in resource consumption. The overhead saved by handling multiple sessions via switching software covers the additional users, because each user only has to log on once.

The only noticeable trade-off is a temporary increase in working set size (for TSO-based users) just after an environment switch. If the user stays in an environment for a few seconds, the operating system will recover any excess frames.

Security and administration are built in. Users are automatically secured, based on their preferred environment. No additional administrative overhead is added, and the facilities of the preferred environment can be used without additional training or education. Also, reliability is not compromised. If one user causes a catastrophic error, it does not affect any other users.

The choice of a central switching address space offered by systems such as TPX, MULTSES, SIM/Session, Nova:log, CA-VTERM or the preferred environment of PIE depends on the installation's evaluation criteria and priorities. Some products shine in pilot tests using a small group of evaluators, but when you switch to production use, you will find that resource consumption goes up considerably or response time goes down.

But if you choose wisely, multiple-session products can increase productivity by allowing users to move between applications without logging off or disconnecting. ■

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Function points: The new measure of software

On time, within budget, satisfied user and benefits achieved — all spell a job well done. Now a new efficiency ruler called Function Points measures the productivity of application software, helping managers justify projects and demonstrate improved productivity.

By John Vacca

Function-point measurement is a method of characterizing the size and complexity of applications, based on the amount of function delivered to the users. This new technique is designed to help managers justify projects and show improved productivity.

The technique was first developed by Alan Albrecht, a member of IBM's senior technical staff. It is widely used throughout IBM's internal applications development groups.

A cooperative industry study on software development and maintenance productivity was conducted in March 1985, coordinated by J. Edward Kunkler of Xerox Corp. In the report, productivity improvements trends were observed and compared across companies with productivity measurements deemed acceptable by industry standards.

Data was submitted by 19 companies, from which a number of comparisons could be made. The trends that have emerged from the data should be considered more significant than the actual numbers, since there is some subjectiveness to the method of counting function points.

There seemed to be a honing in on the same results, even with the changing composition that emerged. Function points provide a valid industry measurement for productivity because of the stability in the results. Productivity, as used in this report, was expressed in terms of the number of work hours required to generate one function point.

Tools and methods that normally influence the rate at which productivity improves are normally classified as "attributes." Data can help answer specific questions, such as "Does subsecond response time really improve productivity and at what price?"

The specific numbers derived from this data are relative. A company will most likely see trends developing as it collects and analyzes its own data over time and makes comparisons with results from other companies.

According to Kunkler, function points for an application are evaluated by the following:

- Considering an external boundary around the application software.
- Listing each of the following major data or control user function types as viewed by the user.
- Classifying each of the user function types to the information processing function.
- Counting the occurrences of each possible combination of user function type and level of information processing function.
- Weighting each of the combinations by a factor to measure the level of information processing function provided by the data control types.
- Adjusting the resulting sum to account for general information processing function by applying a factor.

John Vacca is a free-lance DP contract writer and computer security consultant based in Topeka, Kan.

In addition, Kunkler points out that the function point measure has been chosen for certain reasons. The measure isolates the work-product measure from the attributes, facilitating the analysis and identification of attributes that improve productivity.

Also, the measure is based on the users external view of the application. The counts classifications and general characteristics can all be determined early in the development cycle as soon as the external design has been completed.

Measures of work effort are needed in order to complete a productivity measurement. Differences in work practices at the various development and maintenance sites can cause the measures to differ, even though these measures have been conceptually straightforward and have been used for many years. Therefore, Kunkler explains, "the conversion factor between net and gross work effort should be determined and stated by each organization with their productivity measures."

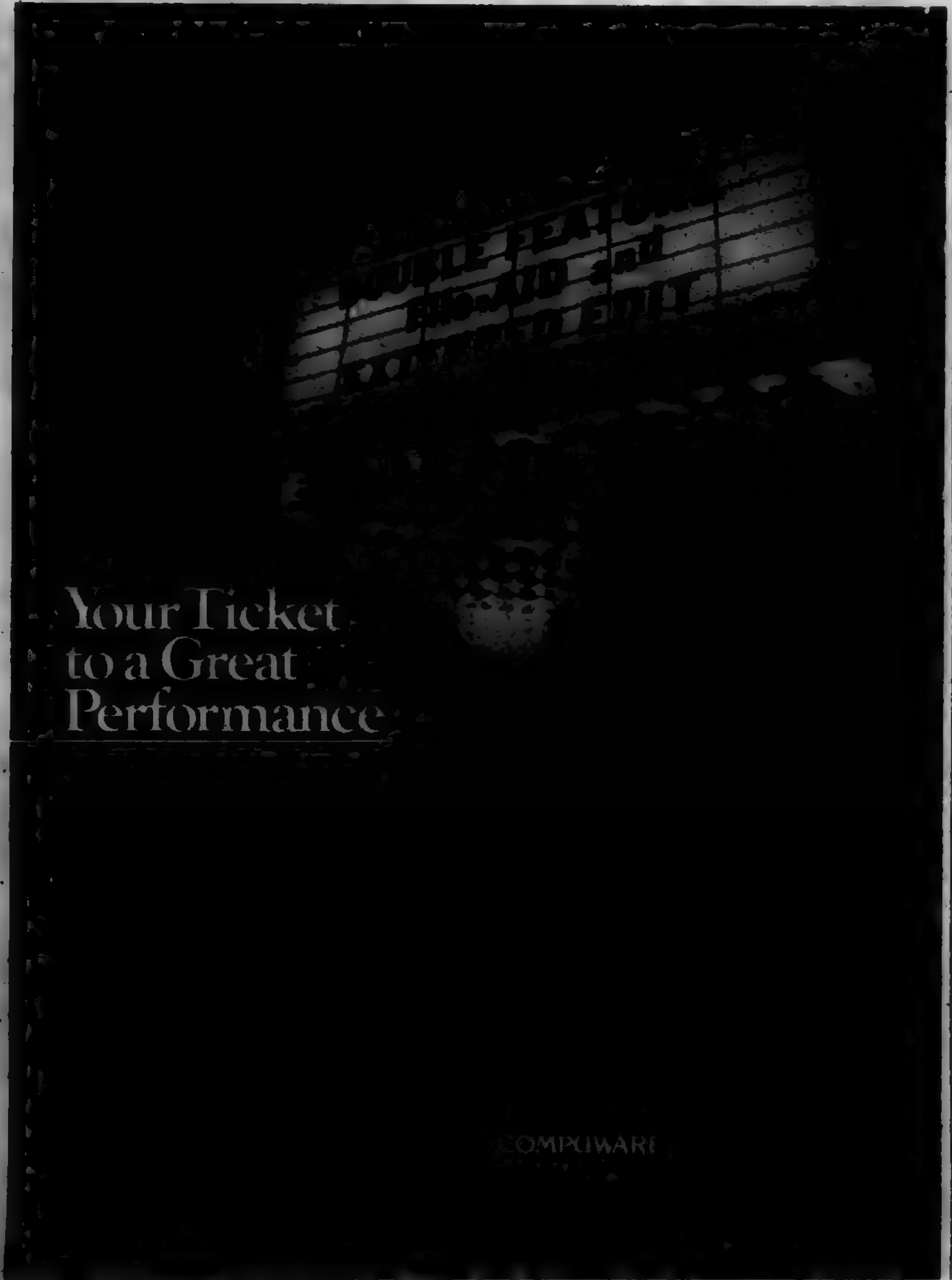
In order to ensure that the similarities and definitions across companies are close enough to provide meaningful comparisons, the specific areas where data is being collected are limited. This study, therefore, has suggested additions and deletions to a company's working set of attributes.

Effectiveness measures have also been established by some companies. On time, within budget, satisfied user and benefits achieved are some of the typical measurements for successful projects. On the other hand, how well we do our professional tasks can also be measured by the efficiency key, which could ask for example, "Are we competitive? Are we improving?"

With these effectiveness measures, comparisons can begin to cut across languages and technologies to determine those attributes that improve productivity and to identify those attributes that should be discontinued. Languages and technologies are less sensitive to the analysis with function points.

Quality is the final aspect of measurement. At present, quality is even more evasive than effectiveness and efficiency measurements. The number of abends, ease of modification, maintenance costs, defects per function point delivered and so on are all quality measures that have been suggested.

Of the 266 projects reviewed by the 19 companies, 118 were programmed using Cobol, 22 using PL/1, 42 using a so-called fourth-generation language such as Focus, and 84 using a mix of the available languages (Figure 1).



Language trends

James Kealey, senior systems consultant of productivity and quality assurance for the Bank of America in San Francisco, says "There appears to be a trend toward projects using more than one language. In fact, a very large development effort we have is to make using a mixture of languages a lot more easier for developers." The majority of the bank's projects are developed in Cobol. For the purpose of measurement, most of these are also measured in Cobol — with some fourth-generation languages.

Areas that are affecting the precision and efficiency of delivering applications software demonstrate both positive and negative industry trends.

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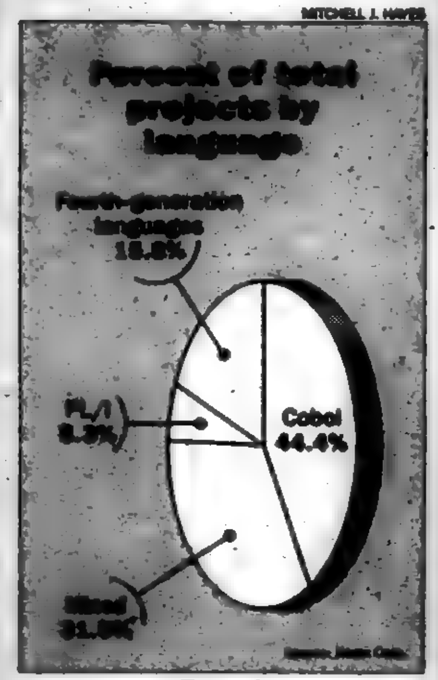

Figure 1

Positives. Increased automation of software development is made more affordable through decreasing computing costs. "Software development," Kunkler says, "continues to be labor intensive."

Kealey explains, "What we've done in the bank is show that by spending more in enhancing our development environment, we'll get a favorable trade-off on labor."

There's an increased availability of higher-level languages. "This has provided the capability for prototyping in some areas," Kealey notes.

Commercial software

As the software development process matured, software factories emerged. Via such options as commercial software packages, adaptation of existing in-house software (reusable code) and program generators, software productivity can be improved by using already available software. "If you do an adequate analysis of an application," Kealey says, "you might want to consider its use in the design phases."

There appears to be a significant amount of growth in the availability of applications development tools and methods. "Here at the bank," Kealey observes, "[The availability of application development tools] has grown both with those that we obtain ourselves and those that are a

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separate unit. Actually, these tools and methods have been developed specifically for the bank's applications programs."

"There must be a greater focus on data strategy vs. traditional application strategy," Kunkler says. In the face of business change, this will extend the life of application software.

Negatives. "There appears to be no real textbook on software creation — an art vs. science approach," Kunkler notes. "In addition, there also appears to be a two- to five-year lag in the application of modern tools, methods and languages."

Excessive learning cost and dissipation of scarce support resources are caused by the proliferation of technical environments. "Because of the restructuring of our technology," Kealey explains, "[Our environment] is geared to avoid excessive learning cost/dissipation of scarce support resources."

Methods and tools

It is assumed that there should be a shift over time to increase the percent of time, effort and costs to earlier phases of the systems development life cycle vs. the design and procedure development phases. An overall decrease in time, effort and costs, as well as an improvement in quality, is the net effect of the shift. "That's been demonstrated," Kealey states, "both on our quality matrix measure and productivity plus the results of the time-caption system that we have.

Kunkler recommends that a company look for improvement over its measurement period, such as from year to year. He further recommends that, "By taking note of the languages, tools, technologies and methods used by companies achieving high productivity, a company that has not yet achieved similar productivity may wish to evaluate [these methods] for use."

Project information

The discussion will now focus on the presentation of the specific analysis of the 266 projects.

Work hours per function point by project size in work years. Larger projects generally result in lower productivity than do smaller projects. "From the results of the measurement data that we have," Kealey says, "one of the things that we do by using function points as an estimator is to allow both the client and developer to see the relationship between the size of the system and how it is used as it's developed."

Work hours per function point by project size in work hours. Productivity tends to decrease as a project increases in size. "This statement is true if it's straight development or if you don't take advantage of productivity enhancers — effort enhancers," Kealey says. "Those things are within the development of control. Obviously, with the use of this data and our own internal data, we would want to minimize the impact of the size [on productivity] because at the bank, we have to develop very large projects."

As stated earlier, higher level languages offer the greatest productivity, followed by PL/1 and Cobol, respectively. "However," Kunkler states, "higher level languages tend to be used on smaller projects."

Lines of code for PL/1 and Cobol. The study also examined the number of lines of code generated for one function point. A greater number of lines of code for Cobol than for PL/1 is a clear indication of higher productivity. "When you look at function points," Kealey notes, "the lines of code are actually necessary to deliver functions."

Function points: An explanation

The purpose of this part of the discussion will be to provide each application development and maintenance site with a consistent way to measure, portray and demonstrate the productivity of their application development and maintenance activities. It is also intended to help distinguish good development and maintenance actions and characteristics from bad ones and to help improve the estimating process.

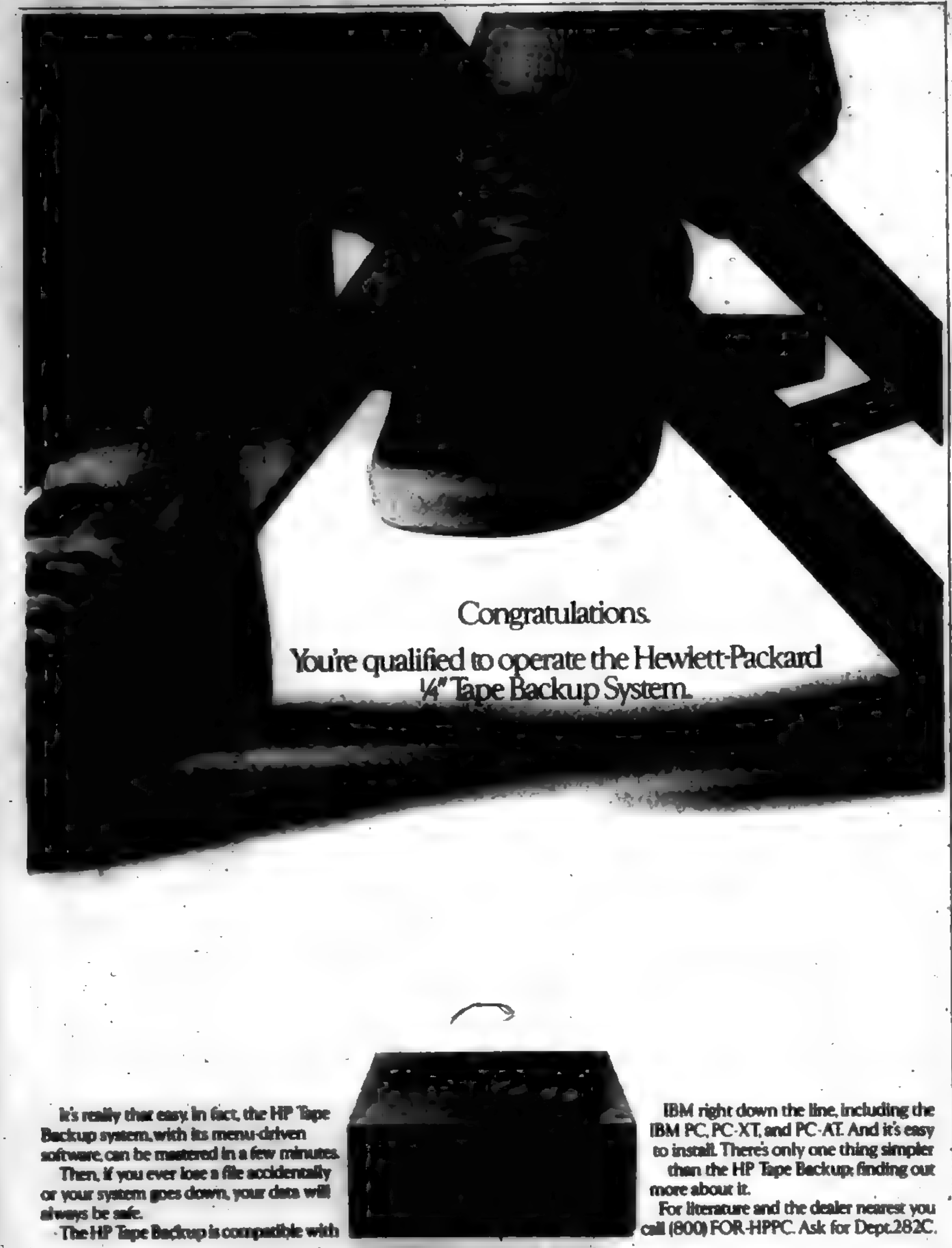
An effective application development and maintenance productivity measure should accomplish several objectives, according to Kunkler:

- It should consistently determine the productivity and productivity trends of application development, enhancement, implementation or period support activity or projects relative to others similar activities at the site and at other sites.
- It should promote actions or decisions that can improve the output of the site.
- It should demonstrate the results of the actions taken to improve the output of the site.
- It should support the estimating process at the site.
- It should support the management process at the site.

For most productivity measures, two basic measures must be established first: One must define work-product output, and the other must define work effort input, or cost (Figure 2). Productivity is work product divided by work effort. "Its trend should be up," Kunkler says. Unit cost, on the other hand, is work effort divided by work product, and Kunkler says its trend should be down.

An application development activity, project or site is placed on a relative scale by the productivity measure or unit cost. Relative placement is determined by the attributes of the application, activity, project or site.

"It is desirable," says Kunkler, "that the work product measure be meaningful to the nontechnical user. The user can then review and agree with the work-product measure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applied to an activity or project.

The work-product measure should allow choices among technologies in order to encourage a number of options for improving productivity. Without change in the output measure, the measure should accomodate new approaches, such as higher level languages, code generators and shared applications.

"The activities and tasks in application development and maintenance are interdependent," Kunkler says. The productivity of later development tasks can be affected by the quality and completeness of early design tasks.

Estimating

In order to estimate an application development and maintenance activity or project effectively, the following three activities must be accomplished first:

- The tasks must be identified, listed and sized.
- An estimate must be developed based on tasks.
- Using other methods, the estimate must be validated.

Without regard for organization lines, all of the work effort used to accomplish the tasks, activities and phases of the pertinent process should be included. "For example," Kunkler says, "if a user works on design tasks for an application development project, the user's time should be included in the work effort for the project."

One must balance the desire to record only a few factors against the need to avoid overlooking those really influencing productivity when selecting the attributes of an application development activity, project or site to be measured and recorded. Generally, the analysis proceeds as follows:

- A series of productivity measurements are made and recorded.
- In order to see which characteristics or attributes are most often associated with higher productivity and/or least often associated with lower productivity, the known characteristics of the activity, project or site must be systematically examined.
- To determine the attributes' effect on productivity and how completely they explain the deviations from "average," those attributes that seem to be most important should be analyzed more completely.

Function points defined

This part of the discussion will center around the basic definitions supporting the measurement, recording and analysis of function points, work effort and attributes.

Development work-product and support work-product measures. Development productivity is usually measured by counting the function points added or changed by the development or enhancement project. "We're counting development work product," says Ed Anspach, assistant vice-president for the Development Center at Harris Bank in Chicago.

Support productivity should be measured by counting the total function points supported during the support period. "What we've been doing," Anspach notes, "is counting all of our original applications and getting the starting point. We're now starting to measure development."

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> *Quality is even more evasive than effectiveness and efficiency measurements. The number of abends, ease of modification, maintenance costs, defects per function point have all been suggested as quality measures.*

Measurement timing. The indicated measures should be recorded at various times in the application life cycle in order to provide the work product, work effort and attributes records needed for each development, enhancement or support project to be analyzed.

For each development and enhancement project, the estimated development work product, estimated work effort and planned attributes should be determined at the completion of the external design phase, when the complete user external view of the application has been documented.

Common applications development. Development centers responsible for common applications should provide data when announcing the end of the requirements and internal design phases. This will provide a consistent base for planning and measuring the installation, support and enhancement of common applications.

Application boundaries. When counting function points, a single, continuous external boundary should be considered. The user should specify or approve the characteristics of the data exchanges among the multiple stages and that the application be developed in multiple functional stages.

"These multiple functional stages," Kunkler says, "should be counted, estimated and measured as a separate application, including all inputs, outputs, interfaces and inquiries crossing all boundaries, because it is intended to be managed as a multiple project."

Brought-in application code. If the project team selected, modified, integrated, tested or installed the

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code, the function points provided by a brought-in applications code, including an internal shared application or a purchased application, should be counted.

For example, the function points should be counted when provided by an application obtained from another site or project and installed by the project team.

Consider all users. Since each application may have a provision for many specified user functions, all users of the application should be considered.

"If the user functions are specified to be provided by the development team," Kunkler states, "[these] user functions should be included in measuring the development work product."

Function points measure

The function points measure is accomplished in three general steps:

- Classify and count the five user function types.
- Adjust for general information processing function.
- Make the function points calculation.

According to Kunkler, "Each unique user data or user control input type should be counted when entering the external boundary of the application being measured and should add or change data in a logical internal file type."

If the external design requires a processing logic different from other external input types of the same format or if it has a different format, an external input type should be considered unique.

For external output types, "Each major logical group of user data or control information in the application as a logical internal file type should be counted," Kunkler states.

From the user's viewpoint, each logical group of data that is generated, used and maintained by the application should be included in each logical file or within a data base.

Within each application, files passed or shared between applications should be counted as external interface file types. Each major logical group of user data or control information that enters or leaves the application as an external interface file type should be counted.

Information processing

For each project that is to be used in productivity measurement and analysis or estimate validation, a record of estimated and actual work effort is needed. "To record the actual results most reliably," observes Sig Haglund, research and development specialist for Electronic Data Systems Corp. in Dallas, "we have used a systematic method of accounting for work effort."

Each characteristic or attribute of a project that might be measured and recorded for future analysis should be considered. "In the context of this analysis," Haglund states, "an attribute can have a significant effect on productivity."

Can it be changed? "Well," Haglund notes, "that depends heavily on the level of management involved and time available to make the change."

Will an attribute be variable at a project site? "Yes," he says. "An attribute that is unvarying across all the activites and projects at a site cannot be used to explain deviations among the projects at the site."

Validating estimates

The documentation of the attributes of a project or activity might be considered almost too easy. "Then," Haglund explains, "the inadequacies of a simple checklist are discovered." The degree to which a tool or technique applies to the project cannot be described by a simple yes and no.

Each estimate should be validated by using two or more estimating methods and looking for reasonable consistency among the estimates. "The function-point work-product measure provides a way to get one of

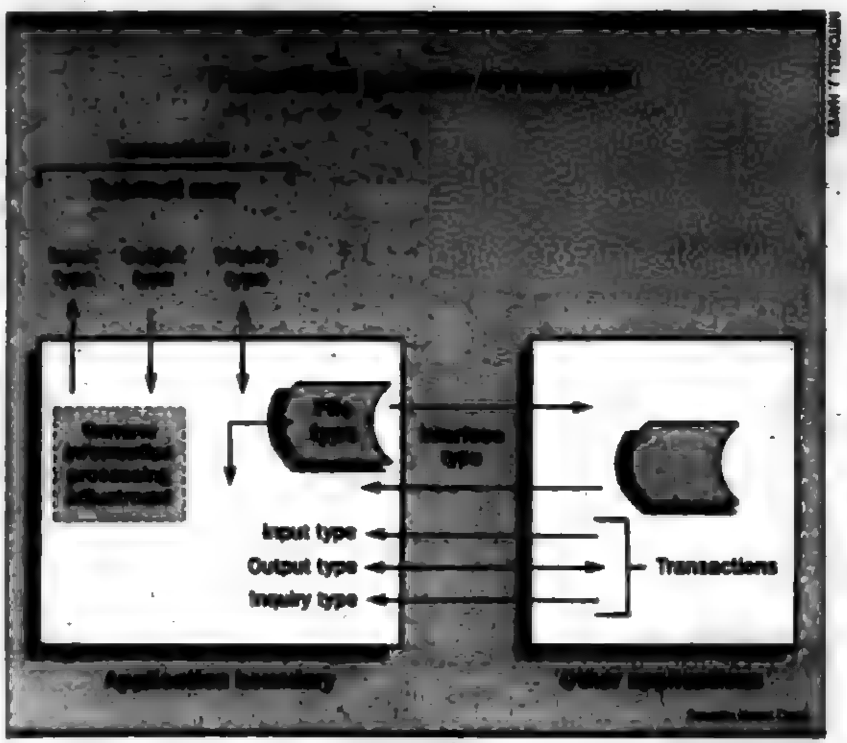

Figure 2

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VT240 Graphics Terminal	1,850	178	99	67
VT241 Color Graphics Terminal	2,650	255	142	95
LN03 Laser Printer	3,295	316	176	119
TI				
TI707 Portable Data Terminal	$ 550	$ 53	$ 30	$ 20
TI820 Data Terminal PKG KSR	1,995	192	107	72
TI855 Dual Mode Printer	725	70	39	26
TI865 Dual Mode Microprinter	1,095	106	59	40
WYSE				
WY50 Video Terminal	$ 459	$ 44	$ 25	$ 17
WY75 Video Terminal	559	56	30	20
WY85 Video Terminal	559	56	30	20
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NT6K90 Displayphone Plus	$995	$ 97	$ 54	$ 37
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the validating estimates," Haglund explains.

The following discussion will center around the implementation of function points at a project site documented by Kunkler. The project site was recommended by IBM's Albrecht.

Function-point implementation

Kunkler recommends that the cooperative industry study guidelines to software development and maintenance productivity be studied thoroughly. Next, people with the greatest knowledge of each application should be used to help determine function points.

"Plan for a central counting group," Albrecht says. In order to maintain consistency, assign the tabulation of function points to a few people who will do it regularly and gain experience.

"These people will work with the applications people," he explains. "Both sets of people will then bring their specific knowledge to properly count function points."

Albrecht further recommends tabulating the function points on several applications installed at the project site. "Experience and confidence can definitely be built through this, he suggests. "It can also provide local function-point data for use in training."

Train people to count function points through a function-point analysis workshop, such as the one offered on-site by IBM's Information System Services, by other training groups, or an in-house education group. These workshops offer instruction in the use of the function-point measurement process to evaluate tools and techniques and to measure quality and productivity of applications development and maintenance.

The workshops also provide case studies so that attendees can learn this measurement technique through actual experience in counting function points for both an applications development project and a maintenance project.

"Initiate the counting of function points on new development and/or enhancement projects," Albrecht explains. The function-point measure should then be produced at both the end of the external design phase and the end of the installation/acceptance phase.

Furthermore, he suggests, "the function-point measure should first be established for the applications in the installed application base."

An inventory should be prepared next, listing the applications in the installed application base. Also, the function-point measure should be determined for each of the applications.

> ”
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> *Productivity tends to decrease as a project increases in size — if the project is straight development or if you don't take advantage of productivity enhancers and effort enhancers.*

Albrecht maintains that "as each new development and enhancement is installed, their function-point measures should be incorporated in order to maintain the application inventory function-point record." Approximations should be converted to counted function points at the next enhancement of each application if the approximations are used to establish the function-point inventory.

Albrecht notes that experiences at various IBM sites has produced the following estimates of function-point counting work effort:

- New development or enhancement project with accurate and external design document available — less than one work-hour per 100 function points.
- Installed application with external design document available — more than one work-hour per 100 function points.
- Installed application with external design document not available — more than three work-hours per 100 function points.

"Finally," Albrecht says, "A full-time coordinator for each average site of about 200 developers should participate with the applications developers in counting function points. This will help ensure consistency, perform the analysis and provide the feedback reports."

Getting results

Companies have now started to use function points as a quick and effective way of validating estimates for a number of projects. Development projects are represented by all of the data received to date.

However, there still seems to be only a limited application of function points to maintenance projects at this time. This is because most companies are collecting data on new development projects. The companies will later track these projects with regard to maintenance productivity, especially when these projects are completed and go into maintenance status.

Function points are one of few measurements that permit a spanning of technology — cutting across different computing environments and various second-, third- and fourth-generation languages. It is important to consider more than one measurement and to consider these measurements in their proper context, as with all measurement activities.

Goals for improvement should be established relative to where your company is today. It is important to consider the lessons learned by those companies that have achieved high productivity already so that your company can take advantage of their experience. ■

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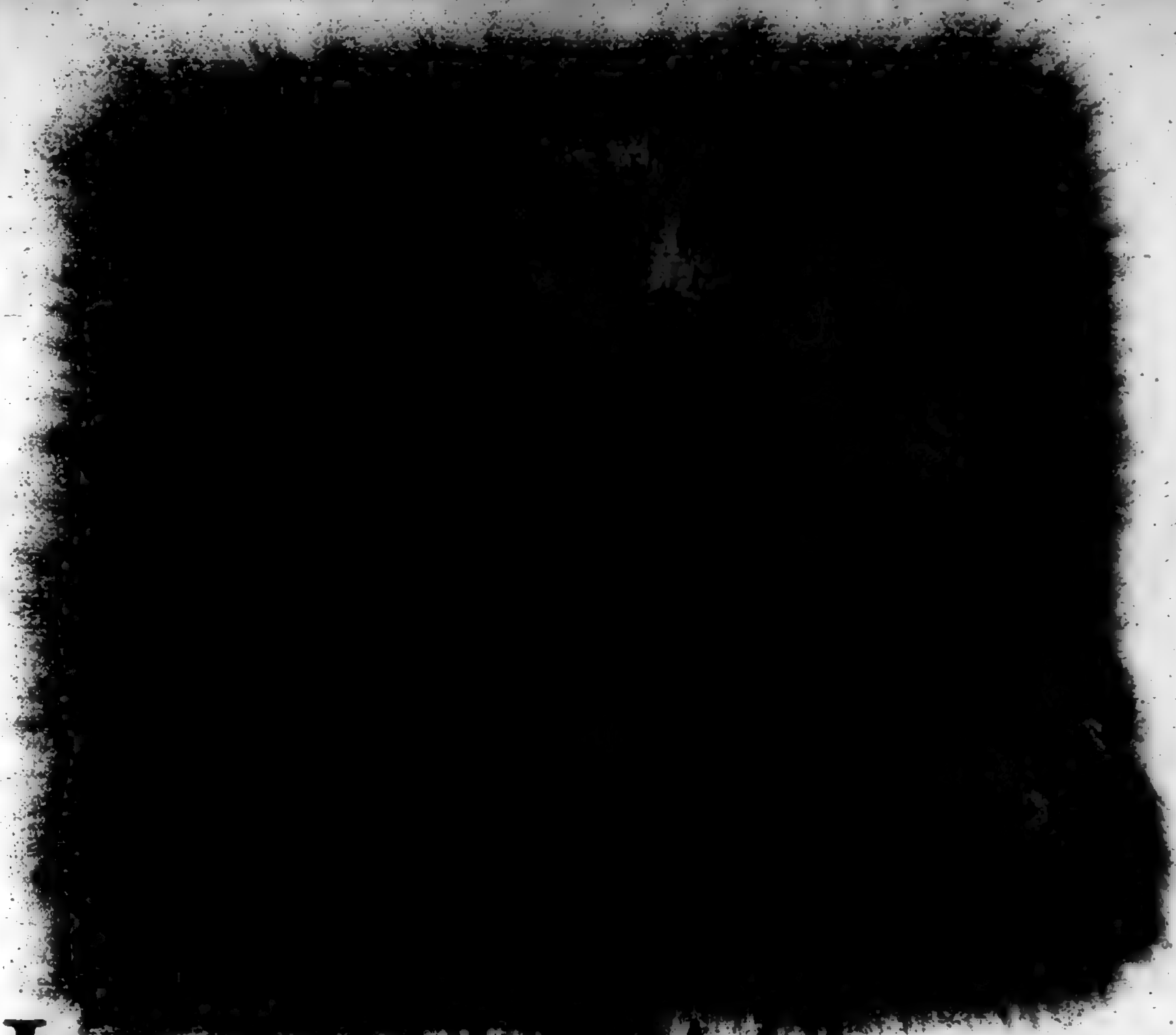

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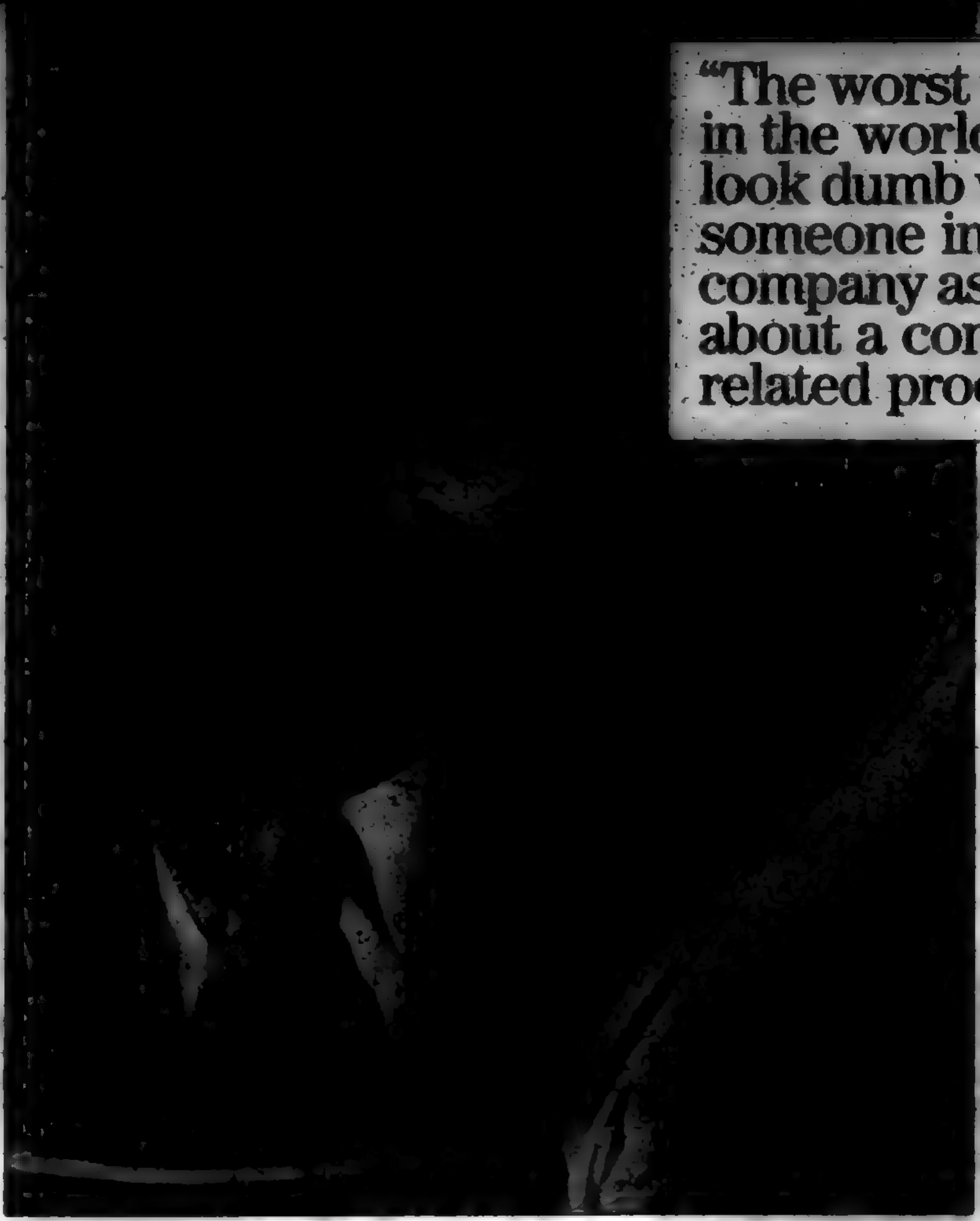

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NEW PRODUCTS

HP unwraps micro printer

Hewlett-Packard Co. of Palo Alto, Calif., has announced a letter-quality daisywheel printer designed for personal computers.

The HP 2603A gives users of IBM and IBM-compatible personal computers, HP Vectra and HP Touchscreen personal computers and HP 3000 business computers the freedom to perform many printing tasks with minimal monitoring of the printing process.

The HP 2603A prints at a speed of 48 char./sec. and has drop-in print wheels in nine fonts, including 10, 12 and 15 pitch, as well as proportional spacing. The vendor also offers a triple-bin sheet and envelope feeder and tractor accessories.

Other features include snap-in ribbons; the ability to select form length, print pitch and feeder without raising the cover; and automatic alignment of single sheets and envelopes. The HP 2603A handles many types of forms and paper including multipart forms, labels, aluminum film, mylar, NCR Corp. paper and a range of bond and xerographic papers. Either cut-sheet or continuous-feed paper can be used. There is a sound-dampening carpet included with the printer that brings the noise level to 58.5db.

Hewlett-Packard daisywheel printer works with IBM micros and compatibles.

The printer can be used with HP's HP Word, Advancewrite, HP Slate and Memomaker word processing software as well as with Multimate Corp. Multimate, Microsoft Corp. Word, Micropro International Corp.'s Wordstar and Wordstar 2000.

The HP 2603A is priced at $1,495. The triple-bin sheet feeder, HP 26030E, is priced at $845.

AT&T call tracking systems bow

AT&T Information Systems of Morristown, N.J., has introduced four business telephone call tracking systems to help companies manage costs and control use of telephone systems.

Designed for companies with as many as 5,000 telephone stations, the AT&T Call Accounting Systems — Models 300, 500, 2000 and 5000 — work with the AT&T Personal Computer 6300 or similarly configured personal computers having one floppy disk drive, one 10M-byte hard disk drive, 512K bytes of random-access memory and using the Microsoft Corp. MS-DOS operating system.

The AT&T Call Accounting Systems were designed to work with AT&T's System 75 or System 85 private branch exchanges as well as other vendors' PBXs that use direct output or internally formatted station message detail recording (SMDR). SMDR produces a report of calls identifying associated extension, date and time the call was placed, call duration, dialed number and call cost.

The AT&T Call Accounting System software packages allow call detail collection and recording in the background while another software application operates in the foreground.

The Model 300 features support of up to 150 telephone lines. It collects up to 150,000 call records and may use 5,000 account codes. It costs $1,995.

Model 500 supports up to 500 telephone lines, collects up to 150,000 records and may use 5,000 account codes. It costs $2,995.

Model 2000 supports up to 2,000 telephone lines, collects up to 150,000 call records and may use 15,000 account codes. It costs $3,995.

The Model 5000 supports up to 5,000 telephone lines, collect up to 150,000 call records and may use 15,000 account codes. It costs $4,995.

INSIDE

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Systems & Peripherals/130

Lee Data multifunction net unit out

Lee Data Corp. of Minneapolis recently announced a network device that provides a combination of functions such as a network gateway, network server and terminal controller.

The Lanmaster supplies gateway functions between a variety of local-area networks and IBM or asynchronous hosts. Supported networks include IBM's PC Network, Protean, Inc.'s Pronet, Datapoint Corp.'s Arcnet and Ethernet.

Lanmaster supplies IBM 3274 Model 51C controller emulation and is able to support 64 mainframe sessions. Asynchronous terminal emulation provided includes Digital Equipment Corp. VT100 and IBM 3101. Remote asynchronous microcomputers can dial into the network. Lanmasters can reportedly be interconnected by a single wire.

There are two Lanmaster models. Lanmaster Model 827 features 1M byte of random-access memory (RAM), a 70M-byte hard disk, two serial ports, two parallel ports, six IBM Personal Computer-compatible expansion slots and a cartridge tape drive with 45M to 60M bytes and a price of $15,600.

Lanmaster Model 827 has similar features except that it includes 70M bytes of hard-disk storage.

Both units can be expanded to 3M bytes of RAM and up to 240M bytes of hard-disk storage.

Racal-Vadic unveils dial-up modems offering network control features

Racal-Vadic, Inc. of Milpitas, Calif., has introduced 9.6K bit/sec. and 1,200 bit/sec. dial-up modems with network control features.

The 9600VP transmits data at rates up to 9.6K bit/sec. and supports synchronous, asynchronous, full-duplex and half-duplex operations. In asynchronous mode, the product works at speeds of 300, 1,200 or 9.6K bit/sec. In synchronous mode, speeds of 1,200, 4.8K, 7.2K and 9.6K bit/sec. are supported.

The modem features automatic answering and calling of up to 15 telephone numbers with logon sequences of up to 60 characters. Also included are front-panel dialing and diagnostic capabilities and compatibility with AT&T 103 and 212A standards.

The product's automatic adaptive equalization corrects line distortion and has fall-back speeds that compensate for line quality problems.

The 9600VP costs $1,495.

A 1,200 bit/sec. modem, 1200PA, is compatible with AT&T 212 and 103 and Hayes Microcomputer Products, Inc. communications standards. It features automatic dialing and answering. Its modem manager enables a network manager to read and change options, phone numbers, logon messages and security codes.

The 1200PA has built-in error control; a full-dialing, front-panel keyboard for control; option settings; dialing; and diagnostics. It also has an LCD display for menu-style feedback and operator interface.

The 1200PA can work with modems supporting transmission speeds of 300 bit/sec. The faster modem will act as a buffer and send a character to a port whenever the buffer is full.

The modem sells for $495.

Supersoft diagnostic tests available for IBM microcomputers, compatibles

Supersoft, Inc. of Champaign, Ill., has recently released a set of diagnostic tests designed to help service technicians diagnose and repair IBM microcomputers and compatibles.

Service Diagnostics can be used to check systems in the shop or in the field to pinpoint hardware errors. It is available for microcomputers using Microsoft Corp. MS-DOS and IBM PC-DOS, and versions are available for all Digital Research, Inc. CP/M 86 and CP/M systems. It can be used to test IBM standard and many nonstandard system components.

Currently, Service Diagnostics tests the following peripheral devices: CPU and system memory, flexible disk drives, monochrome monitors, color graphics monitors, parallel and serial ports, Intel Corp.'s 8087 coprocessors, standard keyboards, fixed drives and printers.

The memory test reportedly checks every byte of available user memory, reporting errors by bit as well as by address. The disk-drive test checks the read/write and seek accuracy functions. The printer test checks every ASCII character in every character position — plus every head and carriage motion for the NEC Information Systems, Inc. Spinwriter and Qume Corp. and Diablo Systems, Inc. printers — including forward and reverse printing.

Service Diagnostics costs $225. The Dysan alignment disk costs $40.

Information appearing in the New Products section has been provided by manufacturers and has not been independently validated by Computerworld.

[illegible]

Core International, Inc. has reduced the prices on its line of **ATplus** hard-disk upgrade kits for the IBM Personal Computer AT.

The new prices are as follows: ATplus20, $1,395; ATplus30, $1,595; ATplus40, $2,595; ATplus56, $3,595; and the ATplus72, $4,595.

Core International, 5151 N. Federal Highway, Boca Raton, Fla. 33431.

■

Polygon Associates, Inc. is offering a $100 discount from the list price of its **Poly-Com/220** and **Poly-Com/240** software products to users of competitors' communications products.

. Users of the competing products can send in a photocopy of each system disk they are trading.

Polygon Associates, 1024 Executive Pkwy., St. Louis, Mo. 63141.

■

Natural Microsystems Corp. has reduced the price of its **Watson** voice/data system.

Watson is an add-in board for IBM Personal Computers and compatibles. The new price is $498.

Natural Microsystems, 6 Mercer Road, Natick, Mass. 01760.

■

Paperback Software International, Inc. has announced a corporate license policy for its **VP-Planner** spreadsheet program.

The license policy states that corporations will pay a one-time fee of $500 and may purchase non-copy-protected copies at a quantity discount. The cost for 20 to 49 units is $70 each; 50 to 99 units cost $60 each; 100 to 199 units cost $50 each; and 200 or more units cost $40 each.

VP-Planner costs $99.95 for a one-user license.

Paperback Software International, 2612 Eighth St., Berkeley, Calif. 94710.

SOFTWARE & SERVICES

Systems software

McDonnell Douglas Computer Systems Co. has announced **Reality '86**, an enhancement package for its Reality operating system.

Reality '86 provides users of the Pick Systems Pick-based system with consistent user interface, on-line user Help facilities, user self-teaching aids, security control features and a fourth-generation language development and prototyping environment.

Reality '86 features seven enhancement components, which are available individually or in any combination. They are improved security, new user environment terminal control language, enhanced query interface prompter, increased data basic functionalities, enhanced system capabilities, extended all functionality and natural language.

Reality '86 is priced at $20,000.

McDonnell Douglas Computer Systems, P.O. Box 516, St. Louis, Mo. 63166.

■

Program Accountability & Evaluation, Inc. has announced **Release 7** of **Tuner/38**, its storage management system.

Tuner/38 is a performance tuning system for the IBM System/38. Release 7 features the ability to change the Tuner job control structure permanently or temporarily, the ability to display history graphically, the ability to choose from three preset cycle times and the ability to assign sleep time and/or snapshot time. Tuner/38 is priced at $1,499.

Program Accountability, 7 Riverway Road, Salem, Mass. 01970.

■

Tat Graphics Group, Inc. has announced the **Sextant Graphics Display series** of software drivers that allow Sextant display systems to run with Calcomp, Inc.'s Cadvance architectural and engineering design package and Personal Cad's electrical design packages.

The driver series provides Calcomp and Personal Cad users with resolutions of 640 by 480 to 1,024 by 768 pixels on 14-in. to 20-in. screen graphics display systems.

The drivers range in price from $2,995 to $5,395.

Tat Graphics Group, Building E, 1270 Lawrence Station D., Sunnyvale, Calif. 94089.

■

Duquesne Systems, Inc. has announced **Dasdmon**, a reporting and analysis system for DASD I/O performance in IBM MVS and MVS/XA environments.

Dasdmon allows users to pinpoint DASD I/O contention problems. Online displays provide information about DASD performance ranging from the path level to the data set level. Users may query the system about DASD resource contention.

A 99-year license costs $10,000 to $12,500.

Duquesne Systems, Two Allegheny Center, Pittsburgh, Pa. 15212.

■

Mathcom, Inc. has released **Version 4.3** of the **Mathcom Compressor**, an IBM VSAM data compression system that runs on IBM-compatible MVS and MVS/XA systems.

The Mathcom Compressor reportedly triples the amount of VSAM data that can be stored on a disk, improves response time and improves batch throughput. It includes functions to analyze current VSAM space usage and to compress existing data sets automatically.

The system license fee is $30,000.

Mathcom, 1309 City Park Ave., Fort Collins, Colo. 80521.

■

Greene Software, Inc. has announced **Sentry**, a procedure and user-level security system for the IBM System/36.

Sentry allows any OCL procedure in any library to be secured by user, workstation, date range and time of day range. No passwords are required. Security access can be controlled by user and by procedure name. All security access and unauthorized security attempts are logged for later inquiry and reporting.

Sentry is available for a one-time license fee of $495 per CPU.

Greene Software, P.O. Box 23, Victor, N.Y. 14564.

■

ETP Systems, Inc. has enhanced its **/USR/Tools** in-house laser publishing package by adding an interactive document formatter and full screen text editor, each operating under most versions of AT&T's Unix.

With the interactive formatter, users can set type sizes, running page headers and footers, multiple-level head formats, margins and column widths by filling in input screens. Multiple document formats can be defined and saved on disk then recalled by name.

The Rune text editor provides multiwindow multifile editing, cut-and-paste buffers limited only by disk space and built-in macro definition capabilities.

The software costs $2,295.

ETP Systems, 10150 S.W. Nimbus Ave., Portland, Ore. 97223.

Productivity aids

Graphic Software Systems, Inc. (GSS) has introduced **GSS-CGI**, a device-independent computer graphics interface for raster and vector graphics.

GSS-CGI supports distributed processing, intelligent peripherals and raster-input devices such as scanners. It provides a device-independent interface between an application program and graphical I/O devices. It decouples applications from hardware dependencies and eliminates the need for device drivers.

It supports I/O devices such as the IBM Enhanced Graphics Adapter.

GSS-CGI is priced at $175.

GSS, 25117 S.W. Pkwy., Wilsonville, Ore. 97070.

■

Simburg, Ketter, Haley, Sheppard & Purdy, P.S. Attorneys At Law has introduced the **Software Export Procedures Kit**.

The kit was designed to give software companies the tools they need to comply with export regulations. It includes a set of documents that helps users determine whether their software is eligible for export without a special license. It lists requirements for individual countries and identifies persons to whom software should not be shipped. Required export declaration forms are included along with directions for filling them out, delivering them and obtaining more forms.

The kit costs $450. Updates on regulation changes are provided free for the first year and at a cost of $40 per year thereafter.

Simburg, Ketter, Haley, Sheppard & Purdy, 2525 First Interstate Center, Seattle, Wash. 98104.

Application packages

American Software, Inc. has announced **Amsoft Querywriter**, an option for its IBM CICS/VSAM applications software running on the IBM 4300 series.

Amsoft Querywriter is said to provide on-line inquiry as well as batch and on-line report writer capabilities.

It is a specially adapted version of Software AG's Super Natural, the vendor reported.

Amsoft Querywriter costs $25,000 to $40,000 depending on the configuration.

American Software, 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

Interpretive Data Systems has announced the **HMO Application** for health maintenance organizations and provider groups rendering services to a prepaid patient population.

The HMO Application consists of five major components: premium billing, membership enrollment, referral and claims processing and reporting. The software can be used to manage multiple health maintenance organizations, monitor in-patient stays, calculate capitation payments and adjudicate claims automatically.

The HMO Application is written in the MUMPS computer language. The system can be run on a time-sharing basis or in-house at the user site. It runs on Digital Equipment Corp.'s PDP-11 or VAX series, the vendor said.

Prices range from $75,000 to $250,000 depending on the configuration.

Interpretive Data Systems, 882 Commonwealth Ave., Boston, Mass. 02115.

■

Aim Technology, Inc. has announced **Release B.2** of the **Aim Benchmark Suite II**, a software system for evaluating and comparing the performance of multiple AT&T Unix systems.

Aim Benchmark Suite II now includes a results data base of seven Unix-based systems including AT&T 3B2/400, Digital Equipment Corp. VAX-750 and Sperry Corp. 5000/80. Suite II includes 37 performance measurements and a report generator that projects systems performances based on certain application requirements.

A site license for Aim Benchmark Suite II Release B.2 costs $3,950, and a corporate license costs $11,850. Current licensees that subscribe to the update service will receive the new release free. The update service is available for $1,000 per year.

Aim Technology, Suite 390, 4655 Old Ironsides Drive, Santa Clara, Calif. 95054.

■

MacKinney Systems Co. has announced two software programs, **CICS/Spy** and **CICS/Calc**.

CICS/Spy allows an IBM 3270-type CRT screen to be viewed from another CRT. It can be used to monitor another terminal for demonstration purposes, for quality control or for help in diagnosing problems on other terminals. It runs on DOS, OS and MVS.

CICS/Calc is a spreadsheet for IBM mainframes. In addition to standard arithmetic functions, it has built-in statistical and financial functions and date calculations. It has a batch program and an application program interface. It runs on DOS/VSE.

CICS/Spy is available for $495 or a $195 annual lease. CICS/Calc costs $2,995.

MacKinney Systems, Suite 112, 2674-A S. Glenstone, Springfield, Mo. 65804.

■

Viktor Programming & Consulting Services has announced a **date utility** for DOS/VSE, VM and MVS operating systems.

The date utility was designed to help with problems involving the

Continued on page 114

It's not just that someone buys a COMPAQ Computer every 62 seconds of every business day...

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Continued from page 112

year 2000. It calculates the difference for any two dates between Jan. 1, 0001 and Dec. 31, 9999 or generates a date by adding or subtracting a number of days to another date.

The program is priced at $99 for the first license and $30 for each additional license up to 30.

Viktor Programming and Consulting, P.O. Box 60, Goffstown, N.H. 03045.

■

International Business Information Systems, Inc. has announced **Opus**, an on-line program usage statistics display program for IBM CICS on the IBM 370, 4300, 3030 and 3080 series.

Intended for the DOS/VSE operating system, Opus provides the following options for individual selection criteria: ranking of the 100 most used programs, current residency status, program type, programs supplied by IBM and an accumulative sum of program size or number of fetches.

Opus is priced at $100.

International Business Information Systems, P.O. Box 15780, 828 Royal St., New Orleans, La. 70175.

■

Sotas, Inc. has introduced **Trademark Manager**, a software package developed for optimum control of legal trademark data.

The Trademark Manager was designed to meet the needs of legal departments. It automatically records the scheduling of future events such as renewal. It features multilevel security, free-form text, computer-generated correspondence and multiple-site recording.

The system runs on the Wang Laboratories, Inc. VS series and is priced at $25,000.

Sotas, 192 Merrimack St., Haverhill, Mass. 01830.

■

Alpha Beta Associates, Inc. has announced **Alpha Beta Project Management**, an automated project manager for IBM System/34 and 36 computers.

The interactive set of programs allows users to enter up to 999 projects, each containing a maximum of 999 steps. Weekly reports and Gantt charts by employee and department can also be produced.

The project manager also lets users accumulate labor and expense costs; schedule projects by priority, start and end dates; enter up to 15 holidays; and record a maximum of 20 vacation periods per employee.

A one-time license costs $500.

Alpha Beta Associates, 11 Wildwood St., Winchester, Mass. 01890.

■

Tom Software, Inc. has released **Speed II Commercial Applications** and **Speed II Corporate Applications**, two integrated information management packages for the Wang Laboratories, Inc. VS series.

The applications are written in the vendor's Speed II fourth-generation language and data base management system. Speed II Commercial Applications addresses business management requirements, while Speed II Corporate Applications adds functions to handle multinational corporate environment needs.

Both packages offer general ledger, accounts payable, accounts receivable, inventory control, commission accounting, purchase order control, order entry, fixed assets, sales analysis and payroll.

Pricing for the Speed II products begins at $5,000.

Tom Software, P.O. Box 66596, 127 S.W. 156th, Seattle, Wash. 98166.

■

Omtool Corp. has unveiled **MCBA Micro Level I** accounting, distribution and manufacturing packages for the NCR Corp. Tower and Tower XP supermicrocomputers.

The NCR Tower is a Motorola, Inc. 68000-based multiuser computer. The Tower XP is built around the Motorola 68010. Both run Unisoft System Corp.'s version of AT&T Unix System V operating system.

Prices of MCBA packages for NCR Tower systems range from $1,500 to $2,250. An Omtool Softbol development system for the NCR Tower costs $1,105, and a single Softbol runtime system sells for $720.

Omtool, P.O. Box 477, Tewksbury, Mass. 01876.

■

Pacific Decision Sciences Corp. is offering **Super Service**, a customer service package and inventory control software for IBM mainframes running Cullinet Software, Inc.'s IDMS data base.

The customer service system is designed for direct and third-party service organizations. It provides call handling, service dispatching, engineering and reliability reporting, billing, invoicing, service contract management, equipment configuration control, spare parts management, inventory tracking and control plus financial management functions.

The Total Order Processing and Inventory Control System (TOPICS) can be programmed under Cullinet's ADS/On-Line fourth-generation language. Functions include parts ordering, warehouse management, physical inventory, inventory planning and forecasting, returned parts tracking and spare parts inventory.

Prices range from $10,000 to $150,000 for Super Service and from $90,000 to $150,000 for TOPICS.

Pacific Decision Sciences, Suite 360, 5757 Wilshire Blvd., Los Angeles, Calif. 90036.

■

W. R. Lewis Associates has upgraded its **PCprint** package for the IBM System/34, 36 and 38 to support IBM's enhanced emulation board.

PCprint runs concurrently with the IBM 5250 emulation program to print host system reports on the IBM Personal Computer printer. When used with the enhanced emulation board, PCprint does not require a device description to be configured on the host system.

The package uses the Application Programming Interface capabilities of the 5250 emulation program to accomplish the pass-through and does not require the virtual disk feature.

Prices are $375 for the System/34 and 36 version and $475 for the System/38 version.

W. R. Lewis Associates, 3009 Glenvalley, Midwest City, Okla. 73110.

Data base management systems

National Information Systems, Inc. has announced utilities for its **Accent R** fourth-generation language and relational data base management system.

The Equate utility allows users to extend the Accent R language. The Flatten and Rebuild utilities aid in large-scale modifications of Accent R applications. Flatten converts a data base library into an ASCII text file, and Rebuild converts the file back.

The Migrate utility allows users to transfer Accent R applications between the Digital Equipment Corp. Decsystem-10, Decsystem-20 and VAX. The menu and Help utilities have been enhanced.

Accent R is available for the DEC VAX line. Prices range from $12,000 to $40,000, depending on the CPU.

National Information Systems, Suite 130, 20370 Town Center Lane, Cupertino, Calif. 95014.

Remote computing services

ITT Dialcom, Inc., part of the ITT Communications Services Group, has announced that users of its electronic mail network can now access **Advanceline** services for daily information concerning legal, legislative and regulatory developments in the areas of business, finance, taxation, labor and securities.

The services available through Advanceline are Daily Washington Advance, Daily Labor Advance, Daily Congressional and Presidential Calendar, Daily SEC Advance, Daily Tax Advance, Private Letter Rulings and Securities Law Advance.

Advanceline rates are $1.14/min. weekdays from 8 a.m. to 9 p.m. and $1.02/min. the rest of the time.

ITT Dialcom, 100 Plaza Drive, Secaucus, N.J. 07096.

Training

McGraw-Hill Training Systems has released **Version 3.3** of its **McGraw-Hill Interactive Authoring System**.

The system allows users to build courses that combine computer-based materials and interactive video to make self-paced instruction.

System requirements are an IBM Personal Computer with a minimum of 256K bytes of memory and two double-sided disk drives or an IBM Personal Computer XT with a minimum of 256K bytes of memory and one double-sided disk drive. A color graphics card and a serial port are required. A mouse is recommended.

Version 3.3 is priced at $1,395.

McGraw-Hill Training Systems, 4th Floor, 1221 Avenue of the Americas, New York, N.Y. 10020.

■

DGC, Inc. has announced two educational products for the IBM Systems/34, 36 and 38, the **System/34 and 36 Standards and Practices** text and the **System/38 Standards and Practices** video seminar.

Both products cover design standards, programming standards, implementation standards, operations standards, security and integrity standards, purchased software standards and personal computer/remote communications standards.

The System/38 Standards and Practices is available in VHS format for $495. The System/34 and 36 Standards and Practices costs $99.

DGC, 1450 Preston Forest Sq., Dallas, Texas 75230.

MICROCOMPUTERS

Software

Intex Solutions, Inc. has released **X-Y-Z:Query**, a companion product for Lotus Development Corp.'s 1-2-3.

X-Y-Z:Query allows search and data retrieval from as many as 1,000 Lotus 1-2-3 or Symphony spreadsheets.

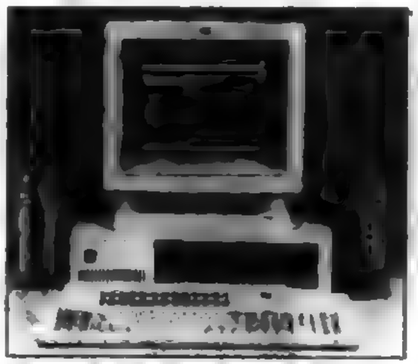
The retrieved data can be used in output formats such as screen or printed reports, new work sheet files and quick statistics and rankings.

X-Y-Z:Query is compatible with Lotus 1-2-3, Symphony 1-2-3 Report and with Intex Solutions' X-Y-Z:Consolidate. It runs on IBM Personal Computers and compatibles, the vendor said.

The price is $195 for up to 12 work sheets and $395 for up to 1,000 work sheets.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

■



Nastec Corp.'s Designaid 3.2

Nastec Corp. has announced an enhancement to its Designaid tool kit for structured analysis, design and software development called **Designaid 3.2** and added two new products, **Safespan** and **Jadesign**, to its Case 2000 series.

Designaid 3.2 has data flow diagram balancing, a provision for structures and a local-area network environment. The local-area network option is called Designaid/LAN.

Safespan provides a bridge between Designaid and Problem Statement Language/Problem Statement Analyzer. Jadesign provides mechanized support for IBM Joint Application Design methodology.

System requirements for Designaid are an IBM Personal Computer XT, AT or 3270 Personal Computer or the Convergent Technologies, Inc. IWS workstation. Both Safespan and Jadesign require Designaid.

Both Designaid 3.2 and Designaid/LAN cost $6,900. There is no charge to current Designaid 2 users. Safespan costs $1,700 and Jadesign $5,000.

Nastec, 24681 Northwestern Highway, Southfield, Mich. 48075.

■

Compufirm Corp. will introduce at Comdex/Fall '85 its **PL/M Connection**, a library of more than 150 functions providing an interface between an IBM Personal Computer and Intel Corp.'s PL/M compiler.

Continued on page 116

It's not just that the COMPAQ Portable is the best-selling portable computer in the world…

It's why.

The COMPAQ® Portable Personal Computer was destined to become a classic. It does more than most desktops because of some farsighted engineering.

We knew that companies would want computers that could keep up with changing technology, so we created a modular portable with a design so innovative it's been patented. It's completely compatible with industry standards. And it has enough memory and expansion slots to accommodate networking, a modem, or a mouse.

Our portables will also accommodate a parallel printer, color and composite monitors, even an *RF* modulator. All are standard interfaces; you don't have to give up an expansion slot to get them.

Many people prefer COMPAQ Portables to desktop computers because of their small footprint. Plus, because they're portable, they're ideal to share.

What's more, our monitors display high-resolution text and graphics, and rugged shock mounting protects stored data. Point being—this is one portable computer with no compromises.

[illegible]

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 114

The set of system interface routines enables software developers to write applications in the PL/M language on an IBM Personal Computer or compatible by using Intel's operating system-independent PL/M compiler. Developers can access all of a microcomputer's DOS, BIOS and graphics functions. The package includes development support for software control of peripherals.

The PL/M Connection is available for a license fee of $295 per user system.

Compufirm, Suite 204, 7677 Ronson Road, San Diego, Calif. 92111.

■

Cway Software, Inc. will announce two functional management software packages, **Cway Strategy** and **Cway People**, at the Comdex/Fall '85 show.

Cway Strategy was designed to provide a blueprint for planning company or departmental growth. It uses menu-driven commands and on-screen instructions.

Cway People was designed to aid in all aspects of employee management, including interviewing, applicant selection and employee appraisals. It maintains applicant, employee and job files.

Both Cway Strategy and Cway People cost $399 for IBM PC-DOS versions and $499 for the Microsoft Corp. Xenix version.

Cway Software, 121 W. DeKalb Pike, King of Prussia, Pa. 19406.

■

Versasoft Corp. will announce at Comdex/Fall '85 its **Dbman-Net**, a version of its Dbman, the Ashton-Tate Dbase-compatible relational data base management system, designed to run on the Novell, Inc. Netware/86 local-area network.

Dbman-Net is a Dbase-compatible multiuser data base manager for local-area networking. It features record, file and semaphore locking. It can convert single-user Dbase programs to mulituser programs. It provides control over error trapping and recovery, and full print server support is built in.

Dbman-Net runs on Novell Netware Version 4.6 and the IBM Personal Computer, Personal Computer XT, AT, Portable Personal Computer and compatibles. It costs $1,100.

Versasoft, 723 Seawood Way, San Jose, Calif. 95120.

■

Mega Cadd, Inc. will announce its enhanced **Design Board Link** translator software and its enhanced **Design Board Professional** three-dimensional design software at Comdex/Fall '85.

Design Board Link transfers drawings created with the Design Board Professional's 3-D data base to two-dimensional drafting packages from other personal computer computer-aided design and drafting vendors. This allows one data base to serve the design/draft cycle without duplication.

Design Board Link costs $295; Design Board Professional is priced at $1,750.

Mega Cadd, Fifth Floor, The Court in the Square, 401 Second Ave. S., Seattle, Wash. 98104.

■

Information Processing, Inc. will release at Comdex/Fall '85 its **PC-Blis**, a micro version of its Blis/Cobol multiuser operating system.

PC-Blis operates on the IBM Personal Computer XT and compatibles. It comes with a PC-Blis board that plugs into a spare slot in the personal computer, enhancing the multiuser throughput of the system and enabling Blis/Cobol to run concurrently with IBM's PC-DOS.

A Blis-to-Blis communications option allows the personal computer to communicate with either another personal computer or with a Blis/Cobol minicomputer.

PC-Blis costs $2,190 for a one-user system and $190 for each additional user. A Turbo VM option providing additional throughput costs $180, and the communications option costs $230.

Information Processing, 401 Whooping Loop, Altamonte Springs, Fla. 32701.

■

Allied Computer Group, Inc. has released **DOS Partner**, a file management utility program.

DOS Partner allows users to flag files individually or in groups for easy copying and deletion, to view files forward and backward one page at a time and to hide and protect files using the attributes option.

System requirements are an IBM Personal Computer or true compatible with 128K bytes of random-access memory and two disk drives or one disk drive and one hard disk drive.

DOS Partner costs $39.95.

Allied Computer Group, Software Development Department P, 432 E. Wells St., Milwaukee, Wis. 53202.

■

Rexon Business Machines Corp. is introducing software and hardware enhancements, **System V**, **Recap 5.1** and **PC Harmony**, to its family of multiuser business computers at Comdex/Fall '85.

The Rexon System V that uses Microsoft Corp. Xenix now has configurations supporting up to 16 users from a single console; Recap 5.1, offering two-level program security, will be released; and PC Harmony, a data link and terminal emulation system enabling the integration of IBM Personal Computers into the Rexon system, will also be introduced.

Prices are $695 for PC Harmony, $495 for Recap 5.1 and $995 for the full development system for the System V Xenix machines. The runtime-only version costs $495.

Rexon Business Machines, 5800 Uplander Way, Culver City, Calif. 90230.

■

Fox Research, Inc. has introduced **10-Base**, an implementation of IBM's SQL for personal computers.

According to the vendor, 10-Base offers the relational data base management system programming language to users of IBM Personal Computers, Personal Computer XTs, ATs and compatibles running Microsoft Corp. MS-DOS or IBM PC-DOS 2 or higher, 320K bytes of random-access memory and two disk drives. The menu-driven program offers easy access to data base operations plus extensive Help. It supports multiple simultaneous users, file sharing and record locking.

The cost of 10-Base is $895.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

■

Mastertype's Writer

Scarborough Systems, Inc. has announced **Mastertype's Writer**, a word processing system for the Apple Computer, Inc. Apple II family and the Commodore Business Machines, Inc. 64 and 128 computers.

Mastertype's Writer offers dual windows for outlining, color highlighting, multiple typefaces, macro commands and an on-disk tutorial. It has sorting capabilities and can print out linked files.

Mastertype's Writer costs $69.95 for the Apple II computers and $44.95 for the Commodore systems.

Scarborough Systems, 55 S. Broadway, Tarrytown, N.Y. 10591.

■

Computer Associates International, Inc. has added **Job Costing** to its Easybusiness series of software poducts and will introduce it at Comdex/Fall '85.

Job Costing allows users to break jobs into as many cost components as needed. Estimated and actual costs can be maintained by job, phase or category.

Job Costing runs under Easyplus, Computer Associates' windowing system. It is available for the IBM Personal Computer, Personal Computer XT, AT, 3270 and compatibles. It requires 128K bytes of random-access memory (RAM). With Easyplus, 256K bytes of RAM and a hard disk are required.

The cost is $595.

Computer Associates, 2195 Fortune Drive, San Jose, Calif. 95131.

■

Software Solutions, Inc. has announced **Voila**, a user-oriented menu of programs for the IBM Personal Computer.

Voila lists programs in English for direct loading. It allows the user to edit the listing, set colors and write batch files.

Voila runs on the IBM Personal Computer, Personal Computer XT, AT or true compatibles running under IBM PC-DOS or Microsoft Corp. MS-DOS Version 2 or higher. It will load and execute all DOS applications, according to the vendor.

Voila costs $29.95.

Software Solutions, 301 W. Harris St., Eureka, Calif. 95501.

■

Omation, Inc. has announced **Schema**, a computer-aided engineering schematic capture program for the IBM Personal Computer, Personal Computer XT or AT.

Schema consists of a drawing editor with a mouse-driven user interface, object libraries containing more than 1,000 objects and five postprocessors.

The postprocessors automatically extract net lists, wire lists and bills of materials from schematic drawings while verifying circuit integrity with routing, design rule check and usage reporting.

Schema costs $495.

Omation, Suite 809, 1701 N. Greenville Ave., Richardson, Texas 75081.

■

Visible Systems Corp. has introduced its IBM Personal Computer-based **Analyst Workbench** modular software productivity tool.

The Analyst Workbench includes three parts. Tool A is the Visible Analyst, which creates diagrams and documents. Tool B is the Visible Rules, which is used for analyzing diagrams; and Tool C is the Visible Dictionary, which stores and organizes data in a central depository.

The Analyst Workbench runs on an IBM Personal Computer XT, AT or 3270 Personal Computer. It requires 384K bytes of random-access memory, one floppy disk drive and one hard disk drive, a Microsoft Corp. mouse and an IBM color monitor.

Each tool costs $595. In mixed quantities of 100, the price is $400 each.

Visible Systems, 336 Baker Ave., Concord, Mass. 01742.

■

VM Personal Computing, Inc. has announced the **Relay Gold Customizer's Toolbox** for users of its Relay Gold concurrent personal computer communications software.

Customizer's Toolbox was designed to give applications developers the flexibility to change completely Relay Gold's user interface by creating menus or altering any of the standard menus to fit specific needs.

The Relay Gold Toolbox will be available in January for $500.

VM Personal Computing, 6 Germantown Road, Danbury, Conn. 06810.

■

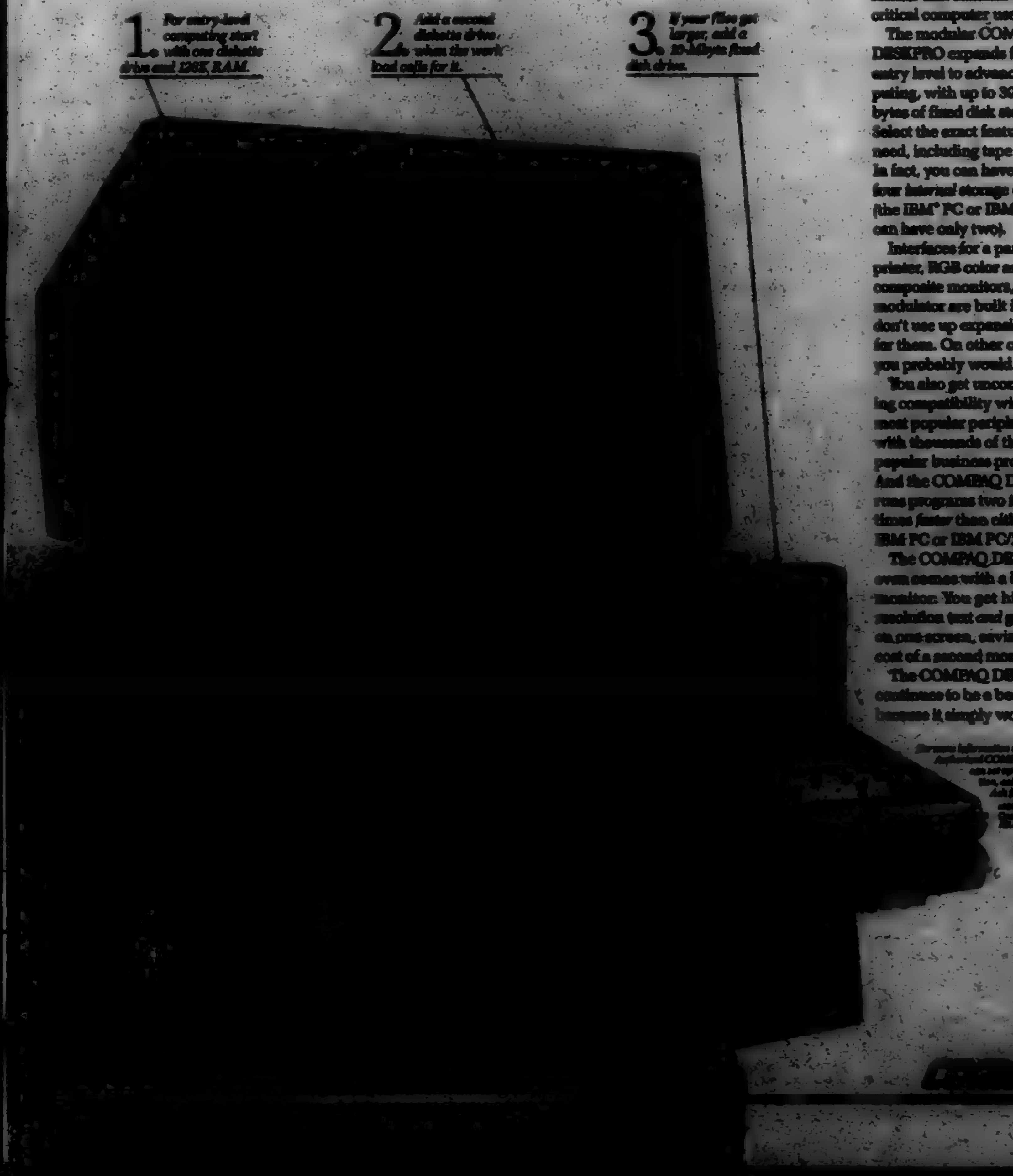
P-Cube Corp. has announced its **Priorities/IBM**, a software product that compares the current status of information services support at any level of an organization against well-defined benchmarks and enables an organization to identify where changes in support offer the maximum return from investments in information resources.

The package incorporates a set of factors for profiling information services support. Each factor reflects a specific aspect of support and has associated with it a measurement scale that shows varying levels of support identified in a variety of industries.

System requirements are an IBM Personal Computer or compatible with at least 512K bytes of random-access memory. The price is $1,800, including training and on-site consulting.

P-Cube, 915 Kings Canyon Road, Brea, Calif. 92621.

It's not just that the COMPAQ DESKPRO is a best-seller. . .



1. For entry-level computing start with one diskette drive and 128K RAM.
2. Add a second diskette drive when the work load calls for it.
3. If your files get larger, add a 10-Mbyte fixed disk drive.

It's why.

In four months the COMPAQ DESKPRO® became the world's second-best-selling 16-bit personal business computer. Today it's a proven performer that satisfies the most critical computer users.

The modular COMPAQ DESKPRO expands from entry level to advanced computing, with up to 30 Megabytes of fixed disk storage. Select the exact features you need, including tape back-up. In fact, you can have up to four *internal* storage devices (the IBM® PC or IBM PC/XT™ can have only two).

Interfaces for a parallel printer, RGB color and video composite monitors, and RF modulator are built in. So you don't use up expansion slots for them. On other computers you probably would.

You also get uncompromising compatibility with the most popular peripherals and with thousands of the most popular business programs. And the COMPAQ DESKPRO runs programs two to three times *faster* than either the IBM PC or IBM PC/XT.

The COMPAQ DESKPRO even comes with a better monitor. You get high-resolution text *and* graphics on one screen, saving the cost of a second monitor.

The COMPAQ DESKPRO continues to be a best-seller because it simply works better.

For more information or the name of Authorized COMPAQ Dealer who can set up a hands-on demonstration, call 1-800-[illegible]. Ask for Operator [illegible].

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COMPAQ®

NEW PRODUCTS/MICROCOMPUTERS

Software Studios, Inc. has released **Version 6** of its **PC-Desk III** desktop management program.

New features include file encryption/decryption, file merge, full screen data entry and editing, the addition of color and the addition of Turboscreen, a screen display function.

PC-Desk III, Version 6 is designed for the IBM Personal Computer, Personal Computer XT, AT and compatibles with a minimum of 272K bytes of random-access memory.

It is priced at $49, plus $2 for shipping. Upgrades for PC-Desk or PC-Desk II cost $25. Updates from the earlier version of PC-Desk III are free.

Software Studios, 8516 Sugarbush, Annandale, Va. 22003.

■

Heuristic Computer Systems has announced a new version of its HCS/Editor, **HCS/E 10-26-85**.

HCS/E is a full screen editor similar to the IBM TSO/SPF mainframe editor. Enhancements reportedly include split screen, support for 254 char. lines, faster execution, displays of the amount of storage available and DOS commands allowed from any HCS/E screen.

HCS/E operates on all IBM PC-DOS- and Microsoft Corp. MS-DOS-type machines with 192K bytes of memory and one floppy drive, including IBM Personal Computers, Personal Computer XTs and ATs.

HCS/E costs $49.95 plus $5 for shipping and handling. Updates cost $8 plus $3.50 for shipping and handling. Current users with Version 8-22-85 or later can upgrade free of charge.

Heuristic Computer Systems, 853 Hickory Drive, Carmel, Ind. 46032.

■

Galileo Scientific, Inc. has released **E-Z Graph II**, a version of its autographing subprogram, and **FIT**, a regression analysis subprogram, for the Hewlett-Packard Co. HP 9000 Series 200 desktop computers.

E-Z Graph II gives graphing capabilities to programs. In addition to its default mode with autoscaling/offset, new features include movable labels with keyboard-controllable size and orientation and nondefault options, which allow more than 100 plotting variations for custom-tailored graphs.

FIT provides linear and general nonlinear regression analysis with any number of independent variables and adjustable parameters. It provides a tabular output of all input data and regression results for easy fitting of equations to data. When used with E-Z Graph II, it gives a graphical display of the fitting analysis.

The programs require HP Basic 2 with Ap2 and 45K bytes of random-access memory. E-Z Graph II costs $125, and FIT costs $70.

Galileo Scientific, 20312 Aspenwood Lane, Gaithersburg, Md. 20879.

■

Pacific Bond Research has announced **Yldex**, a program for calculation and analysis of fixed-income securities.

Yldex supports investment activities such as investment analysis, trading, accounting and performance evaluation. It provides quoted true and after-tax yields, pretax and after-tax durations, principal, accrued interest and totals, straight-line and constant-yield amortization and profit and loss accounting. Analysis includes scenario analysis, sensitivity analysis, break-even analysis, horizon analysis and peformance analysis.

Yldex runs on all IBM and compatible microcomputers with 192K bytes of memory. It is priced at $100.

Pacific Bond Research, #1, 620 Clayton St., San Francisco, Calif. 94117.

■

Unisource Software Corp. has ported Ryan-McFarland Corp.'s **RM/Cobol** to the Venturcom, Inc. Venix/86 operating system on personal computers.

RM/Cobol can be used to create application software. It is particularly suited to the development of vertical business appplications.

Venix/86 is an implementation of AT&T's Unix for the IBM Personal Computer, Personal Computer XT, AT and compatibles; the AT&T PC-6300 and Digital Equipment Corp. personal computers.

A complete RM/Cobol development system is available for $1,260, and runtime versions sell for $250 each.

Unisource Software, 71 Bent St., Cambridge, Mass. 02141.

■

Data-Basics, Inc. has introduced a **multiterminal option (MTO)** for its Architectural Engineering Master Accounting System software package.

MTO uses the Microsoft Corp. Xenix-286 operating system on microcomputers including the IBM Personal Computer AT, the Compaq Computer Corp. 286 series and the Sperry Corp. PC/IT, allowing the microcomputers to support multiple terminals. The Sperry PC/IT will support up to nine terminals, and the IBM and Compaq computers will support up to three terminals.

The MTO option costs $2,500.

Data-Basics, 11000 Cedar Road, Cleveland, Ohio 44106.

■

Aton International, Inc. has introduced **Micro/Remote 3270 Emulator**.

Micro/Remote 3270 emulates the IBM 3275 bisynchronous interactive terminal protocol for use with both DOS and dedicated system applications. Users can access an IBM mainframe from an IBM Personal Computer, Personal Computer XT or AT and perform local processing as well.

Features include single or multiport nonswitched communications line protocol, support of ASCII or EBCDIC transmission codes, print key dump to a list device, line monitor routines for on-screen display of communication line sequences, easy adaptation for 3274/3276 cluster emulation and the ability to configure the software to use separate ASCII CRTs instead of a personal computer screen and keyboard.

The source code is priced at $9,500. A binary executable copy of the product and user documentation is available for $95.

Aton International, Suite 119, 1765 Scott Blvd., Santa Clara, Calif. 95050.

■

Micro Support Resource Corp. has announced **Magic Answer Extracter (MAX)**, a computer programmed to answer questions about personal computer software available to personal computer users via a toll-free telephone hot line.

Personal computer users with a Micro Support Resource support contract can call the company toll free to question MAX. MAX Supports Lotus 1-2-3 and Symphony from Lotus Development Corp.; R-Base 5000 from Microrim, Inc.; Microsoft Corp. Word; IBM Displaywriter 3; Wordstar 2000 from Micropro International Corp.; Multimate, from Multimate International Corp.; Word Perfect from Satellite Software and Samna+ and Samna Word from Samna Corp.

The price of an annual Micro Support Resource support contract is based on the number of software packages in use. A single-user contract for support of Lotus 1-2-3 is priced at $104.

Micro Support Resource, Suite 150, 3355 Northeast Expwy., Atlanta, Ga. 30341.

■

Lifeboat Associates, Inc. has unwrapped three program development packages for Digital Equipment Corp. VAX computers running IBM VMS or AT&T Unix and Motorola, Inc. MC68000 running Unix and Microsoft Corp. MS-DOS: **Lattice C**, a C cross compiler; **Fortrix-C**, a Fortran-to-C converter; and **Emacs**, a text editor.

Lattice C cross compilers let users develop software for microcomputers by writing code on minicomputers and then recompiling. Each cross compiler offers the same functionality and generates the same code as native Intel Corp. 8086/8088 compilers and can use native Lattice 8086/8088 support libraries.

Fortrix-C converts Fortran programs and code to C. It can be used with the Lattice C cross compiler to convert programs to C and download to the microcomputer environment.

The full screen text editor, Emacs, lets users edit several files at once by dividing the screen into multiple windows. Users can also create macros and write their own editor commands using a built-in compiled MLisp programming language.

List prices are $500 for the C cross compiler and $375 for Emacs. Fortrix-C is priced from $995.

Lifeboat Associates, 1651 Third Ave., New York, N.Y. 10128.

■

RM/Cobol-8X, a Cobol compiler for microcomputers that includes IBM mainframe Cobol extensions and structured programming features from the ANSI X3.23 198X Cobol standards proposal has bowed from **Ryan-McFarland Corp.**

Designed for the IBM Personal Computer family, the RM/Cobol-8X compiler provides portable applications code. To enable smaller systems to handle mainframe applications, the compiler eliminated the 64K-byte program size restrictions usually associated with IBM PC-DOS or Microsoft Corp. MS-DOS Cobol programs.

The compiler also provides an RM/Cobol Version 2 compatibility switch, which ignores new language features like the ANSI 85 extensions to eliminate syntax conflicts between RM/Cobol Version 2 applications and the ANSI 85 standard.

RM/Cobol-8X development systems list for $1,250; runtime versions sell for $300.

Ryan-McFarland, 609 Deep Valley Drive, Rolling Hills Estates, Calif. 90274.

■

The Finot Group has upgraded its Keeptrack hard-disk utility software for the IBM Personal Computer, Personal Computer XT, AT and compatibles. **Keeptrack Release** 1.1 features backup and restore and branch operations.

The backup and restore function provides procedures for moving all or selected files from a hard disk to floppy disks. Keeptrack offers a choice of backing up the entire disk, backing up selected files or partial backup — which usually consists of anything new since the last backup.

Branch operations allow users to copy, move, delete or perform other functions on an entire subdirectory or on a directory and its subdirectories via function key commands.

Keeptrack 1.1 costs $79.

The Finot Group, Suite 3, 2390 El Camino Real, Palo Alto, Calif. 94306.

■

Beaman Porter, Inc. has introduced **Release 2.2** of the **Powertext Formatter**, a text formatter for any word processor running Microsoft Corp.'s MS-DOS that generates ASCII files.

Release 2.2 lets users format in two or more newspaper-style columns; write multiple synchronized columns for audio/video scripts or columnar reports; automatically footnote in several styles at the bottom of a page or end of a document; automatically outline up to nine levels deep; and outline within columns or according to military specification requirements.

Other enhancements in this release are an ability to number paragraphs for contracts, legal documents and technical manuals; proportional printing; calendar and screenplay formatting; and mail merge.

The Powertext Formatter is priced at $49.95.

Beaman Porter, 417 Halstead Ave., Harrison, N.Y. 10528.

Systems

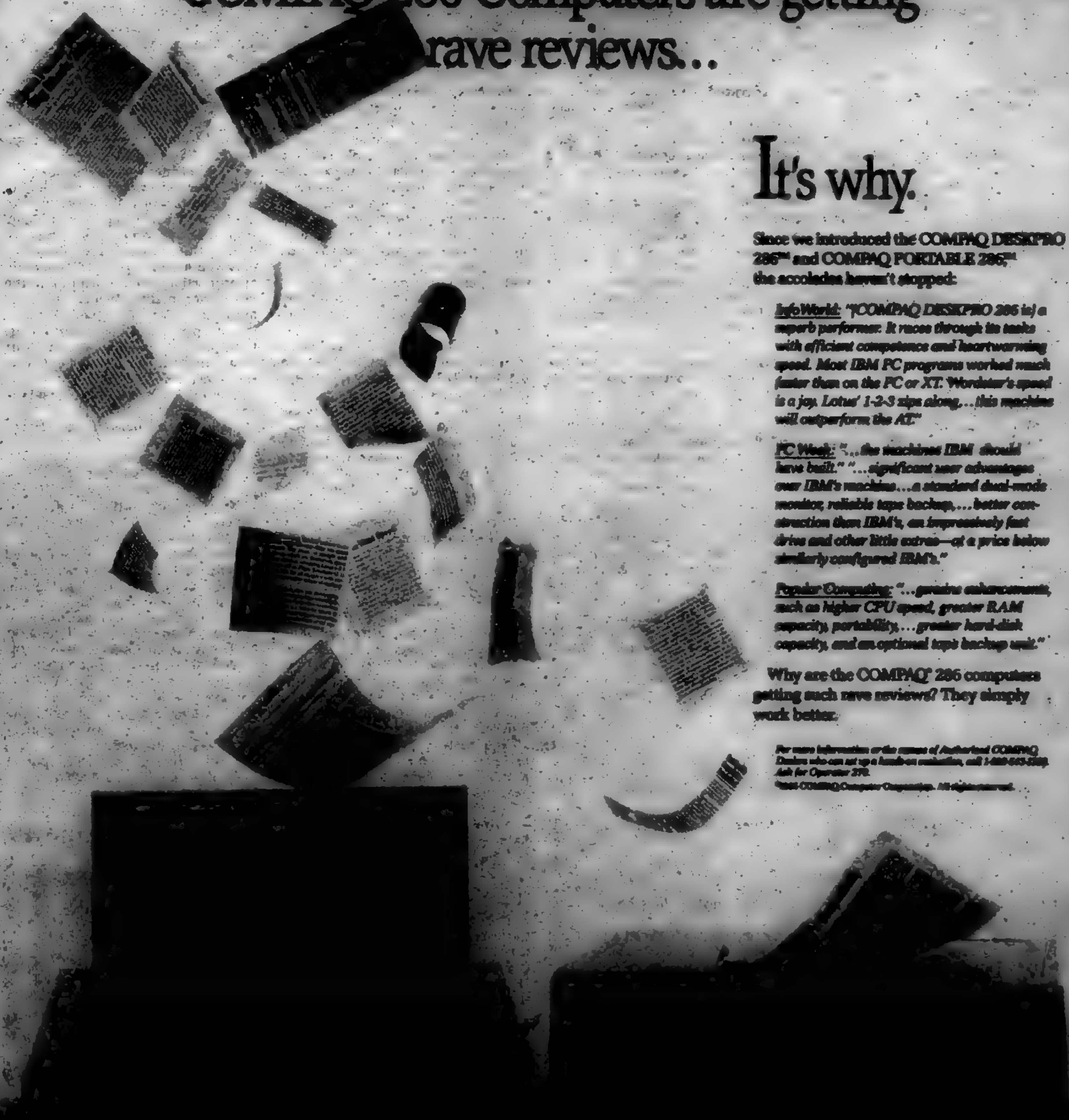
Duxbury Systems, Inc. has introduced its **Braille Production System (BPS)**.

BPS is an integrated system that produces braille from typewritten copy with just four keystrokes. The system includes an IBM-compatible personal computer, the Duxbury Braille Translator, a voice device such as Digital Equipment Corp.'s Dectalk, a personal or high-production braille printer and an optical character reader.

A basic Braille Workstation consisting of a personal computer, Braille Translator and a complete software package for communications, word processing and screen management is available for the price of $4,995.

Duxbury Systems, P.O. Box 1504, 435 King St., Littleton, Mass. 01460.

It's not just that COMPAQ 286 Computers are getting rave reviews...



It's why.

Since we introduced the COMPAQ DESKPRO 286™ and COMPAQ PORTABLE 286,™ the accolades haven't stopped:

- _InfoWorld:_ *"[COMPAQ DESKPRO 286 is] a superb performer. It races through its tasks with efficient competence and heartwarming speed. Most IBM PC programs worked much faster than on the PC or XT. Wordstar's speed is a joy. Lotus' 1-2-3 zips along...this machine will outperform the AT."*
- _PC Week:_ *"...the machines IBM should have built." "...significant user advantages over IBM's machine...a standard dual-mode monitor, reliable tape backup,...better construction than IBM's, an impressively fast drive and other little extras—at a price below similarly configured IBM's."*
- _Popular Computing:_ *"...genuine enhancements, such as higher CPU speed, greater RAM capacity, portability,...greater hard-disk capacity, and an optional tape backup unit."*

Why are the COMPAQ® 286 computers getting such rave reviews? They simply work better.

For more information or the names of Authorized COMPAQ Dealers who can set up a hands-on evaluation, call 1-800-[illegible]. Ask for Operator [illegible].

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NEW PRODUCTS/MICROCOMPUTERS

Omni Computer Systems, Inc. has announced **Flash+4**, an integrated mail system.

Flash+4 is used to simplify mass mailing and to organize mailings. For instance, it is used to update address files with five-digit ZIP codes to nine-digit codes.

Flash+4 is a turnkey system consisting of an IBM Personal Computer XT with either a 10M- or a 20M-byte hard disk, a control card, a modem and a laser disk reader. Software components include ZIP+4 conversion routines, Flash-Com electronic mail software, Flash+4 smart formatting routines and laser-key data retrieval software. The ZIP+4 and other data bases reside on the laser disk.

Flash+4 is priced at $25,000. There is a yearly support service available for $2,000 a year.

Omni Computer Systems, P.O. Box 162, Chestnut Hill, Mass. 02167.

■

ISI International Corp. has added the **ISI 6170 Industrial Computer** to its line of ruggedized IBM Personal Computer and Personal Computer AT-compatible systems.

The 6170 is a rack-mountable computer that is hardware and software compatible with the IBM Personal Computer AT. It also provides compatibility with IBM's 7532 Industrial Computer. The 6170 uses Intel Corp.'s 8-MHz 80286 processor and optional 80287 math coprocessor. It has 12 dual-connector expansion slots.

Single-quantity pricing for a 6170 with 512K bytes of memory, a 1.2M-byte disk drive and a keyboard is $4,000.

ISI International, 1275 Hammerwood Ave., Sunnyvale, Calif. 94089.

■

Sextant 815, a graphics display system for IBM Personal Computer-based computer-aided design software, has debuted from **TAT Graphics Group, Inc.**

Sextant 815 provides noninterlaced 800- by 600-pixel flicker-free resolution. The system includes a 15-in. color monitor with tilt-and-swivel base, TAT single-board Galaxy graphics controller, red-green-blue cable and initialization software. An optional print feature lets users create 16-col. or 8½- by 11-in. overhead transparencies or prints. A Tektronix, Inc. 4107 color graphics display terminal emulation package, T-Graf-07, is also available as an option.

Sextant 815 sells for $4,395. Option prices are $150 for the print package and $995 for T-Graf-07.

TAT Graphics Group, Building E, 1270 Lawrence Station Road, Sunnyvale, Calif. 94089.

Communications

Matrix Communications, Inc. is set to unveil the **Alliance series**, a system designed to interconnect IBM Personal Computers, at the Comdex/Fall '85 show.

The Alliance series links up to 20 personal computers. It is based on a programmable cluster controller that connects the computers via RS-232 interfaces at 115K bit/sec.

Pricing for the Alliance series is approximately $100 per node. The eight-port model is priced at $695 with a $349 charge for each additional four-port module.

Matrix Communications, 112-116 Washington St., Marblehead, Mass. 01945.

■

Integrated Network Systems, Inc. is set to introduce its **Gateway** product line consisting of the **SDLC Gateway PC Adapter**, the **8100 Gateway PC Adapter** and the **X.25 Gateway PC Adapter** at the Comdex/Fall '85 show.

The SDLC Adapter connects to any host supporting IBM's Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) 3270 control units via leased or switched lines. Up to 32 personal computers in the network can appear as logical units to the host, each with file transfer capability.

The 8100 Adapter connects to the multiuse communications loop of the IBM 8100 Information System, and the X.25 Adapter allows connection to public or private X.25 networks using switched or permanent virtual circuits to hosts supporting SNA 3270 control units. Both provide file transfer for as many as 32 network-connected personal computers.

All the Gateway PC Adapters feature SNA 3274 cluster controller emulation, on-board microprocessor, local screen capture to printer or disk and the application program interface that enables user-written programs to perform varied operations.

The SDLC and X.25 Gateway PC Adapter are priced at $1,995, and the 8100 Gateway PC Adapter is priced at $2,295.

Integrated Network Systems, P.O. Box 91395, Mobile, Ala. 36691.

■

Fox Research, Inc. has added electronic mail and other utilities to its **10-Net** local-area network.

10-Net electronic mail lets users send files, notes, memoranda and letters to one or more users. The Chat software utility allows users to exchange short messages, and the News utility posts messages and general interest information to every workstation.

10-Net runs on the IBM Personal Computer, Personal Computer XT, AT and compatible systems running Microsoft Corp.'s MS-DOS or IBM's PC-DOS 2 and higher. 10-Net local-area network nodes, including interface card, tap box, 8-ft connecting cable, software and manual, are available for $695 each.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

■

The Software Link, Inc. has announced a **Multilink Advanced** version of its **Btrieve/N** file management system used to develop applications in Basic, Pascal, C, Fortran and APL.

Multilink Advanced allows users to connect up to eight ASCII terminals to a single microcomputer running IBM's PC-DOS 3.2. It is fully compatible with all existing versions of Btrieve and provides automatic file recovery in the event of a systems crash. Single-user Btrieve environments can be moved into a multiuser environment without software changes.

The Multilink Advanced version of Btrieve is priced at $595. Multilink Advanced costs $495.

The Software Link, Suite 632, 8601 Dunwoody Place N.E., Atlanta, Ga. 30338.

■

Gateway Communications, Inc. will announce its **G/Snanet**, a communciations gateway server for its G/Net local-area network.

The package allows IBM Personal Computers, Personal Computer XTs, ATs and compatibles interconnected on G/Net to access mainframe computers through the G/Snanet local-area-network-to-host gateway in an IBM Systems Network Architecture/Synchronous Data Link Control (SDLC) environment.

G/Snanet provides up to 32 concurrent sessions. Each personal computer can use the 3270 protocol or the 3770 RJE protocol. In 3270 mode, G/Snanet emulates an IBM 3274 controller. In 3770 RJE mode, it emulates an IBM 3770 RJE workstation.

The package consists of a personal computer plug-in board plus a software emulation module. The G/Snanet software module with SDLC adapter is priced at $2,495. The G/Snanet software module costs $2,995.

Gateway Communications, 16782 Red Hill Ave., Irvine, Calif. 92714.

Storage

Suitable Solutions has announced **Idrive**, an add-on floppy disk drive for the Digital Equipment Corp. Rainbow personal computer.

Idrive provides IBM Personal Computer and Personal Computer XT compatibility. It is an external 48 track/in. double-sided disk drive that plugs into the back of the Rainbow. It allows IBM-compatible diskettes to be read, written and edited from the Rainbow without reformatting media or transferring files.

Idrive costs $395.

Suitable Solutions, Suite 319, 47 Saratoga Ave., San Jose, Calif. 95129.

■

Priam Corp. has unwrapped **Innerspace IT60**, a tape backup kit for the IBM Personal Computer, Personal Computer XT, AT and compatibles that creates an archival copy to protect data stored on disks from accidental damage or loss.

Designed for use with the vendor's 5¼-in. Innerspace disk drives, the kit operates at 90K bit/sec. and transfers the contents of a 60M-byte disk in less than 15 min.

Innerspace IT60 costs $1,595.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134.

Printers/plotters/peripherals

Okidata Corp. has unwrapped the **Cut Sheet Feeder 900 (CSF900)**, an accessory for single-sheet printing on Microline 192 and 193 dot matrix printers.

CSF900 accepts up to 170 sheets through the input hopper. Users can feed paper manually or automatically through host computer software. Paper ranging from 7.2 in. to 8.5 in. wide and weighing between 16 and 24 lb, plus company letterhead, can be accommodated. A top retention feature allows the top-of-form position to be set from the printer's front panel. This position remains stored in memory even when the printer's power is turned off.

CSF900 sells for $229.

Okidata, 532 Fellowship Road, Mount Laurel, N.J. 08054.

■

Facit, Inc. is set to introduce two IBM-compatible dot matrix printers, the **4513** and the **4514** at the Comdex/Fall '85 show.

Both printers can emulate the IBM/Epson America, Inc. and the Epson/FX protocols, allowing them to interface with computers ranging from IBM Personal Computers to AT&T Unix-based supermicrocomputers. Both offer 10 and 12 char./in. or proportional space printing in the near-letter-quality mode. In draft mode they offer 10, 12 and 17 char./in. and proportional space printing. Both print at 160 char./sec. in draft mode and include a parallel and a serial interface.

The 4513 is priced at $695, and the 4514 costs $845.

Facit, 9 Executive Drive, Merrimack, N.H. 03054.

■

Brother International Corp. has announced its **2024L** letter-quality dot matrix printer.

The 2024L uses a 24-pin staggered arrangement, single-pass print head for 180 dot/in. graphics, letter-quality printing at up to 96 char./sec. and draft printing at 160 char./sec. It provides Centronics Data Computer Corp. parallel or RS-232C interfaces.

The 2024L is priced at $1,295 including a rear-feed tractor. There is an optional 8½-in. paper capacity sheet feeder available for $299 and an optional 15-in. paper capacity sheet feeder for $399.

Brother International, 8 Corporate Place, Piscataway, N.J. 08854.

■

Microvitec's Model 945 CN

Microvitec, Inc. has announced the **Definition** line of color graphics monitors for business graphics and computer-aided design.

The line includes the 900 series and the 940 series. The 900 series includes three 14-in. monitors each with a horizontal scan frequency of 31.5 kHz and a 900- by 640-pixel resolution. The Definition 900-DI and the 901-DI are board compatible with 640- by 400-pixel noninterlaced 25-kHz scan rate boards. The 905-DN is an analog monitor.

The 940 series also includes three monitors each with a horizontal scan frequency of 31.5 kHz normal. The 941-DN has a 14-in. monitor with 900- by 640-pixel resolution. The

Continued on page 122

It's not just that COMPAQ Personal Computers are used in more top companies than Apple, Wang, Tandy, Hewlett-Packard, Digital, AT&T, Data General, NCR, NEC . . .

It's why.

In just three short years, COMPAQ® Personal Computers have gained greater [illegible] A recent survey* of Fortune-ranked U.S. corporations revealed that [illegible] and COMPAQ is quickly [illegible] their lead.

Such success is due to the quality of COMPAQ products. They are repeatedly rated faster, more flexible, more expandable, and more portable than their competition. In fact, COMPAQ Computers are simply more compatible with IBM personal computers than the IBM [illegible] with one another.

[illegible] why COMPAQ Computers have surpassed [illegible]

[illegible]

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 120

940-CN has a 20-in. monitor and 940- by 700-pixel resolution. The Definition 945-CN has a 20-in. monitor and 1,024- by 768-pixel resolution.

Prices are as follows: the 900-DI, $795; the 901-DI, $895; the 905-DN, $995; the 941-DN, $995; the 940-CN, $1,595; and the 945-CN, $1,795.

Microvitec, 1943 Providence Court, Airport Perimeter Business Center, College Park, Ga. 30337.

■

Wyse Technology's WY-700 screen

Wyse Technology, Inc. will introduce the **WY-700**, a high-resolution, 15-in. monochrome monitor and graphics board subsystem for personal computers at the Comdex/Fall '85 show.

The WY-700 provides up to 1,280- by 800-pixel resolution. It runs on the IBM Personal Computer, Personal Computer XT, AT, the Wyse Technology WysePC and other compatible personal computers. The monitor has a bit-mapped graphics board that uses one slot in the personal computer.

The WY-700 is priced at $1,595.

Wyse Technology, 3571 N. First St., San Jose, Calif. 95134.

Board-level devices

Applied Reasoning Corp. has added the **Model 2100** to its PC-Elevator series of processor boards and will introduce it at Comdex/Fall '85.

The Model 2100 is said to accelerate the computational power of an IBM Personal Computer or Personal Computer XT to twice the speed of a Personal Computer AT. It operates in tandem with the Intel Corp. 8088 processor and uses it as an I/O processor for managing all disk and other I/O functions. It incorporates a 10-MHz Intel 80286 processor, and it has an 80287 floating-point coprocessor in both 5- and 8-MHz versions.

The Model 2100 costs $2,695.

Applied Reasoning, 765 Concord Ave., Cambridge, Mass. 02138.

■

Dynatec Systems, Inc. is set to introduce at Comdex/Fall '85 the **PC Supercharger**, a plug-in board that increases the IBM Personal Computer processing speed without using a coprocessor.

The Supercharger installs in the microprocessor socket on the motherboard and does not require an expansion slot.

The board uses either a hardware switch or software commands for speed change selection, according to the vendor.

The PC Supercharger uses a 10-MHz Intel Corp. 8088 microprocessor. Operation is transparent to the user.

The PC Supercharger costs $279.95.

Dynatec Systems, Suite 103, 870 E. 9400 South, Sandy, Utah 84070.

Emulex Corp. has announced the **IB02** host adapter, which connects an IBM Personal Computer to small computer systems interface peripherals.

The IB02 contains a protocol controller that provides the small computer systems interface. The device implements full small computer systems interface protocol and ensures proper performance of the I/O system. The IB02 is packaged on a printed-circuit board that plugs into one of the I/O expansion slots in the IBM Personal Computer, Personal Computer XT or AT backplane.

The IB02 provides integration of 5¼-in. Winchester disk drives and/or ¼-in. cartridge tape drives for expanded storage and backup capabilities. Up to seven controllers can be attached to the IB02, and each controller can suppport up to eight Winchester drives.

The IB02 is priced at $395.

Emulex, P.O. Box 6725, 353 Harbor Blvd., Costa Mesa, Calif. 92626.

■

ABM Computer Systems will announce at the Comdex/Fall '85 show its **X2C** board, a multifunction board for the IBM Personal Computer, Personal Computer XT and compatibles.

The X2C offers up to 2M bytes of random-access memory (RAM), nonvolatile RAM for all memory, automatic software configuration and software that includes a pop-up windowing print spooler, error correction and detection memory.

The board features 256K bytes of RAM, expandable on the main board to 1M byte; printer port; serial port; clock/calendar; and software.

The price is $395.

ABM Computer Systems, 3 Whatney, Irvine, Calif. 92718.

■

Reference Technology, Inc. has announced its **Clasix Multidrive Directer** that increases the number of card read-only memory drives attached to a personal computer.

Clasix connects up to eight Reference Technology Clasix Datadrive Series 500 optical disk drives to a single IBM Personal Computer, Personal Computer XT, AT or compatible.

There are two models of the Multidrive Director. The Model MD-504 attaches four Datadrives, and the Model MD-508 attaches the full eight Datadrives.

The MD-504 costs $795, and the MD-508 is priced at $1,000.

Reference Technology, 1832 N. 55th St., Boulder, Colo. 80301.

■

Toshiba America, Inc. has unveiled two 64K-byte CMOS static random-access memories (RAM), the **Model TC5561P** and the **Model TC5562P**.

Model TC5561P offers two speed sorts: 55 nsec and 70 nsec. Operating current is said to be 100 mA.

The TC5562P provides 45-nsec or 55-nsec access times. Operating current is also 100 mA, and standby power is 20 mA, according to Toshiba America.

I/O is transistor-transistor logic compatible on both models, which operate from a single 5V power supply.

Sample quantity prices are $38.50 for the Model TC5561P and $35 for the Model TC5562P.

Toshiba America, 2692 Dow Ave., Tustin, Calif. 92680.

Auxiliary equipment

Kensington Microware Ltd. has announced four accessories: the **Universal System Stand**, the **Universal Tilt/Swivel**, the **Universal Copy Stand** and the **Universal Anti-Static Wrist Rest**.

All were designed to work with Kensington's Master Piece for IBM Personal Computers and compatibles, according to the vendor.

The Universal System Stand allows the computer system to sit vertically beside the desk. The Tilt/Swivel fits under any personal computer monitor and accommodates the Master Piece. The Copy Stand attaches directly to the monitor. The Anti-Static Wrist Rest attaches to the keyboard and is covered with a grounded antistatic mat.

Prices for the system stand, the tilt/swivel, the copy stand and the wrist rest are $39.95, $49.95, $44.95 and $49.95, respectively.

Kensington Microware, 251 Park Ave. S., New York, N.Y. 10010.

■

Systems Control's surge suppressor

Systems Control, a division of **M. J. Electric Corp.**, has introduced the **Engarde Surge Suppressor**.

The Engarde protects the microcircuitry and software of personal computers from damage and lost data by clamping off power surges. It features a built-in antistatic touch pad that drains static electricity from the operator's body before the computer is used.

It also attenuates radio frequency interference to keep data from becoming garbled in memory and warns the operator with an LED when the electrical outlet being used is improperly grounded.

Engarde is priced at $67.50.

Systems Control, P.O. Box 788, Iron Mountain, Mich. 49801.

[illegible]

Voice/data communications

Help/38 Systems, Inc. has announced the **Telexpro** system, designed to tie the international telex network to every workstation in an IBM System/38 system.

The system plugs into any System/38 workstation port with a single twin-axial cable. Users then plug in their existing telex or TWX line to the Telexpro computer. Telexpro incorporates the user's word processing system, so users can direct any telex into any data base file.

Telexpro is priced at $8,950.

Help/38 Systems, 210 Baker Road, Minnetonka, Minn. 55345.

■

Lanier Thought Processing VIP Classic

The **Lanier Thought Processing Division** of **Harris Business Information Systems** has announced the **VIP Classic**, a combination microcassette dictation unit, full-featured telephone and a telephone answering system.

The VIP Classic has a speakerphone and offers speed dialing, redialing, a telephone record capability and an alarm system.

The VIP Classic is priced at $795.

Lanier Thought Processing, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

Protocol converters

Method Systems, Inc. has introduced the **PCT-100 Programmable Communications Translator**, a user-programmable in-line RS-232 protocol and data translator.

The PCT-100 is used to interface laser printers to existing computer or word processing systems. It emulates the old printer so that it is not necessary to modify existing hardware or software.

The single-quantity price is $495.

Method Systems, 3511 Lost Nation Road, Willoughby, Ohio 44094.

■

NCR Comten, Inc. has enhanced its **Comten Integrated Protocol Converter (IPC)** to give more flexibility in configuring networks and managing network integrity and security.

The enhancements allow users to program line control characteristics, such as inactivity disconnect timers or password designations, on a line-by-line basis.

There are also security enhancements that include information management systems queue flushing and password protection.

The Comten IPC price ranges from $6,100 to $15,450. Two-year lease prices vary from $296/mo to $746/mo. Current users can upgrade at no cost.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

■

TRW, Inc.'s Information Networks Division has introduced the **Dual Port 3278 Interface** and the **Multiport 3274 Interface** units.

The interfaces allow IBM 3270-type terminals to emulate one of five asynchronous terminal types, providing 3270 connection to an asynchronous host via the local-area net.

The Dual Port 3278 supports up to

Continued on page 126

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COMPAQ®

NEW PRODUCTS/COMMUNICATIONS

Continued from page 122

two IBM 3270 Coaxial A terminal devices. The Multiport 3274 provides asynchronous ASCII-to-IBM connections. It comes in 16- or 32-port configurations through RS-232 connections.

The Dual Port 3278 Interface is priced at $1,800. In the 16-port configuration the Multiport 3274 is priced at $17,700 and the 32-port configuration at $32,800.

TRW, 23800 Hawthorne Blvd., Torrance, Calif. 90686.

Software

Network Research Corp.'s Fusion network software now supports TCP/IP protocols for Micom Systems, Inc.'s NI5010 Ethernet controller board.

This lets IBM Personal Computer users running Microsoft Corp.'s MS-DOS communicate with other systems using the TCP/IP protocol suite.

TCP/IP protocols can be used in applications such as file transfer, remote login and electronic mail. Developers can access the Fusion library of system calls to create their own TCP/IP applications.

Prices are $750 for Fusion software and from $575 to $725 for the NI5010.

Network Research, 2380 N. Rose Ave., Oxnard, Calif. 93030.

Multiplexers/modems

Universal Data Systems, Inc. is set to introduce four modems — **Sync-Up 208A/B, Sync-Up 201C, Fastalk 2400 and 224 A/D** — at the Comdex/Fall '85 show.

Sync-Up 208A/B is for use with the IBM Personal Computer family of microcomputers. It features synchronous automatic dialing and plugs into a single slot. It permits half-duplex operation at 4.8K bit/sec. over dial-up networks and full-duplex operation over four-wire leased lines. It comes with Sync-Up 3780, a synchronous communications software package that emulates an IBM 2780 or 3780 terminal.

Sync-Up 201C is also for use with the IBM Personal Computer family. It features synchronous automatic dialing and permits half-duplex operation at 2,400 bit/sec. over dial-up networks.

Fastalk 2400 operates with the IBM Personal Computer and compatibles. It is a full-featured Hayes Microcomputer Products, Inc.-compatible unit with an RS-232 interface. It operates in full-duplex mode at 2,400 bit/sec. over the dial-up networks and also functions as an AT&T 212A or 103 series modem at fallback rates of 1,200 and 300 bit/sec.

The 224A/D was designed for communications applications involving dumb terminals but can be used with micros.

It features asynchronous communications at 0 to 300, 1,200 and 2,400 bit/sec. and synchronous communications at 1,200 and 2,400 bit/sec. It permits full-duplex operation over dial-up networks and can function as an AT&T 212A or 103 series modem at fallback rates of 1,200 and 300 bit/sec.

All four modems feature automatic answer, automatic tone or pulse dialing selection and built-in diagnostic testing.

Prices for the Sync-Up 208A/B, the Sync-Up 201C, the Fastalk 2400 and the 224A/D are $1,200, $625, $625 and $645, respectively, the vendor said.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.

Local-area networks

3M Interactive Systems has introduced the **3M Model 80 Channel Translator** and the **3M Model 70 Preengineered Cable System.**

The Model 80 translator was designed specifically for use with smaller local-area networks. It provides translation for up to three separate 3M LAN/I and/or 3M LAN/PC networks on a single broadband cable system.

It features uniform translation over five channels.

The Model 70 cable system consists of a set of six broadband cable systems that permit installation of a local-area network in areas ranging from 10,000 to 160,000 sq ft. The preengineered cable network is equipped with regularly spaced taps for plug-in access all along the cable, the vendor said.

There is a description/instruction manual on the cable system available free of charge.

The Model 80 Channel Translator is priced at $590, and the Model 70 Preengineered Cable System's prices range from $500 to $3,500, the vendor said.

3M Interactive Systems, Department IP85-32, 3920 Varsity Drive, Ann Arbor, Mich. 48104.

Test equipment

Telebyte Technology, Inc. has introduced the **Model 301 Mini Analyzer** for testing and monitoring data communications circuits.

The Mini Analyzer displays key signals, interrupts selected signal paths and patches new configurations.

It is composed of two modules: one for display and one for patching. Each module is equipped with a male and a female DP-25 connector, which allows placement at any point of an RS-232 cable path. The display module continuously monitors and displays eight signals of the RS-232C data path. The patching function is performed by a mini patch box that breaks the 23 signal paths of the interface with both ends terminated on female jack receptacles.

The Model 301 costs $95, the vendor said.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

WANTED:
OLD
THINKER
TOYS.

CW Communications, ComputerLand and The Computer Museum invite you to send in your early personal computers, software, and memorabilia — you could win a free trip to The Computer Museum in Boston

Your old, dusty "thinker toy" may now be ready to become a treasured museum piece. The Computer Museum in downtown Boston — an international museum dedicated entirely to computing — is searching for the very best and most unique relics of the personal computer-revolution.

ComputerLand, CW Communications, and The Computer Museum are working together to bring these early relics out of your attic and into the collection of The Computer Museum. The museum is especially looking for kit machines, prototypes, programs, output, newsletters and memorabilia of early computing from around the world. A selection of the finest items will be used to create an exhibit on the evolution of personal computers and a catalog highlighting the Museum's collections. If your submission is accepted for addition to the Museum collection, you will be invited to the grand opening of the exhibit and will receive a bound edition of the catalog. If your item is selected as one of the five best "finds", you will also receive an all-expense-paid trip to Boston for the grand opening party.

So, get up to the attic, down to the cellar and into your closets, and tell us what you find! Call or write the Museum for an official entry form, or send a photo and description of your items by March 1, 1986 to: The Computer Museum, Personal Computer Competition, 300 Congress St., Museum Wharf, Boston, Massachusetts USA 02110, (617) 426-2800, Telex: 62792318.

ComputerLand®

The Computer Museum

CW COMMUNICATIONS/INC.

Entries will be judged on significance, rarity, date, completeness and condition. Items particularly sought include pre-1980 machines, early serial numbers (get those number 1's out), machines made for purchase outside of North America (even modern machines are sought in this category); first releases of software such as first releases of operating systems, languages and mass-marketed and original applications; and pre-1980 photographs, newsletters, manuals and other records. The Computer Museum is a private non-profit educational institution. All donations are tax-deductible according to the provisions of the Internal Revenue Service. Thinker Toys is a registered trademark of George Morrow & Morrow Designs, Inc.

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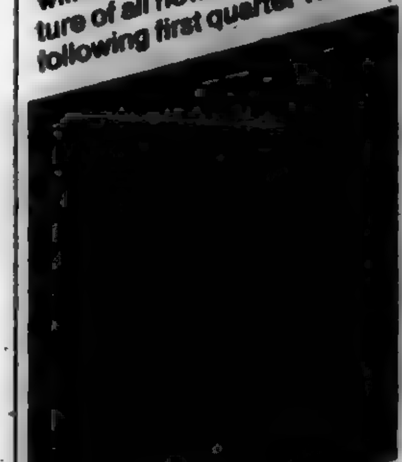
On Oct. 15, 1985, NESTAR Systems, Inc. announced the availability of state-of-the-art LAN systems that are 100% compatible with IBM's strategic direction and complementary to IBM's product offerings.

NESTAR will support use of IBM Token-Ring Network in conjunction with NESTAR PLAN™ 3000, 4000, and 5000 systems.

Support of the Token-Ring Network will be available as an upgrade to current NESTAR's PLAN Series™ and will become a standard feature of all new installations following first quarter 1986.



NESTAR is now accepting orders for IBM PC Token-Ring Adapters and Multi-station Access Units. NESTAR also announces new models of the PLAN Series file servers, which incorporate both the IBM Token-Ring and ARCNET™ as standard components.

NESTAR's PLAN Series provides flexibility in communicating to mainframes and networked PCs.

NESTAR's family of products includes PLAN 1000 device servers, PLAN 2000 PC-based servers, the PLAN 3000, 4000, and 5000 multi-function servers; network interface cards for IBM and Apple personal computers, and PLANPak,™ a suite of ready-to-use integrated multi-user applications software.

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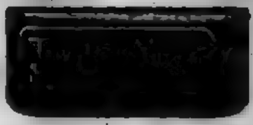

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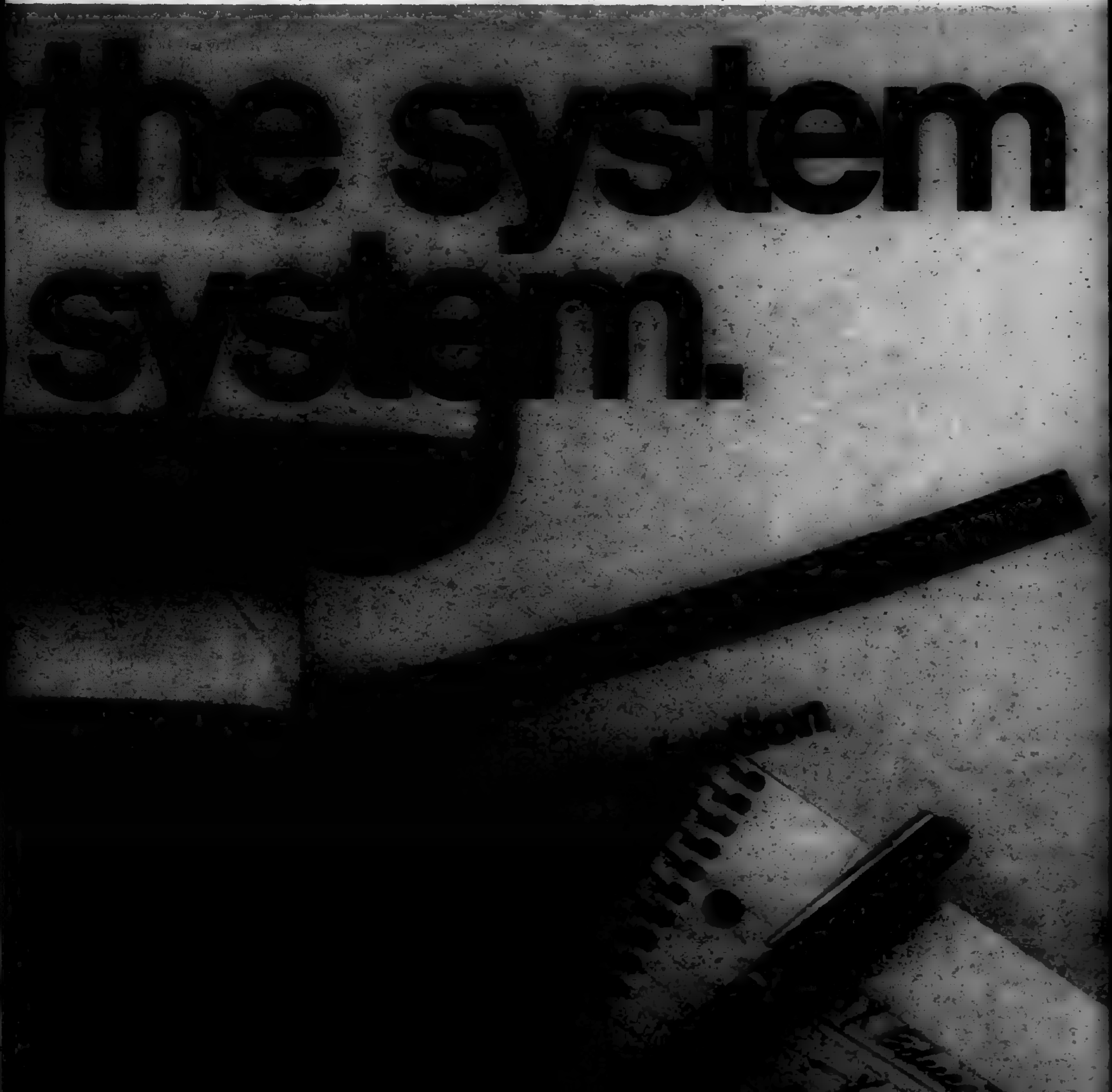

Auxiliary equipment

Western Telematic, Inc. is introducing at Comdex/Fall '85 its **TAS-41** terminal-activated switch that allows four users to share one computer port and its **SS-16**, a 16-port smart switch for RS-232 networking.

The TAS-41 allows each of four users to connect and disconnect to one computer port by entering commands from the remote terminal's keyboard. If a user forgets to log off, a time-out feature automatically disconnects the port within a user-selectable time period.

The SS-16 allows users to create an any-port-to-any-port local-area network, linking terminals, modems, printers or computers. Switching capabilities include computer port expansion and sharing, remote data gathering and personal computer training laboratories. Up to eight pairs of ports can communicate simultaneously. It accommodates rates between 150 and 19.2K bit/sec.

The TAS-41 is priced at $395, and the SS-16 costs $1,895.

Western Telematic, 2435 South Anne St., Santa Ana, Calif. 92704.

■

Arbo Connections, a division of **Arbo Corp.**, has introduced a line of **Switchboxes**, devices that can connect multiple computers to any peripheral.

Switchboxes allow a computer user to attach up to five peripherals to one computer — or up to five computers to the same peripheral — with a single turn of a dial. They use IBM parallel connectors, nine-line and 25-line RS-232 connectors, 15-line RS-422 connectors or 36-line Centronics Data Computer Corp. connectors.

Prices start at $115.

Arbo Connections, 18047 N.E. 68th St., Redmond, Wash. 98052.

SYSTEMS & PERIPHERALS

Data storage

Tallgrass Technologies Corp. has announced the **Flexstor** series of internal hard disks ranging from 25M to 80M bytes.

The Flexstor series comprises four disks equipped with Backtrack software that is said to back up data files automatically. The controller and disks are priced separately, and each product carries a limited one-year warranty.

Prices for the Flexstor series are $1,195 for the half-height, 25M-byte TG-5525i; $2,295 for the full-height, 35M-byte TG-5535i; $2,595 for the full-height, 50M-byte TG-5550i; and $3,595 for the 80M-byte, full-height TG-5580i.

Tallgrass, 11100 W. 82nd St., Overland Park, Kan. 66214.

■

Distributed Logic Corp. (Dilog) has introduced the **DQ226** controller board that allows Digital Equipment Corp. users to connect one or two storage module drive-compatible disk drives to any of DEC's Q-bus computers.

The controller features Dilog's Universal Formatting system that permits the attachment of drives that have different performance characteristics without having to configure the controller to handle the various drive types.

The DQ226 is compatible with storage module drive disk drives made by Ampex Corp., Control Data Corp., Century Data Systems, Inc. and others. The controller offers full 22-bit Q-bus addressing and is capable of handling transfer rates up to 2.5M bit/sec.

It is priced at $1,990.

Dilog, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Terminals

Tatung Company of America is set to introduce the **CM-1376** high-resolution red-green-blue analog color monitor at the Comdex/Fall '85 show.

The monitor was designed for use with the IBM Professional Graphics Adapted Card and is compatible with the IBM Model 5175 color monitor.

The CM-1376 features a 13-in. screen and offers a palette of more than 4,096 display colors. Resolution is 640 by 480 pixels.

The CM-1376 is priced at $999.

Tatung Company of America, 2850 El Presido St., Long Beach, Calif. 90810.

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Your Connection to Industry Networks

There are also cases where an industry benefits from the efficient exchange of information.

In the property and casualty insur-

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Ampex Corp. is introducing at Comdex/Fall '85 the **Ampex 219** and the **Ampex 220**, two Digital Equipment Corp.-emulating VDTs.

The Ampex 220 is fully compatible with the DEC VT220 terminal, and the Ampex 219 is compatible with the DEC VT100 terminal. Both feature programmable, color-coded function keys; a detachable/adjustable keyboard; and a choice of green or amber 14-in. screen.

The Ampex 219 is priced at $649, and the Ampex 220 costs $749.

Ampex, 401 Broadway, Redwood City, Calif. 94063.

Printers/plotters

Minolta Corp. has introduced its **Minolta Computer Assisted Retrieval (Mincar)** system.

The system allows for both data entry of documents into the computer and automatic retrieval of data on the Minolta RP 505 plain-paper reader-printer. Mincar incorporates Minolta reader-printers and the Micro Auto 16 planetary recorder with Mincar software, operational in a variety of IBM and Digital Equipment Corp. environments, including the IBM Personal Computer XT and AT, IBM Series/1, IBM System/36 and DEC VAX.

Prices range from $6,000 to $60,000, depending on the configuration.

Minolta, 101 Williams Drive, Ramsey, N.J. 07446.

Output Technology Corp. is introducing the **OT-700E** dot matrix printer at the Comdex/Fall '85 show.

The OT-700E is an enhanced version of the company's OT-700. It operates at 700 char./sec. It was designed for use with micro, mini and mainframe host systems. The printer offers 350 char./sec. correspondence-quality printing; dual-mode addressable graphics and front-panel menu programming; as well as an 8K-byte buffer; IBM character set; Epson America, Inc. Epson FX and Digital Equipment Corp. LA-120 emulation; and multipitch printing.

The OT-700E costs $1,995.

Output Technology, Bay 33, 9922 E. Montgomery Drive, Spokane, Wash. 99206.

Graphics systems

Vidar Systems Corp. has announced its **Model 4220** image processing scanner.

The 4220 converts graphics images on paper to digitized electronic form for computer storage, manipulation and retrieval. At any point in the process, the image can be reconverted to hard copy. The process takes 30 seconds, according to a company spokesman.

The Model 4220 costs $69,900.

Vidar Systems, 520 Herndon Pkwy., Herdon, Va. 22070.

Power supplies

Intecolor Corp. has introduced an **autoranging power supply option** for its 14-in. **color graphics terminals**.

The optional power supply allows terminals to operate over wide voltage and frequency ranges without using switches and jumpers.

The price for quantities of 100 is $90 apiece.

Intecolor, 225 Technology Park, Norcross, Ga. 30092.

■

Isoreg Corp. has introduced the **Isoshield** line of **computer power isolators**.

The three-phase line incorporates power surge protection with step-down transformer action and three-phase power distribution for shielding computers from voltage spikes and surges.

The computer power isolators are available in 13 three-phase power ratings from 6 kVA to 300 kVA. Representative prices are $2,480 for the 30-kVA model, $6,100 for the 75-kVA model and $16,100 for the 300-kVA model.

Isoreg, P.O. Box 486, Littleton, Mass. 01460.

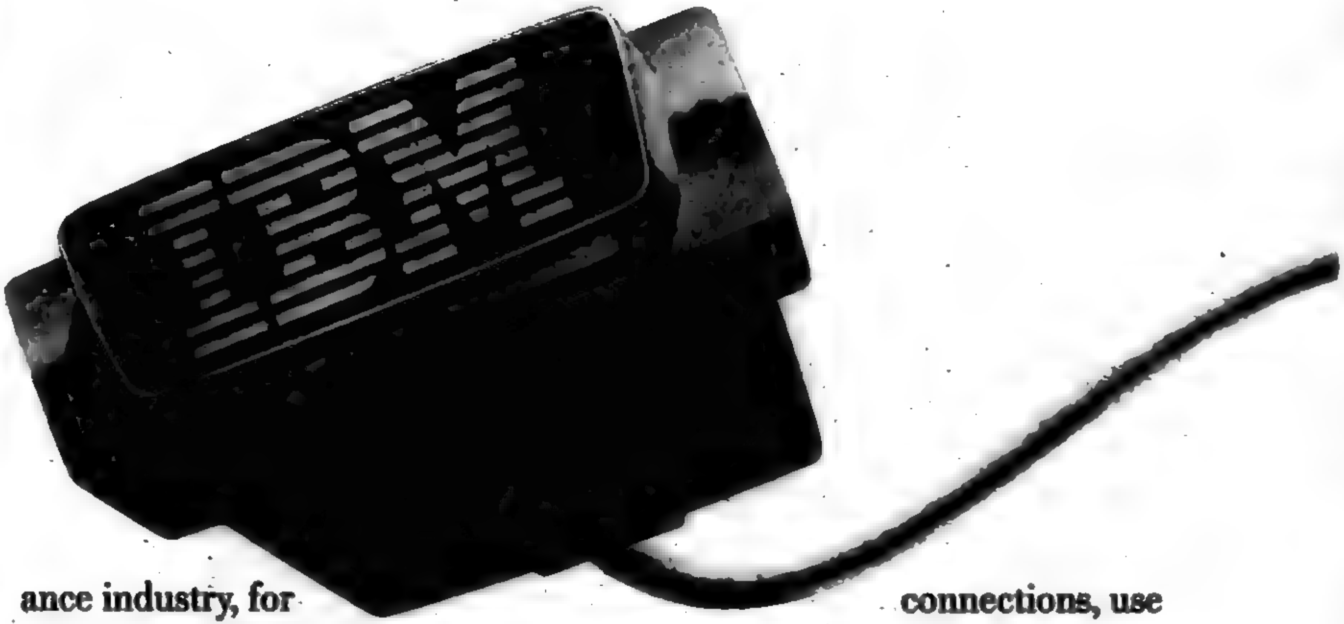
■

Single and multiple output 1,200W **switching power supplies** are available from **Computer Products, Inc.**

The power supplies provide remote inhibit, remote margining of the main output and remote sense on all outputs. Single-, dual-, triple- and quadruple-output configurations are offered.

The power supplies cost from $1,075 for single-output models to $1,295 for quadruple-output models.

Computer Products, Power Conversion Group, 2900 Gateway Drive, Pompano Beach, Fla. 33069.



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NEWS

CALL FOR PAPERS

MUMPS USERS' GROUP 16TH ANNUAL MEETING
San Diego, June 9-13

Papers and demonstrations/presentations are solicited in all topic areas applicable to MUMPS.

The deadline for submission of papers is Dec. 2, and they should be sent to MUMPS Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

CUSTOM INTEGRATED CIRCUITS CONFERENCE
Rochester, N.Y., May 12-14

The Custom Integrated Circuits Conference is sponsored by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) Electron Devices Society; the IEEE Rochester Section; and the IEEE Solid-State Circuits Council.

Original papers are solicited in the following areas: computer-aided design — device and process modeling, circuit simulation, logic simulation, fault grading, testability analysis, layout verification and very large-scale integration design aids; gate arrays, standard cell and full custom integrated circuits — trade-offs and design techniques, CMOS, N-channel MOS, bipolar and gallium arsenides; applications — digital signal processing integrated circuits, smart power integrated circuits and smart sensor integrated circuits; and fabrication technologies — silicon and nonsilicon, mixed processes and direct wafer writing.

Deadline for submission is Dec. 2. Papers should be sent to Roberta Kaspar, Executive Secretary, Custom Integrated Circuits Conference '86, Ledgewood Drive, Rochester, N.Y. 14615.

SIGPLAN '86: SYMPOSIUM ON COMPILER CONSTRUCTION
Palo Alto, Calif., June 23-27

Authors are invited to submit papers on all aspects of programming language translation.

Topics of interest include solutions to specific language translation problems, new techniques for compiling specific language families, techniques for retargetable and rehostable compilers, code optimization techniques and their practical effects and compiler generation tools.

Summaries must be received by the program chairman by Dec. 1. Summaries should be sent to Stuart I. Feldman, Room 2D-396, Bell Communications Research, 435 South St., Morristown, N.J. 07960.

LIGHTNING CONFERENCE
Dayton, Ohio, June 21-24

This conference is being sponsored by the National Interagency Coordination Group of the National Atmospheric Electricity Hazards Protection Program in conjunction with the Florida Institute of Technology.

Papers dealing with research and protection of aircraft, helicopters, aerospace vehicles, ships and ground facilities against the atmospheric electrical hazards associated with lightning and static electricity may be submitted.

Papers are due no later than Dec. 13. Authors submitting papers should direct them to Conference Chairman Lawrence Walko, U.S. Air Force, AFWAL/FIESL, Wright-Patterson Air Force Base, Ohio 45433.

ELECTROMAGNETIC COMPATIBILITY
San Diego, Sept. 16-18

This Institute of Electrical and Electronics Engineers, Inc. International Symposium is seeking unpublished papers on all aspects of electromagnetic compatibility.

Suggested topics include, but are not limited to, the following: analysis, control, design, electromagnetic environment and electromagnetic pulse, ESD, filters, instrumentation, theory, lightning, magnetics and materials.

Prospective authors should submit abstracts by Dec. 13 to the Technical Paper Chairman, Edward Skomal, Aerospace Corp., MS:M4/937, P.O. Box 92957, Los Angeles, Calif. 90009.

THE 24th ANNUAL MEETING OF THE ASSOCIATION FOR COMPUTATIONAL LINGUISTICS
New York, June 10-13

Papers are invited on all aspects of computational linguistics, including, but not limited to, pragmatics, discourse, semantics, and syntax; understanding and generating spoken and written language; linguistic, mathematical and psychological models of language; and phonetics and phonology.

Papers are due Jan. 6 and should be submitted to Alan Biermann, Program Chair, Department of Computer Science, Duke University, Durham, N.C. 27706.

INTERNATIONAL CONFERENCE ON COMPUTER VISION AND PATTERN RECOGNITION
Miami Beach, June 22-26

The Institute of Electrical and Electronics Engineers, Inc. Computer Society has announced a call for papers for this international conference. Conference topics include, but are not limited to, three-dimensional vision; image understanding systems; geometrical reasoning systems and robot vision; edges, lines and contours; texture analysis and reconstruction; vision hardware; pattern analysis; and applications of computer vision.

Submission deadline for long and short papers is Jan. 7. The deadline for poster presentations is Feb. 4. Papers should be submitted to Prof. Michael Brady, Department of Engineering Science, Oxford University, Parks Road, Oxford OX1 3PJ England.

SIXTH INTERNATIONAL WORKSHOP ON EXPERT SYSTEMS AND THEIR APPLICATIONS: CONFERENCE AND EXHIBITION
Avignon, France, April 28-30,

Original papers are now being sought for this Sixth International Workshop. Papers are solicited in all areas relating to expert system technology.

All papers are due by Jan. 15.

Contact the Workshop Chairman, Jean-Claude Rault, Agence de l'Informatique, Tour Fiat-Cedex 16, 92084 Paris-La Defense, France.

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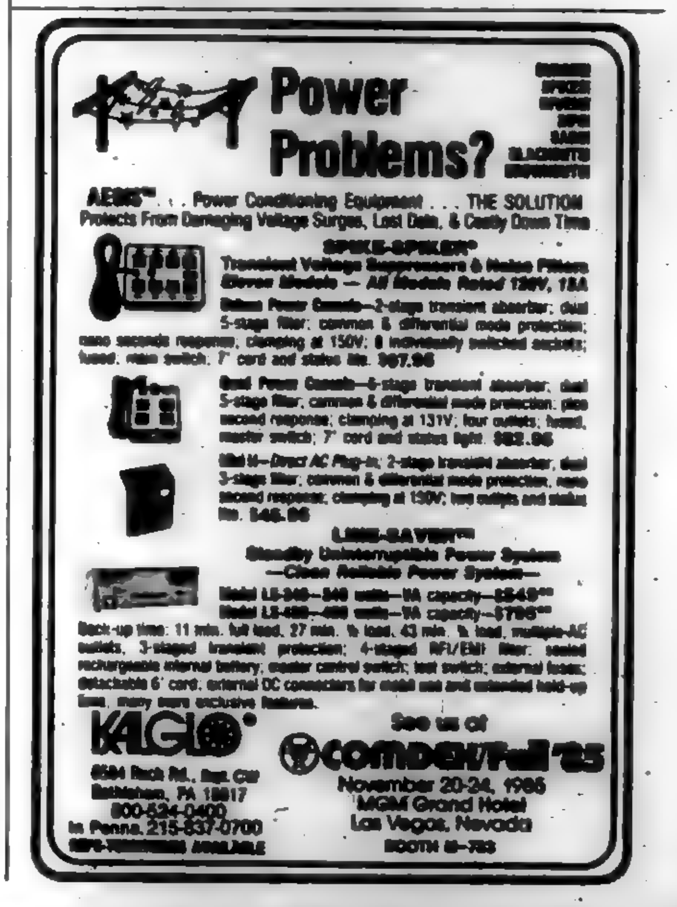

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The time has come
for straight talk about
database management systems.

"The only reason to buy a database management system is to build better applications."

Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEO's of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

John J. Cullinane
Chairman of the Board

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The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of online and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/1, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS

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CALENDAR

WEEK OF DECEMBER 8

DECEMBER 8-11, CHICAGO — **1985 Fall Industrial Engineering Conference.** Contact: Stephanie Starr, Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

DECEMBER 9-10, BOSTON — **Systems Analysis & Design for the HP 3000.** Contact: Charles Volz, Volz Associates, 34 Undine Ave., Winthrop, Mass. 02152.

DECEMBER 9-10, DALLAS — **Third Annual Microcomputer Conference.** Contact: Financial Managers Society, Inc., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

DECEMBER 9-10, LOS ANGELES — **Introduction to VSE/SP 2.1 for Systems Programmers.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 9-10, ORLANDO, FLA. — **Satellite Communications.** Contact: TMSA Seminars, c/o Technology Training Corp., P.O. Box 3608, Dept. SATCOM, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held Dec. 12-13 in Washington, D.C.

DECEMBER 9-10, SOMERSET, N.J. — **Writing Management Reports.** Contact: Mary Ann Cluggish, Information Mapping, Inc., 275 Wyman St., Waltham, Mass. 02154. Also being held Dec. 11-12 in Somerset and Jan. 7-8 in Boston.

DECEMBER 9-10, WEST PALM BEACH, FLA. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 9-11, SAN FRANCISCO — **Telecommunications Management.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 9-11, WASHINGTON, D.C. — **Financial Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

DECEMBER 9-13, LOS ANGELES — **Telecommunications and Communications Engineering Program.** Contact: University of California at Los Angeles Extension, Department of Engineering and Science, P.O. Box 24901, Los Angeles, Calif. 90024.

DECEMBER 9-13, MIAMI BEACH, FLA. — **The 2nd Conference on Artificial Intelligence Applications.** Contact: Trade Associates, Inc., Exposition Management, Suite 200, 12250 Rockville Pike, Rockville, Md. 20852.

DECEMBER 9-13, NEW YORK — **VTAM for Practitioners.** Contact: Judith Anderson, American Data Group, Inc., 3685 Woodberry Drive, Duluth, Ga. 30136.

DECEMBER 10-11, WASHINGTON, D.C. — **T-1 and Virtual Networks.** Contact: Telestrategies, Inc., P.O. Box 811, 1355 Beverly Road, McLean, Va. 22101.

DECEMBER 10-12, COLUMBUS, OHIO — **EASE Authoring Workshop.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 10-12, PHILADELPHIA — **1985 Videodisc, Optical Disk & CD-ROM Conference/Exposition.** Contact: Jean-Paul Emard or Marilyn Reed, Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

DECEMBER 10-12, TOKYO — **Interface in Japan.** Contact: Peter B. Young or Linda M. Yogel, The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

DECEMBER 11-13, ANAHEIM, CALIF. — **Dexpo West '85 — The Eighth National DEC-Compatible Exposition.** Contact: Carol Henderson, Expoconsul International, Inc., 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

DECEMBER 11-13, WEST PALM BEACH, FLA. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 12-13, BOSTON — **PC as a Programmer/Analyst Workstation.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

DECEMBER 12-13, DALLAS — **Troubleshooting the Data Communications Networks.** Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940. Also being held Dec. 19-20 in Boston.

DECEMBER 12-13, SAN FRANCISCO — **Financial Analysis for Telecommunications Equipment Acquisition.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 13, DALLAS — **MIS/DP/Telecommunications Consultants.** Contact: Barbara Moosehekian, Infomart, 1950 Stemmons Freeway, Dallas, Texas 75207.

WEEK OF DECEMBER 15

DECEMBER 16-18, NEW YORK — **Data Analysis & Logical Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

DECEMBER 17-19, WASHINGTON, D.C. — **System 2000 Applications Programming Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

DECEMBER 19, COLUMBUS, OHIO — **DOS/VSE Working with Shared DASD.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT
Clinton Wilder
CW Senior Editor

Lessons for the big boys

It is a rare week when the top executives of both the world's largest and second largest computer companies publicly share their views on the state of the industry. Such an event occurred two weeks ago, with IBM's John Akers addressing British securities analysts in Scotland two days before Digital Equipment Corp.'s Ken Olsen spoke to his company's shareholders an ocean away at DEC's annual meeting in Boston.

Both men showed an unbridled optimism for the long-term growth of their companies, albeit tempered by discouraging predictions that the industry slump will probably linger on through most of 1986. But what is interesting to note is that neither Akers nor Olsen said he believes the "Great Slump of '85" has signified a fundamental change in the nature of the industry.

"Is our industry suffering from more than a cyclical slowdown?" Akers asked rhetorically. "Are we seeing major structural changes, a decline in total demand? . . . The answer is, 'No.' Our industry has always been driven by scientific and technological progress. . . . I am convinced those same forces will continue to drive our industry in the years ahead."

Ah, technology to the rescue once again. Ken Olsen feels the same way. In Olsen's view, if MIS managers aren't beating a path to Maynard, Mass., for Microvax IIs, VAX 8600s and "the Digital style of computing," it's not because of cautious capital spending; it's because "we're not getting our message across."

In a statement that raised a few press conference eyebrows, Olsen essentially claimed that DEC's superior technology and system connectivity — and make no mistake, most of it is truly impressive — make the company immune to economics. In a slow growth period, he reasoned, the VAX line will gobble up market share; and when

See LESSONS on page 146

DEC's IBM micro coming

Olsen: A more costly, more functional machine

By Clinton Wilder

BOSTON — Digital Equipment Corp. will introduce its first completely IBM-compatible microcomputer and will continue to push its Ethernet networking capabilities in the coming year, DEC President Kenneth H. Olsen said at the company's recent annual meeting.

DEC President Ken Olsen

Olsen said DEC's forthcoming Microsoft Corp. MS-DOS-based micro, which is currently in the testing stage, came in response to DEC customer pressure for an IBM-compatible machine. Most industry observers felt DEC's Rainbow personal computer failed because it lacked that compatibility, although Olsen blamed its demise on DEC "trying to go after a retail market that didn't appreciate quality."

"We won't sell an IBM clone, and we won't target it to retail customers," Olsen said of the new machine. "We will satisfy our customer needs." He added that the system will be both more functional and more expensive than the IBM Personal Computer but would not comment on what microprocessor chip will drive it. He also declined to reveal when the product would be announced.

The bulk of Olsen's remarks to company shareholders was devoted to the networking capabilities of DEC's VAX product line. In the face of the slowdown in U.S. capital spending continuing through 1986, Olsen said DEC's goals are to increase its market share and to "make our networking the common approach in the industry."

Olsen shrugged off the effects of his own predictions that the computer industry will remain sluggish throughout next year and that the recent weakening of the dollar will have little positive effect. "We're in an ideal situa-

See DEC on page 151

INSIDE

Massachusetts Computer Software Council's purpose appears obscure/136

New U.S. Department of Defense procurement regulations are not welcomed by computer vendors that want to protect proprietary information/144

INSTANT ANALYSIS

"The growth of third-party and other maintenance alternatives is making the service sector of the computer industry more like automobiles, consumer electronics and even heavy industry."

— John T. Harnett
director of industry services, Customer Service Division, TRW
during a recent CW interview

[illegible]

Apollo plugs into IBM

Apollo Computer last week signaled its intent to tap its workstation technology into the IBM mainframe environment. The Chelmsford, Mass.-based company said it will make a $3 million equity investment in Spectragraphics Corp. of San Diego. Additionally, the companies signed an $800,000 product development pact for Spectragraphics to provide a hardware and software gateway for Apollo's Domain products to plug into IBM hardware.

■

The semiconductor industry saw a possible sign of recovery last week as the San Jose, Calif.-based Semiconductor Industry Association announced that the book-to-bill ratio climbed to a year-high 0.82 in October. The 0.06

See BUSINESS on page 152

Worldwide data protection eyed

By Bryan Wilkins

WILLIAMSBURG, Va. — Information technology in developed and developing countries is "truly a transnational force, a disruptive force," according to Alan Westin, a professor of political science at Columbia University and a leading authority on the political implications of technology.

Westin was a featured speaker at a recent conference titled "International Information Economy," which addressed the issues of transborder data flows and privacy protection of data. He cited the experience of Hong Kong, which last year introduced an electronic car registration and monitoring system that set off a fight in the city over privacy. As a consequence, the Hong Kong government is expected to enact the first data and privacy protection law this year.

Westin also cited Japan, which has formed a commission to draft the nation's first privacy and data protection law within the next two years.

See WORLDWIDE on page 152

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Mass. software council meets amid high attendance, enthusiasm

Group searching for clear identity

By John Desmond

NEWTON, Mass. — Its first meeting started with a lament about a newspaper story that said software does not work, and it proceeded to employ a slogan that has no clear basis in fact.

Thus, the Massachusetts Computer Software Council was formed.

Enthusiasm was high and attendance of some 250 people was impressive at the software council's meeting attended by the press. An identity for the group was anything but clear.

Some observers saw it as a liberal counterbalance to the conservative Massachusetts High Technology Council. But, said council member Mitch Kapor of Lotus Development Corp., "We had no mention of politics here today."

But the group did invite as its first speaker Massachusetts Gov. Michael Dukakis, a liberal Democrat preparing for reelection next year.

Recalling a story on software bugs from a major Wall Street daily newspaper, Kapor expressed hope that the new council could act as a "responsible and noninflammatory counterweight" that could be "more fair than some of what we've seen in the press" toward software companies.

Reason for slowdown

Such misunderstanding and confusion among consumers is one reason for a slowdown in the personal computer industry, he asserted. According to council founder Eric Vogt, president of Micro Mentor, Inc., a personal computer education company, "Massachusetts is the software capital of the world." When asked by *Computerworld* for the basis of that assertion, Vogt said it was not technically checked out.

Bureau of Labor Statistics data, according to John Hatch, director of communications of the Palo Alto, Calif.-based American Electronics Association, shows that California has 33,704 people employed in the production of software, while Massachusetts has 12,231. Both Virginia and Maryland employ more people in the production of software, 17,106 and 17,495, respectively, than does Massachusetts.

The number of companies employed in the production of software, as of June 1984, totals 1,940 in California and 517 in Massachusetts. New York is home to 1,038 software firms and Virginia, 691.

"I wouldn't say there is a software capital," Hatch said. "It's spread throughout the high-technology centers in the country."

Several in the press questioned why the software council was not formed as a subcommittee of the Massachusetts High Technology Council, which has 160 member companies representing 250,000 employees.

> *'The software capital is spread throughout the high-tech centers in the country.'*
>
> — John Hatch
> American Electronics Association

According to Vogt, "The High Technology Council has a lot to deal with already. Their plate is full."

High Technology Council President Howard P. Foley said no one had ever suggested to him that a special software subcommittee of his group be formed. "That might have made more sense. I have a feeling it would have been unanimously endorsed," Foley said.

The High Technology Council, which concentrates on policies regarding spending, taxation and education, is known as a conservative group in Massachusetts politics.

Perhaps the Software Council founders were trying to counter the image of high technology in the state as a conservative political force. "I think there's a grain of truth in that," Foley said. As far as Massachusetts being the software capital of the world, Foley said, "I hope they're right. And if we are, I hope we stay that way."

Common interests

The first president of the Massachusetts Computer Software Council, John Cullinane, president of Cullinet Software, Inc., said the organization was founded to further common interests of software companies. "There has always been a hardware myopia; software has been taken for granted," Cullinane said. "The software industry is unique and has its own needs."

Dukakis said for the software companies to reach consensus on certain issues would be helpful to state government. "The more you are a part of an organized effort, the better it will be for us," he said.

A number of ideas for what services the software council could offer were suggested by those attending. Ideas included a hot line resource service, a committee to evaluate business plans, help for start-up companies, a regional survey of compensation levels and personnel practices, help for firms considering overseas branches, an employment council to help find skilled workers, and an ombudsman council to resolve differences between companies and between clients and vendors.

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Market showcase to be built

By Mitch Betts

WASHINGTON, D.C. — Developers have broken ground for construction of the $250 million Techworld facility, a marketing showcase for information technologies in the nation's capital, much like Infomart in Dallas.

The first phase of the project, including two-thirds of the World Technology Trade Center and a hotel, will be completed by late 1987, according to officials of Washington, D.C.-based International Developers, Inc.

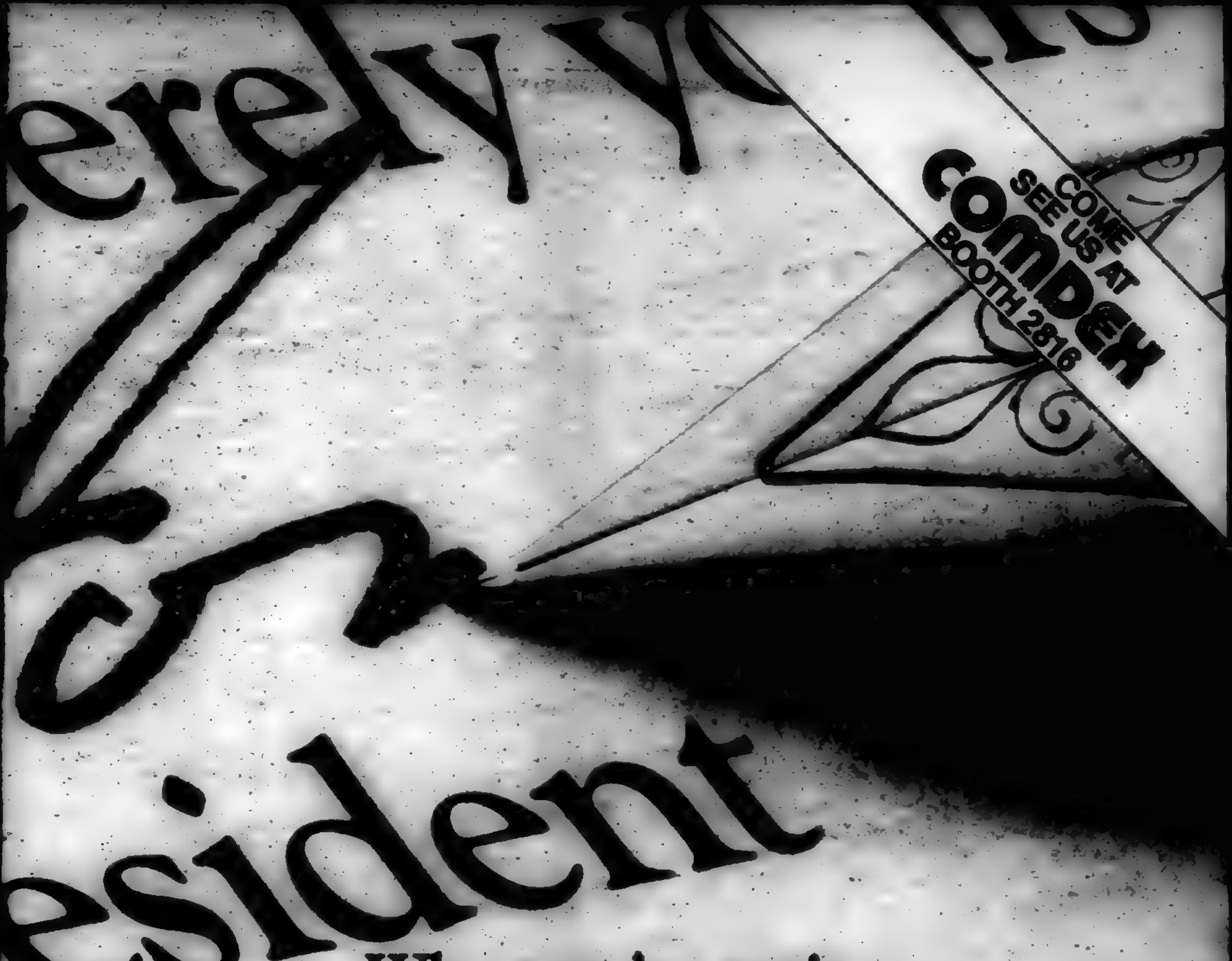
Techworld officials hope that the location of the four-acre site — next to the Washington Convention Center and close to government agencies — will be the facility's drawing card for vendors and buyers.

"There is no better location for it than right here in the world's largest and best marketplace," boasted Alan Bogatay, senior vice-president for marketing.

Oliver Smoot, executive vice-president of the Computer and Business Equipment Manufacturers Association, said the trade group views Techworld "both as a way to enhance public understanding of our industry and as an exciting marketing and educational opportunity."

In addition to the trade center, with 960,000 sq ft of showroom and office space and a 140,000 sq-ft conference center, the Techworld development includes an 800-room convention hotel, restaurants, shops, a technology museum and underground parking. The project is scheduled to be finished in early 1989, officials said.

Developers said Techworld will be equipped to house vendors' marketing and customer support offices.



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ITC rules in favor of U.S. chip manufacturers

By [illegible]

WASHINGTON, D.C. — U.S. semiconductor companies have suffered at the hands of Japanese chip makers practicing predatory pricing policies on erasable programmable read-only memory chips, the International Trade Commission (ITC) ruled recently.

The ITC's unanimous 5:0 ruling came earlier this month, about two months after semiconductor companies Intel Corp., National Semiconductor Corp. and Advanced Micro Devices, Inc. filed a petition asking the ITC to investigate instances of alleged dumping of Japanese chips in the U.S. market.

The case is one of several avenues now being pursued by U.S. companies to remove trade barriers with Japan. In June, the Semiconductor Industry Association (SIA) filed a petition with the U.S. Trade Representative's Office seeking relief from what it called discriminatory trade practices by Japan. That petition is still pending.

Key to the chip makers' argument in the ITC and SIA cases is a memo acquired from Japan's Hitachi Ltd., instructing its sales force to undercut U.S. chip prices by 10%. The Japanese countered U.S. allegations by arguing that because the U.S. exports chips for completion, there essentially is no U.S. chip market.

Before any action can be taken against Japanese firms, however, the ITC case must be heard by the U.S. Department of Commerce. Should the Commerce Department concur with the recent decision, the ITC can implement measures that could include imposing duties on Japanese chip imports.

A ruling from the Commerce Department is expected by March, and a final determination of the issue could come by July.

Silicon Valley semiconductor companies said they were pleased by the ITC ruling, while Japanese firms remained hopeful regarding the ITC indication that it would attempt to clarify further the definition of imports.

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ComputerLand, CW Communications, and The Computer Museum are working together to bring these early relics out of your attic and into the collection of The Computer Museum. The museum is especially looking for kit machines, prototypes, programs, output, newsletters and memorabilia of early computing from around the world. A selection of the finest items will be used to create an exhibit on the evolution of personal computers and a catalog highlighting the Museum's collections. If your submission is accepted for addition to the Museum collection, you will be invited to the grand opening of the exhibit and will receive a bound edition of the catalog. If your item is selected as one of the five best "finds", you will also receive an all-expense-paid trip to Boston for the grand opening party.

So, get up to the attic, down to the cellar and into your closets, and tell us what you find! Call or write the Museum for an official entry form, or send a photo and description of your items by March 1, 1986 to: The Computer Museum, Personal Computer Competition, 300 Congress St., Museum Wharf, Boston, Massachusetts USA 02110, (617) 426-2800, Telex: 62792318.

ComputerLand
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Entries will be judged on significance, rarity, date, completeness and condition. Items particularly sought include pre-1980 machines, early serial numbers (get those number 1's out), machines made for purchase outside of North America (even modern machines are sought in this category); first releases of software such as first releases of operating systems, languages and mass-marketed and original applications; and pre-1980 photographs, newsletters, manuals and other records. The Computer Museum is a private non-profit educational institution. All donations are tax-deductible according to the provisions of the Internal Revenue Service. Thinker Toys is a registered trademark of George Morrow & Morrow Designs, Inc.

Agencies get poor ratings for security

By Mitch Betts

WASHINGTON, D.C. — On a scale of one to 10, computer security at federal agencies would rate a five or six, the U.S. House Committee on Science and Technology was told recently.

Computer systems in the U.S. government are highly vulnerable to abuse, destruction, error, fraud and waste, according to William S. Franklin, associate director of the information management and technology division of Congress' General Accounting Office (GAO).

At a committee hearing chaired by Rep. Dan Glickman (D-Kan.), Franklin said that of the 25 critical computer systems the GAO studied, none had a well-balanced computer security program that combined the management and technical controls recommended by government standards.

The survey found that only 10 systems had audit trails or logs and only nine had contingency plans that were tested; for three systems, there were no requirements that passwords be changed.

Glickman is holding a series of hearings on computer security in the government, using the testimony to build a case for legislation (H.R. 2889) that would require agencies to provide computer security training for employees.

At Glickman's request, the GAO studied 25 civilian computer systems, using criteria developed by the National Computer Security Center, the National Bureau of Standards, the U.S. Office of Management and Budget and the GAO.

The study focused on the government's most important systems, such as those at the Federal Aviation Administration, the Federal Reserve System and the Social Security Administration, Glickman said. The agencies responding to the survey were promised anonymity, Franklin said, so that their specific vulnerabilities would not be publicized.

Only five of the computer systems were protected by all of the physical, technical and administrative safeguards deemed necessary, Franklin reported. And most agencies did not have important management controls in place, such as a complete risk analysis, he said.

Agency officials frequently cited lack of management commitment and lack of funds as reasons for the shortcomings, Franklin said.

In many cases, the government agencies had partially implemented a security program but had not met all of the criteria that the security experts established. For example, the GAO survey found that 19 of the agencies had some sort of training, but only two had developed a formal, full-scale training program.

On the positive side, most agencies had a security officer, a computer security policy document and a password and user-identification system, had conducted a security audit and required badges for entry to the computer facility, the GAO survey showed.

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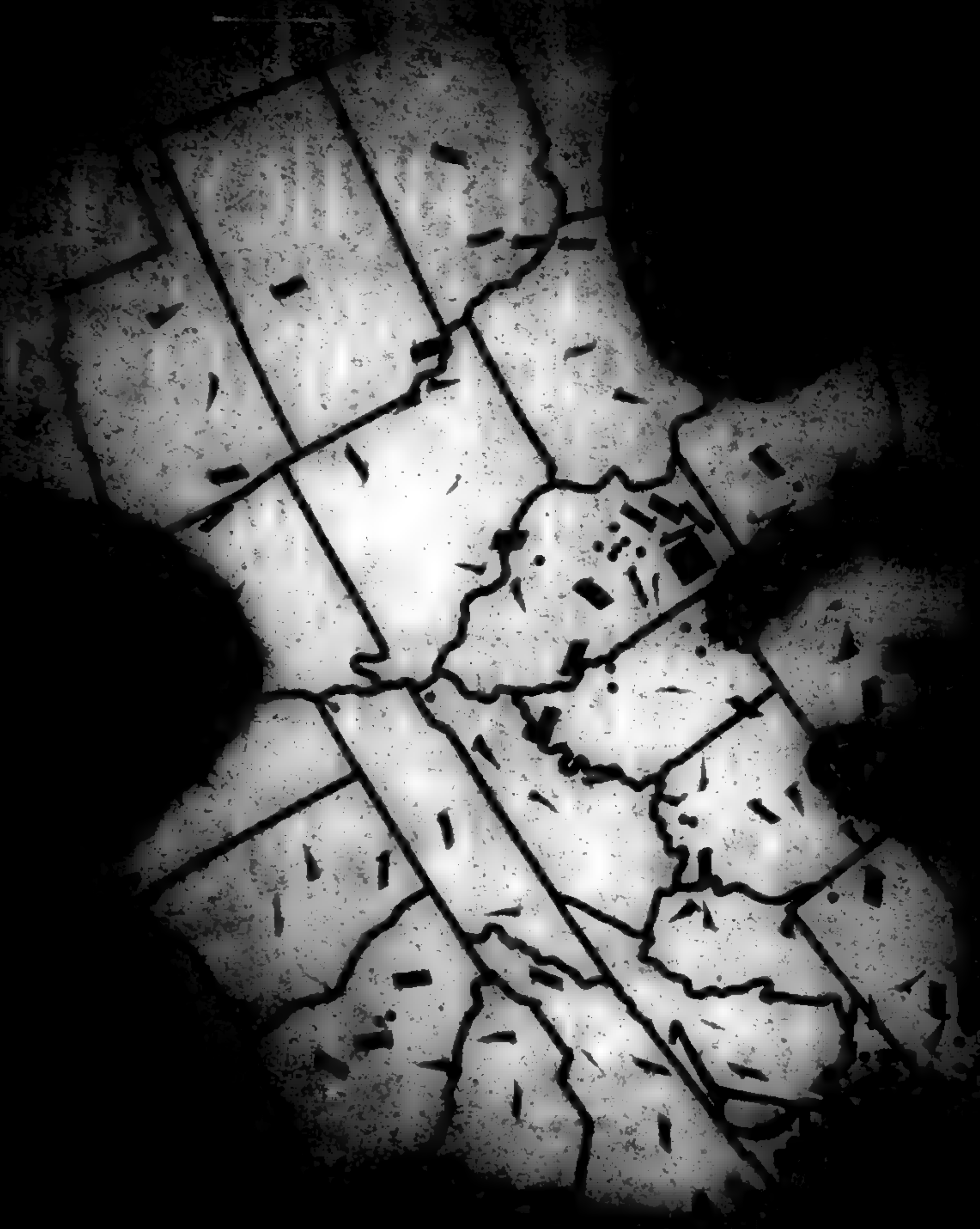

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Vendors blast Pentagon's high-tech procurement regulations

Rules require review of price, technology

By Mitch Betts

WASHINGTON, D.C. — The computer industry feels that the Pentagon has gone too far this time, and it is fighting back.

The industry is miffed about new U.S. Department of Defense regulations that require vendors to turn over their pricing and technical data for review when the Pentagon buys hardware and software.

"The . . . rules are viewed as stepping beyond congressional intent and giving away the farm," said a research bulletin from International Data Corp.'s (IDC) Washington, D.C., division. "Industry is pulling out the stops to make itself heard on the matter," it added.

At issue is the way the U.S. Congress and the Pentagon are trying to combat the procurement "horror" stories about spare parts overcharges. The Pentagon recently issued regulations to implement the Defense Procurement Reform Act of 1984, a legislative response to such notorious cases as the $7 hammer that cost the Pentagon more than $400.

The goal of the legislation and the regulations is to give Pentagon buyers all of the cost and technical data needed to evaluate procurements and to give that information to vendors so that, via reverse engineering, they can compete for future contracts.

But the computer industry argues that the regulations are too broad, because they lump commercial products in with the unique products that are sold to the military based on the vendor's cost claims.

> *'The rules are viewed as stepping beyond congressional intent and giving away the farm.'*
>
> — IDC report

"Unfortunately, we see today a growing confusion, a blurring in the minds of some regulators between procurement policies appropriate for cost-based products on the one hand and for commercial products on the other," according to Vico E. Henriques, president of the Computer and Business Equipment Manufacturers Association.

Henriques, testifying at a recent congressional hearing, argued that the new procurement rules "seem to be abandoning the idea that government seeks the lowest price that competition can reasonably produce and replacing it with the concept that government has the right to dictate commercial prices or gain access to the commercial suppliers' costs."

These new demands may gradually force the industry to scale back its dealings with the government, Henriques warned.

May affect prices

Also, the paperwork costs of the regulations may force vendors to raise the prices of their commercial products for all customers, simply because the government is a buyer, he indicated.

Henriques said the procurement scandals involved unique, military-specified products, not commercial products. He said the government has the right to scrutinize the cost claims of defense contractors, since their profits are based on a percentage of their development and manufacturing costs, to prevent profiteering at the taxpayers' expense.

But the prices of commercial products "are based on a highly competitive commercial marketplace, which determines what is a fair price," Henriques testified. The commercial price includes research and development costs for new products and a contribution to company profits as well as development and manufacturing costs, he said.

Henriques blasted the new Pentagon rules as "regulatory overreach" that would violate the propriety of commercial product information and called for legislation requiring different treatment for commercial and unique products.

IDC and other sources said the Pentagon plans to revise the regulations. Henriques welcomed these moves, but urged the Pentagon to develop a better relationship with commercial vendors. "A cooperative dialogue could go a long way toward avoiding the confrontational environment that has enshrouded government procurement in the past year," he said.

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Bell Atlantic calls on Justice to review AT&T divestiture

NEW YORK — Bell Atlantic Corp., stung by the Federal Communication Commission's approval of new high-volume services to be provided by AT&T, services that may bypass its own facilities, recently called on the U.S. Department of Justice to open a review of the AT&T divestiture terms and conditions.

Thomas Bolger, chairman and chief executive officer of Bell Atlantic, told a meeting of New York security analysts that the FCC's approval of tariffs for AT&T's Megacom and Software Defined Network in effect legalized bypass.

Megacom and Software Defined Network are services aimed at connecting large and small businesses directly to AT&T switches.

FCC theory overturned

Bolger said the FCC's theory — and the assumption of the divestiture that the local telephone company's control over the local exchange created a bottleneck — had been overturned, justifying removal of the restrictions on the regional holding companies to provide solely local-exchange telephone service.

Phil Campbell, president of Bell Atlantic Network Services, also said the company would file a petition in the next two weeks with the FCC, seeking relief from rules barring it from combining local telephone service with its marketing of telephone equipment.

If granted, the petition would provide relief similar to that recently granted to AT&T.

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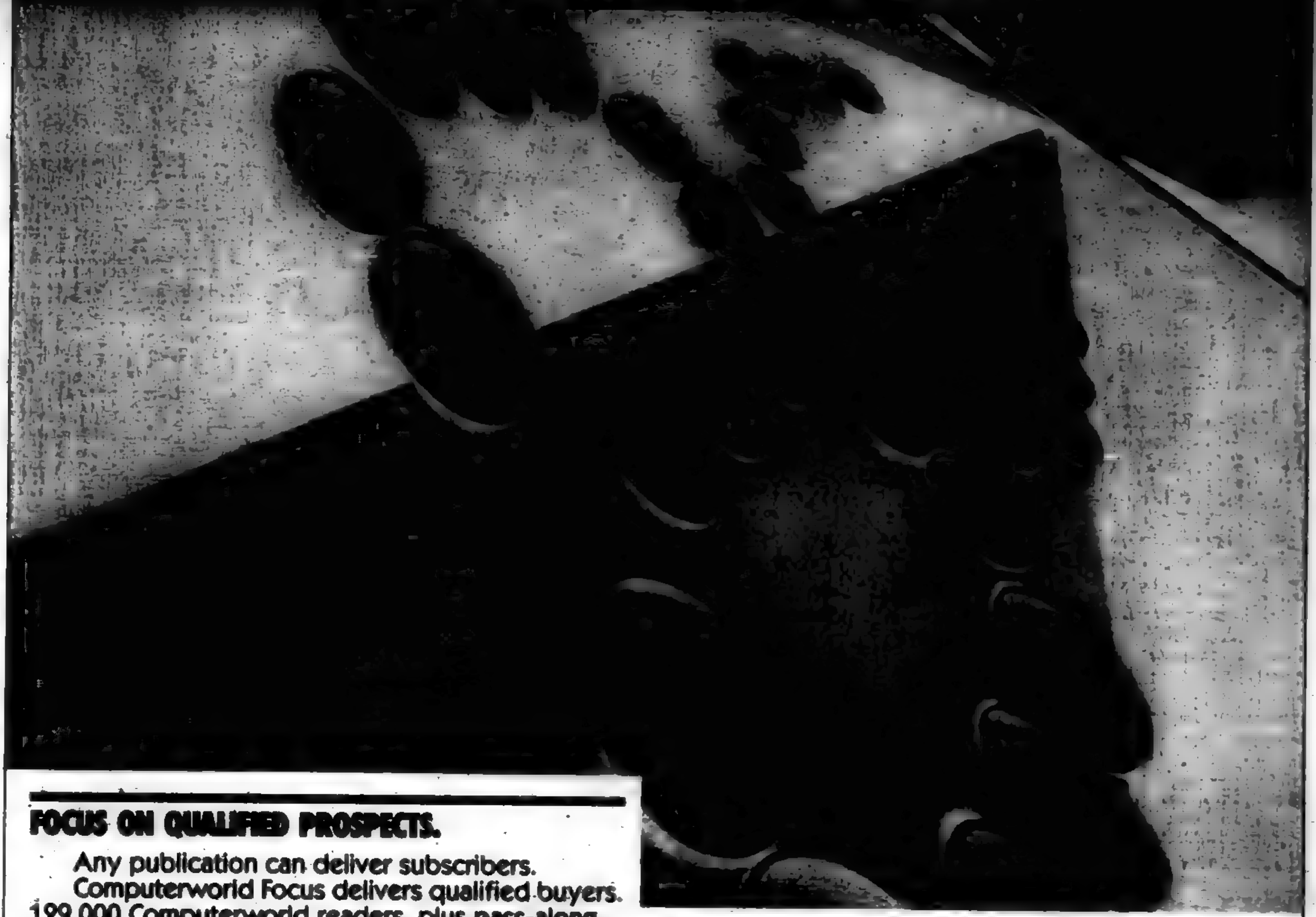

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But hurry, the closing for the January 15th Communications issue is December 6th.

Computerworld Focus Topic	Issue Date	Closing Date*	Show Distribution
Communications	January 15**	December 6	Comnet
Software	February 19	January 10	
Manufacturing	March 19	February 7	Advanced Manufacturing
Microcomputing	April 16	March 7	Comdex/Spring '86
Office Automation	May 14	April 4	NCGA, NCC
Software*	July 9**	May 30	PC Expo, Software Expo
Unix™	August 20**	July 11	Unix™ Expo
Communications	September 17	August 8	TCA
Office Automation	October 8	August 29	Info '86
Microcomputing	November 12	October 3	Comdex/Fall '86

* Premium positions close one week prior to the published closing dates above.
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COMPUTERWORLD FOCUS

We Put The Hottest Issues Of The Day In Focus.

Smithsonian seeks financial support for computer exhibition

By Mitch Betts

WASHINGTON, D.C. — Officials from the Smithsonian Institution recently announced plans for a major museum exhibit on computer and communications technology to be opened in 1989 and have begun an unprecedented effort to raise $4.3 million from the industry to fund the project.

The 12,000 sq-ft exhibition hall will replace and dramatically expand the admittedly outdated computer exhibit now at the Smithsonian's National Museum of American History, officials said. More than five million tourists visit that museum every year.

"We at the Smithsonian propose to take the lead in helping the American people understand the origins and implications of information technology and the information revolution, which are affecting their lives," Smithsonian Secretary Robert McC. Adams said.

Adams and U.S. Rep. Norman Y. Mineta (D-Calif.) immediately began talking with representatives of such firms as IBM, Honeywell, Inc., AT&T, Burroughs Corp., NCR Corp., Texas Instruments, Inc. and Lotus Development Corp. to solicit funds, equipment and advice.

Adams said the Smithsonian would retain all control over the content of the exhibit and its messages to avoid any bias toward the contributing manufacturers.

Officials said the Smithsonian has thousands of historical items relating to information technology, including an original Hollerith punched card tabulating machine used for the 1890 U.S. census; the ENIAC electronic computer of 1946; the UNIVAC I and early compilers of the early 1950s used for general-purpose data processing; the IBM 650 of the mid-1950s; and the Altair 8800 of 1975, which launched the decade of personal computing.

But Adams and Roger Kennedy, director of the National Museum of American History, stressed that the exhibit will be more than equipment and labels. They said the exhibit will be interactive with computer terminals that answer inquiries and permit hands-on demonstrations.

Kennedy said the information will be presented at several knowledge levels, so the exhibit will be educational for novices as well as the computer literate.

Furthermore, officials said the exhibit will stress the social conditions that prompted the development of information technology, the personalities involved and the effects of computers on society.

The museum also hopes to keep the exhibit up to date by following the activities of research laboratories around the country, officials added. In a decade or so, the "Information Revolution" exhibit may be spun off into a full-fledged museum on information technology, they said.

Smithsonian officials denied that their project competes with The Computer Museum in Boston [CW, Oct. 14]. They said the Smithsonian has a friendly relationship with the Boston museum and that the two efforts are complementary.

"It belongs on the Mall in Washington," Adams said of the proposed computer exhibit.

"That doesn't mean [computer technology] doesn't belong in other science museums around the country, but this is a national responsibility," he said.

> ”
>
> *'We at the Smithsonian propose to take the lead in helping the American people understand the origins and implications of information technology.'*
>
> — **Robert McC. Adams**
> **Smithsonian Institution**

Lessons for the big boys

From page 137

overall demand rebounds, orders will go through the roof.

DEC does have the chance to prove Olsen right over the next couple of quarters, as the VAX 8600 and especially the Microvax II move into peak product cycle. But so far, while DEC's results have been favorable vis-a-vis its competitors, it has not surpassed year-earlier results. Most major industry players, most notably IBM, have not been able to do that in 1985.

That is just the point. There are a lot more factors that drive computer demand than the latest technological wizardry, even with a product as impressive as Microvax II or as long anticipated as Sierra.

Twelve months ago, it might have been hard to convince the high-flying computer industry of that. But after three or four quarters of industry news ranging from slower growth rates to devastating losses, the lessons should have been learned. For a long list of reasons technology does not sell itself anymore.

DEC's new products have given the firm modest success in 1985; IBM is banking on Sierra — and its patchwork quilt of price cuts and price increases — to deliver a brighter fourth quarter. But these successes will be relative to the overall condition of an industry whose best days are behind it.

That is not, however, a picture of gloom. There will be plenty of future growth in the computer industry, and there will indeed be companies, with the right combination of niche, product and marketing, that will double or triple quarterly earnings from year to year.

But the computer industry has turned a major corner in 1985. IBM and DEC may not be facing the same type of challenges as Control Data Corp., Wang Laboratories, Inc. or Data General Corp., but they, too, must live in a postboom, maturing computer business world. The companies that recognize the limits of that world after a year of turmoil and shakeout are the companies best prepared to prosper within it.

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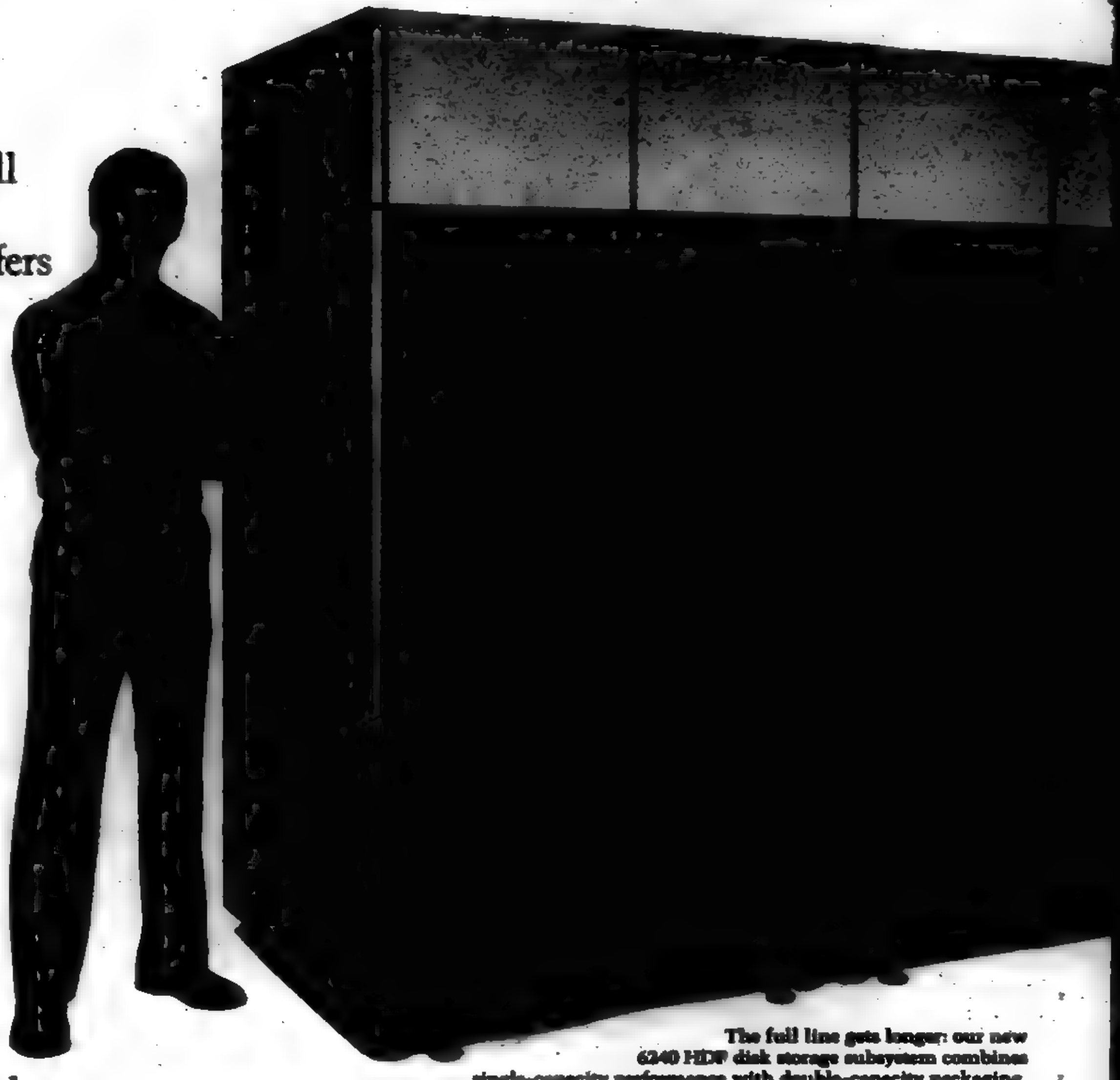

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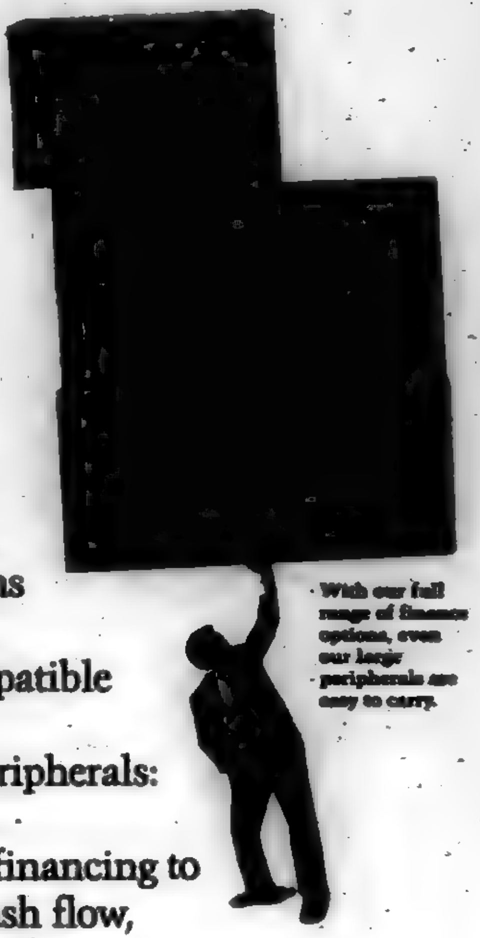

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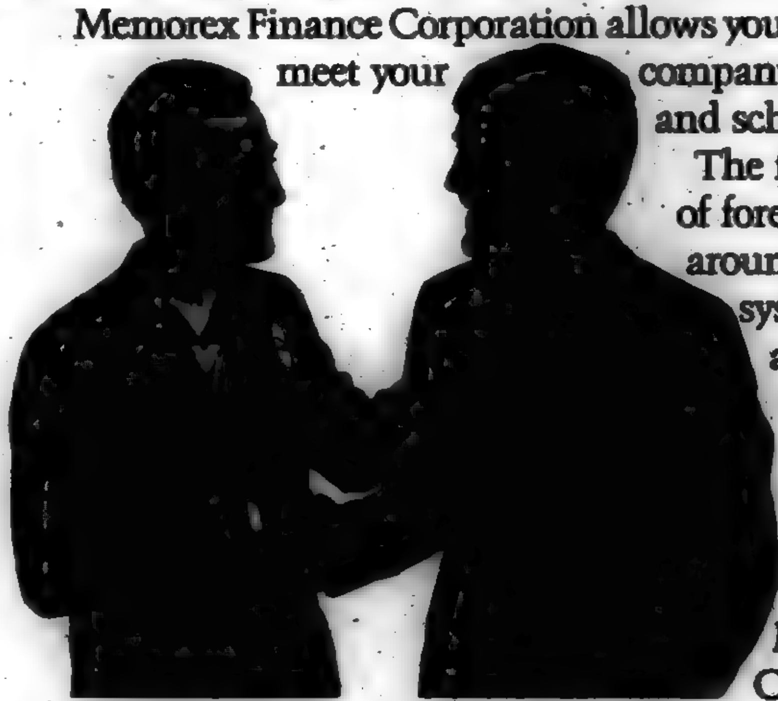

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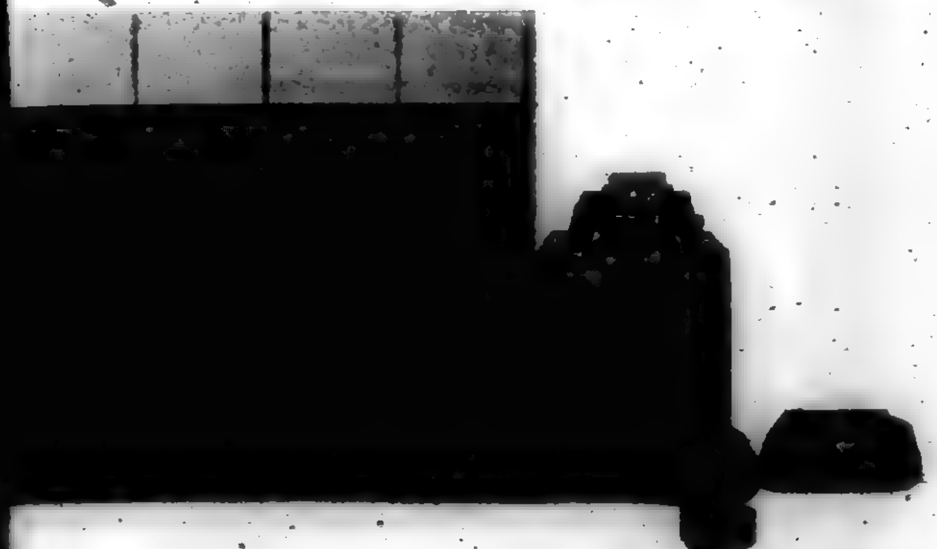

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Disclaimers may not protect vendors from suffering liability

OUTSIDE LINES
L. J. Kutten

It seems everybody in the computer industry is putting disclaimers and limitations of liability on products regardless of whether the product needs it.

I recently received a book from Scott Foresman and Co. titled *Microsoft Basic Programming for the Mac.* It contained a "Notice of Liability" that stated neither the author nor Scott Foresman "shall have any liability to [the] customer or any other person or entity with respect to any liability, loss or damage, caused or alleged to be caused directly or indirectly by the programs contained herein. This includes . . . loss of business or anticipatory profits or consequential damages from the use of the programs."

And what kind of book could cause such losses? According to the author, it was a beginner's book in Basic programming. While it contained a multitude of short programs that explained fundamental concepts of Basic programming techniques, there was nothing in the book or programs that could cause either the author or publisher to suffer liability.

Not alone in disclaimer use

Scott Foresman is not alone in using disclaimers. They can be found in books and software regardless of their nature or complexity. I even heard of a disclaimer in an educational program designed to teach preschool children to recognize numbers and letters.

Why computer vendors use these disclaimers on all their products is beyond comprehension. Contrary to public opinion, in many instances, the disclaimer or limitation of liability is not worth the paper it is written on in the event litigation occurs.

First and foremost, a disclaimer has no effect on an express warranty. All too often vendors assume an express warranty can only be created by them making an express promise to a buyer. They are mistaken. A statement of fact made in an advertisement, an instruction manual and so forth is an express warranty. Take the case of Consolidated Data Terminals vs. Applied Digital Data Systems, Inc.

Speed not up to claims

The defendant marketed the Regent 100 terminal with advertised specifications of 19.2K bit/sec. The terminal could not work at that speed, and the specification was lowered to 1,900 bit/sec. When sued, the defendant argued that "the warranty disclaimer clause incorporated into each . . . contract negatives any other . . . promises contained in oral or written descriptions of the goods or in promotional literature." The court disagreed. Since the statements regarding the terminal's 19.2K bit/sec. capability were an express warranty, they could not be disclaimed as a matter of public policy.

Second, a limitation of liability has no effect if it fails its essential purpose. Assume the contract says the vendor shall repair or replace the defective software or hardware, and he is unable to. In such event the limitation fails. In RRX Industries vs. Lab-Con, Inc., the defendant agreed to provide a working medical laboratory software package for $40,867.

When it failed to correct the bugs, it was sued. The court disregarded a contract provision limiting damages to the amount of the contract and awarded additional damages of $6,364 for overtime spent by the plaintiff trying to get the software to work and $1,142 for additional costs.

Finally, vendors should be aware that the doctrine of unconscionability limits their ability to contractually limit their liability. In recent years a trend has appeared in computer cases where the court examines the parties relative computer sophistication rather than their commercial sophistication.

Two cases

This trend is clearly seen in two cases, The Glovatorium, Inc. vs. NCR Corp. and Horning vs. Sycom.

In Glovatorium, the plaintiff was a small first-time computer user. It purchased an NCR Spirit/8200 computer system to do routine accounting.

The system failed to work, and Glovatorium sued NCR. The jury awarded compensatory damages of approximately $225,000 for intentional misrepresentation, $50,000 for breach of warranty and $2 million for punitive damages.

NCR defended on the grounds that the contracts contained disclaimers and limitations of liability. The trial court felt otherwise. It said that "if there is ever a reason for a holding

See DISCLAIMERS on page 157

Kutten is a member of the Missouri and Illinois bars and author of The Computer Buyer's Protection Guide, *published last year by Prentice Hall, Inc.*

DEC's IBM micro coming

From page 137

tion," he said. "If the economy is down, we'll gain a bigger market share; if it goes up, we'll do a higher volume. So we don't care either way."

But he acknowledged that DEC would fall short of its stated goal of a 22% return on stockholders' equity — which it has never reached — if economic doldrums continue. "It is a big challenge," he said. "With the products we have, we should have a simple set of components that will allow us to reach those goals. But we have to get our message across and exploit the technology we have now and the technology on the way."

Olsen said DEC has shipped about 1,000 of its VAX 8600 high-end superminis to date, and that greater than anticipated demand for the Microvax II has resulted in a six- to eight-week wait for orders. He said the microprocessor-based machine has cut into sales of older, more expensive VAX-11/730s and VAX-11/750s, as expected. "The plan was to wipe them out eventually," he said.

Olsen downplayed the significance of Data General Corp.'s forthcoming MV/20000, which DG will position against the 8600 with a higher million instructions per second (MIPS) rating. "MIPS is a strange game," Olsen said. "Software, not hardware, makes the real difference in speed. We aim not for a specific number [of MIPS] but for usefulness. That's what our customers want, and that's what we have. A few MIPS either way is not that important."

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Business notes

From page 137

jump from September was the highest month-to-month increase since February.

Association President Thomas Hinkleman said the figure represented an across-the-board improvement in orders for most categories of chips. Combined with a recent increase in distributor orders, Hinkleman said, the ratio indicates "a modest upturn in business for the near term."

Monthly orders for the three-month period ended in October were $506 million, an 8% increase from the previous three-month period but a 36% decrease from the year-earlier period.

The October book-to-bill ratio indicated that chip makers received $82 worth of new orders for every $100 in orders shipped.

■

Tandon Corp. has landed H. L. Sparks as its new senior vice-president for sales and marketing. In the past, Sparks headed successful sales organizations for the IBM Personal Computer and for Compaq Computer, a company Sparks has been with since 1983, most recently as vice-president of sales of Compaq Telecommunications Corp.

He spent 20 years at IBM, ending his Big Blue career as director of sales and service for the Personal Computer and as a member of the Personal Computer management team.

■

Despite a 156% gain in revenue, Trilogy Ltd. reported a 34% greater loss for its third quarter compared with year-earlier results. The beleaguered Cupertino, Calif.-based venture of Gene Amdahl posted a $7.1 million, 20-cent-per-share loss, compared with a loss of $5.3 million, or 14 cents per share, a year ago. The recent loss included a one-time charge of $4 million, or 11 cents per share, for discontinued development activities.

Revenue rose to $1.7 million from $662,000 in the third quarter of 1984. Most of Trilogy's revenue came from service contracts providing research and development on advanced systems interconnect and packaging technologies.

The third quarter included finalization of Trilogy's merger with Elxsi, a San Jose, Calif., supercomputer vendor.

Fourth-quarter and subsequent results for the two firms will be combined. In the third quarter, Elxsi lost $5.4 million on sales totaling $5.6 million.

■

Borland International's Turbo Pascal and Sidekick software received a potential boost recently when Borland signed a distribution agreement with IBM.

Big Blue will distribute the two low-priced IBM Personal Computer applications through its national accounts and national marketing divisions.

Worldwide data protection eyed

From page 137

"Both of these situations, in Japan and Hong Kong, illustrate the power of the technology to force a change in attitudes toward data protection," Westin said. "Both want to be a force in the worldwide data processing services industry, and both have developed a very positive idea that, in order to play in this market, they will have to enact standards governing the protection of data."

The conference on international information focused on the large multinational corporations that ship large volumes of data across borders without deterrence, while keeping within national data and privacy protection laws.

Peter Robinson, telecommunications advisor to the Canadian government, predicted that developing countries will move to assert some form of control over the intangible value of intracorporate data flow.

"There will be rules of the road for the transnational corporations, and there will be input from the corporations," said Robinson, who admitted there was a "lack of dialogue" between the developed countries and the developing countries.

"U.S. companies engaged in overseas business are simply unaware of the problem, in the main," according to Burnes Hollyman of the accounting firm of Peat, Marwick, Mitchell & Co. He said the lack of interest typifies the attitude in most organizations that communications and information are not part of the strategic assets of the company.

While data protection laws are being enacted by many countries that have previously been content with none, the sensitivity of data protection has assumed an economic and political importance in trade relations in Europe and the U.S. The foreign ministers of Europe, Japan and the U.S., comprising the Organization for Economic Cooperation and Development (OECD), recently added the issue of barriers to trade in services to their international trade agenda.

In the past, U.S. firms with offices in Europe have faced the possibility of national telephone administrations measuring the volume of intercontinental data transmitted on their private telecommunications lines.

Last April, the OECD adopted for the first time a declaration on transborder data flows that acknowledges the growing interdependence of the international information economy on their countries.

The OECD's transborder data flow subcommittee recently decided to study intracorporate data flows as one of its three main areas of concern, a decision denounced by the U.S. Computer and Business Equipment Manufacturers Association.

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States going on-line with criminal data

WASHINGTON, D.C. — Thirty-five states now have computerized criminal records, and the trend toward automation is continuing at a steady pace, according to studies by the U.S. Bureau of Justice Statistics.

"I am pleased that the state administrators [responding to the bureau's survey] report a significant and continuing improvement in the completeness and accuracy of their data bases," commented Steven R. Schlesinger, the bureau director.

"Effective crime-control measures depend heavily on the accuracy of criminal records," Schlesinger said. "We ought to be able to identify dangerous offenders at key decision points in the criminal justice system, for example, at pretrial release hearings and at sentencing," he added.

The bureau noted that nine years ago it had urged states to establish centralized criminal-history record centers; currently, all states have either done so or granted authorization for them, the bureau reported.

The bureau, part of the Department of Justice, said the findings are contained in two reports, NCJ-99017 and NCJ-93926.

— **Mitch Betts**

VDT educators air guidelines

By Mitch Betts

WASHINGTON, D.C. — The Center for Office Technology, a VDT education organization funded by computer vendors and users, recently released a set of guidelines designed to help employers provide VDT operators with a safe, comfortable and productive workstation environment.

The guidelines offer suggestions about adjustable workstations, lighting that reduces glare, vision care, alleviating the health concerns of pregnant employees, work breaks and exercises and the need for employers to provide a continuing flow of information about VDT work to all operators.

The center said it will distribute the three-page document to U.S. business leaders. "Appropriateness of these guidelines for specific work situations will vary, but we believe voluntary support of these principles by employers will benefit both employees and employers," commented Renee Ross, executive director of the center.

The center, along with the Computer and Business Equipment Manufacturers Association, has lobbied against government-mandated VDT standards.

Convergent invests in Baron

By Maura McEnaney

SAN JOSE, Calif. — Soon after the resignation of founder and Chairman Allen Michels and three other key employees, Convergent Technologies, Inc. announced plans to purchase 40% of systems integrator Baron Data Systems of San Leandro, Calif.

The $14.6 million investment gives Convergent two seats on the board of directors at Baron; however, the deal restricts any further investment in the company for three years. At that time, Convergent can make an offer to buy out the remainder of the shareholders, Baron said.

Convergent President Paul Ely told a group of financial analysts that the company intends to "build a federation of companies in selected vertical markets." Baron is the first of those companies, specializing in turnkey systems for the legal and medical professions. Baron's revenue for the six months ending Sept. 30 was $10.4 million, and profits were $400,000.

Convergent third-quarter revenue was $101.6 million, down slightly from $101.6 million a year ago.

OTA endorses privacy act

By Mitch Betts

WASHINGTON, D.C. — The U.S. Congress' Office of Technology Assessment (OTA), in a recent report, endorsed the Electronic Communications Privacy Act of 1985, a pending legislative proposal designed to outlaw the interception of data communications and electronic mail.

In a report titled "Electronic Surveillance and Civil Liberties," the OTA agreed with sponsors of the legislation that current federal law does not protect such communications. The OTA report said the major policy option available to Congress is to amend the federal wiretap law to give electronic messages the same privacy protection as phone calls.

The Electronic Communications Privacy Act of 1985 is sponsored by Sen. Patrick J. Leahy (D-Vt.) and Rep. Robert Kastenmeier (D-Wis.), with the support of the Electronic Mail Association and others [CW, Sept. 30].

The OTA report also expressed concern about the possibility of what it called data base surveillance. "As computerized record systems and data communications linkages become widespread, the potential for computer-based surveillance of the movements and activities of individuals also increases," the report stated.

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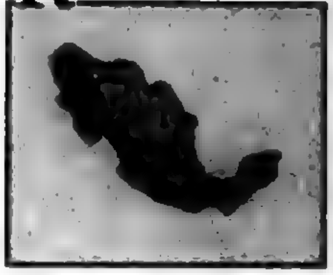

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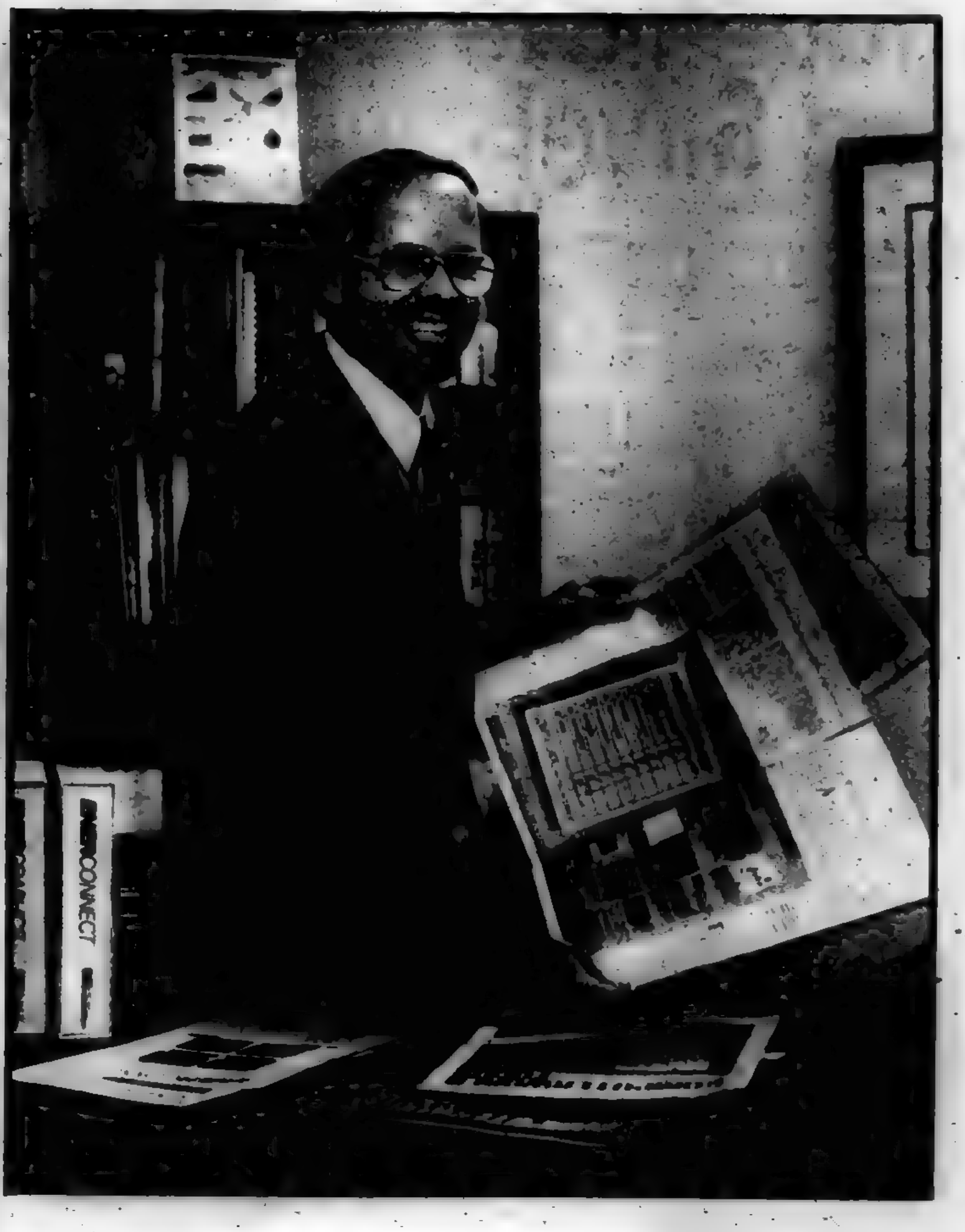

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Japanese insider on IBM, NTT

From page 1

ful domestic companies.

What does IBM stand to gain?

From the IBM side, their missing link is obviously telecommunications. They have now matched with Rolm Corp. and are very aggressively pursuing the telecommunications market. So technology and human resources from NTT would be very attractive to IBM.

The NTT-IBM deal appears to have happened so quickly. How long had you been laying the groundwork?

Though NTT was privatized on April 1 of this year, we have actually been preparing for this kind of liberalization of telecommunications for at least a year. First we planned on how to handle the liberalization of the value-added network market.

Is the definition of value-added network in Japan different from that in the U.S.?

In the U.S., the value-added network is usually a product of a reseller who adds value to a network and resells the lines rented from common carriers. In Japan, this type of network has much wider coverage, such as remote computing services.

In the U.S. and Europe, IBM dominates the computer market, but in Japan, IBM has only 28% of the computer business. NEC Corp., Fujitsu Ltd. and Hitachi Ltd. together have a 57% or 58% market share.

So, if you want to be in the value-added network business in the U.S., you can support an IBM interface — 3270 or other of their protocols — and cover 65% to 70% of the market. But if you want to do the same thing in Japan, you have to consider IBM evenly along with these three other companies.

Also, Japanese customers, especially in the big corporations, want a standardized network because they can't deal with a single vendor. The situation is so complicated that they have to think about the balance among the suppliers.

So why did NTT make this IBM deal?

We thought it neccessary to deal with at least these four companies to have the most effective and useful value-added network in Japan. We started this effort in November of last year and talked to executives of all four companies.

In the beginning, we had a fairly good reaction from all four companies. But after Mr. Takeo Shiina [president of IBM Japan] consulted with IBM's Asia/Pacific Group, we got a negative answer. The group's major concern was that if IBM Japan established a joint venture with the other three major mainframe makers, it might infringe on the antitrust laws. So the answer was, "Why don't you have a joint venture for value-added networks only with IBM?" We turned down that counterproposal.

What was wrong with that offer?

IBM has only 28% of the market in Japan, so we couldn't do that. But during our negotiations with them, we got the feeling that — although it was very difficult for IBM Japan to invest directly into a joint venture — if IBM and NTT had some other kind of formation, IBM Japan could invest into the value-added network company through that subsidiary. So we began talking to find out the appropriate subject for a joint undertaking.

Where did these talks lead?

We found the best product with which to do something jointly was the DCNA-SNA combined technology. Since December 1983 we have been conducting joint research with IBM to converge their Systems Network Architecture into NTT's Data Communications Network Architecture. DCNA is the standard network activity in Japan. We got the information from our laboratory that the product would be ready to go commercial by March of 1986. So we thought it was the right time to have a joint venture.

> **”**
>
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So the venture was done entirely at NTT's initiative?

I would say both. Dr. Hisashi Shinto, NTT president, and Mr. Shiina of IBM are very good friends. On many occasions they talked about general business, and it's also true that both were pursuing some kind of joint architecture.

And which company gets to manage this new business?

The president of this new company will be from NTT and the vice-president from IBM Japan.

Who will control IBM's side of the deal, IBM Japan or IBM in Armonk, N.Y.?

So far, it looks like IBM Japan will be in charge of the business. But if you are familiar with IBM's management style — the various strategies, pricing policies, the terms and conditions — all the major issues belong to the headquarters in the U.S.

Can two large companies from different countries cooperate like this?

I don't think it will create a problem, although it's true that there are many differences between the companies' corporate cultures. But I my-

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self have been involved in this deal for more than eight months. We faced many differences. My feeling is that we have a strong and determined mind; we can conquer anything.

Is the NTT management style very different from IBM's?

Yes, it's very different. We were formerly a government organization.

Can you comment on technologies that will come out of this deal?

The SNA-DCNA connection will be very important. But IBM still has the mentality that their world is the whole world. They don't like to interconnect to the other networks. But they can learn something from the Japanese market. Japan is truly a multivendor environment — so that will feed back to the strategy of IBM's head office and may have a very good effect for the whole operation of IBM. But we don't know. It's too early to tell.

The venture has set off criticism regarding monopoly and antitrust. How are you dealing with this?

So far, the reaction from Japanese companies is very emotional. We didn't announce the anticipated revenue for the next five years. But some of the preliminary numbers were divulged intentionally. For example, people know the revenue in 1990 will be around $400 million. If you think about the whole value-added network market in Japan, it will exceed $6 billion. So $400 million out of $6 billion — who could say it's domination or monopoly? But people are surprised by the number $400 million.

They think it's too much?

Most people think it's very big. It may be true, the whole market is currently $3 billion, so $400 million in five years looks very quick. But the market itself is now growing 20% per year or more. So, our estimation for the next five years is very moderate. I think it's curious to see the very strong reaction.

But you are two huge forces in the business, and the implications of the agreement are enormous.

Most of the major companies — say, the 40 biggest companies in Japan — usually buy the product and construct systems by themselves. But now, because of the increasing complexity of systems, they can't handle it by themselves. They are asking NTT to figure out the incompatibility. So our deal with IBM is basically aiming to satisfy and cope with the demand from existing customers.

Will you be buying more products from IBM because of this deal?

Yes, we want to purchase a lot more of IBM's products. We decided to purchase the new Sierra for software development. We are going to buy the IBM 5550, which is the version of the IBM Personal Computer in Japan. And we are very interested in the System/38, which is very nice.

Where will the major business for this new venture come first, inside or outside Japan?

Inside Japan. It's obvious.

We already have two orders from major city banks to do joint development activity with the new joint venture.

Disclaimers may not aid vendors

From page 151

that these provisions in these contracts should not be enforced because of unconscionability, this is the A No. 1 case." It noted that NCR had targeted "businesses that have never used computers before, who do not have any experience with them, and didn't know the consequences are of a defect and failure . . . to provide . . . adequate support." Since the company was dealing with a first-time computer user, NCR was under a special obligation to be fair in dealing with the user.

In Horning, the plaintiff challenged the forum selection clause in a software licenses agreement as unconscionable. The plaintiff was a solo practitioner dentist in a small Kentucky town who purchased a Tandy Corp. microcomputer. The licensed software was supposed to be able to assist him in compiling financial data, tax records, patient records and so forth.

After the system failed to operate, Horning filed suit in Kentucky for breach of contract, breach of warranties, negligence and fraud. The defendant attempted to remove the case to Wisconsin under the forum selection clause of the contract. In denying the defendant's motion, the Kentucky court stated:

"While the court cannot say that the defendant has engaged in overreaching, it does regard the clause as bordering on unconscionability as applied to the sale of an important piece of office machinery to a small businessman for the substantial purchase price. In the opinion of the court, there was a disparity of bargaining power with regard to the particular clause of the contract in questions."

The court further noted that "the forum selection clause is only one of many clauses in the sales contract that together represents the best job of boiler-plating since the building of the Monitor."

Unless the members of the computer industry wake up and act responsibly with regard to disclaimers and limitations of liability, they will find themselves shackled with state legislation affecting both the creation of and the disclaimers of warranties regarding their computers. Such an attempt was already tried this year in the state of California.

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Florida State University invites applications and nominations for the position of Director of the Computing Center. The Center, the focal point for all academic computing on the campus, has operated a CDC Cyber 760 and two CDC Cyber 730's for some time. Moreover, the Center operates a CDC Cyber 205 which will be upgraded to an ETA 10 in late 1986. Additionally, the Center provides various assistance services to faculty, staff and students.

Operating under the overall guidance of the Computing Center Policy Board, the Director arranges these capabilities, develops and implements strategies which promote Florida State's role as a major user and supplier of computing capability, and facilitates cooperation between groups involved in computing activities within the University. The Director reports to the Associate Vice President for Computer and Information Resources.

The appointee may qualify for a tenure track appointment in one of the academic departments. The appointee must evidence proven capabilities for successfully exercising the duties of the position. This may include such qualifications as experience as manager or director or equivalent of a multidisciplinary computing center in an academic or research environment, extensive personal experience in such settings, demonstrated ability to identify and activate sources of external revenue to help support University computing facilities, and ability to work with a diverse population to carry on the development of an outstanding computing facility. A proven background of extensive experience in operating systems, data communications, user support, budget management and vendor negotiation will be preferred.

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Nominations should be received by December 15, 1985. Applications must be received by January 15, 1986 to be assured of consideration, must include a current vitae and the names, addresses, and telephone numbers of at least three references, and are to be sent to: Dean Robert M. Johnson, Graduate Studies and Research, Florida State University, 408 Westcott, Tallahassee, Florida 32306.

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Analysis, design, programming, implementation & maintenance of computer applics. as they apply to various businesses. Utilize knowl. of PL/1, BAL, CICS, ADSO, IDMS/DB, TSO/ISPF. Hardware - IBM mainframe. 3 yrs. exp. or 3 yrs related programming exp. Bachelor's in Math. or Comp. Sci. $40,000/yr. 40 hrs/wk. [illegible] Corp. 420 Lexington Ave. NYC 10170. Send resume, Attn: C. Snelder.

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DATA PROCESSING

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IDMS Database Specialists

Involves database systems development, skills with related software products, proficiency in data management and data analysis, as well as data modeling and IDMS database design, ADS/O application development and support, and prototype-based database development. Will perform systems support for all client software product line (IDMS release 10.0) with some or all of the following skill areas:

- Data Analysis
- Data Dictionary Analysis
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Perform administrative functions in support of our RACF Security System. Involves user training, RACF problem resolution and project support. Knowledge of access control systems (RACF, ACF 2, etc.) plus application or systems programming desired.

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Design and develop computer security access control software products. Evaluate application and OS software packages to assure access control compatibility. Experience with all aspects of Assembly language programming as well as in-depth knowledge of OS/MVS internals required; IMS and RACF desired.

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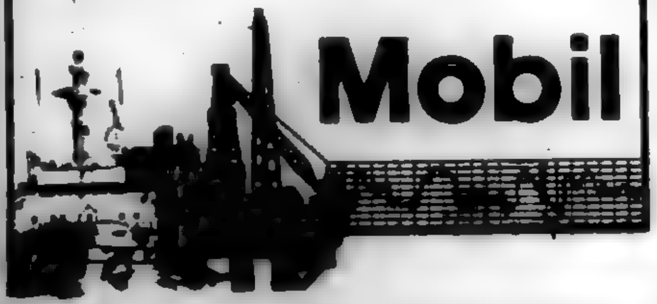

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[illegible]
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P.O. Box [illegible]
[illegible], SC [illegible]
([illegible]) [illegible]

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Currently recruiting experienced computer pros with background in any of the following: IBM COBOL Mainframe applications; Macro or Command CICS; AMAPS Progrs. & Analysts; IDMS P/A; HP 3000 COBOL; PCS applications with IBM Mainframe exper.; DEC VAX Systems Mgmt; Data Base Analysts and Specialists; MVS or VM systems programming; NOMAD OR Analysts; Datacom or Network Software; Software Engineering. Partial listing of the paid positions. Call or write:

The Underwood Group, Inc.
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(919) 782-3084

SENIOR COMPUTER SYSTEMS ANALYST wanted for design and development of distributed data processing systems using COBOL and DMS-II for Burroughs B-20 and B-1900 systems; interfacing between the B-20 and B-1900 computer systems; analysis and implementation of financial and itemized billing systems; assist users in systems design and application planning; analyze existing computer based systems and recommend improvements. Requires M.S. in Computer Science and one year experience; $32,000.00 per year; 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #63165. "Employer Paid Ad"

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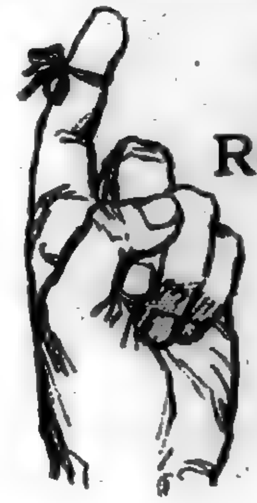

Just A Reminder!

COMPUTERWORLD DECEMBER 2nd issue

This is to remind you that Computerworld will be closing for the December 2nd issue on November 22nd, not the 20th as indicated on our Rate Card #19

COMPUTERWORLD DECEMBER 9th issue

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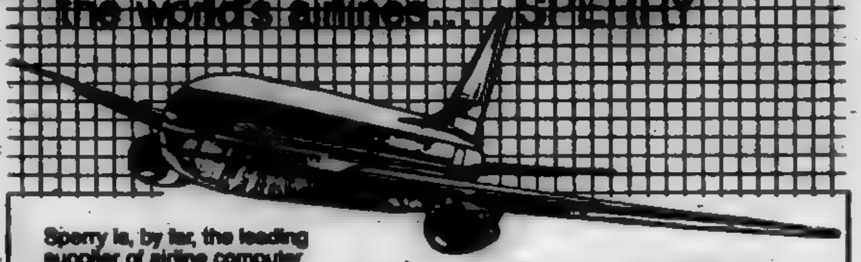

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International Division
Sperry Corporation
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P.O. Box 500
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AA/EOE

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We have a unique opportunity for an MVS Systems Software Programmer to assume a major role in our upcoming migration to MVS/XA. Requirements include 3 or more years experience providing software support for MVS and JES2. Experience supporting DOS/VSE, VM/CMS, CICS and previous DOS-MVS migration experience are all pluses.

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INTERGRAPH

Senior Scientific Programmer
REAL TIME CONTROL

The National Radio Astronomy Observatory, has commenced work on a new radio telescope array (Very Long Baseline Array), which will consist of ten antennas located in Hawaii, St. Croix and the continental U.S. We are presently seeking a computer professional who will collaborate with astronomers and engineers in developing an on-line, real-time monitor, control and data acquisition system for the array. The successful applicant will have a degree in computer science or astronomy (preferably an advanced degree) plus significant experience with real-time control software. Experience with astronomical instrumentation or data communications is desirable.

The position is based in Socorro, New Mexico. Occasional travel to the antenna sites may be required. For consideration please send resume and salary requirements to: D.L. [illegible], NATIONAL RADIO ASTRONOMY OBSERVATORY, P.O. BOX O, Socorro, New Mexico 87801-0387

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[illegible] Wilshire Blvd.
Suite [illegible]
Los Angeles, CA [illegible]

SENIOR COMPUTER SYSTEMS ANALYST wanted to conduct systems design studies on specific areas of manufacturing and PL/I, IMS, DB/DC, TSO/SPF and OS/JCL languages and software; recommend design changes and develop new systems; Requires M.S. in Computer Science and one year related experience as a Software Engineer/Analyst; $28,000 per year; 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #63086 "Employer Paid Ad"

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System Analyst. 40 hours per week from 8:30 AM to 5 PM at $13.[illegible] per hour. Responsibilities include: codes, tests, designs, debugs, modifies, and corrects errors in assigned application programs. [illegible] Third Floor, Chicago, Illinois [illegible]. [illegible] An employer paid ad.

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Develop computer aided design (CAD) database software systems. Research and evaluation of relational database model for its possible use in the CAD environment. Plan for the distribution of CAD system on a local network.

Requires MS degree in Computer Science. Requires coursework in database systems, computer network and advanced data structure with at least 6 months team oriented database project experience, including development of relational database, [illegible] Lisp Machines and Apollo workstation. Requires experience or knowledge of FORTRAN, PASCAL, C and Assembly language. Salary [illegible] per month.

Submit resumes to:

Mr. [illegible]
[illegible]
Minnesota Job Service
[illegible] Second Avenue South
Minneapolis, MN [illegible]

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IBM 38

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Applicants should have 2-3 years experience in system programming and a Degree in Computer Science or equivalent additional experience. Will have primary responsibility for the generation, maintenance and tuning of the VM and DOS/VSE operating systems on IBM 4381 and 4341 mainframe hardware. Must have knowledge in CICS and assembler language.

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State University of New York College at Oswego invites applications for the position of Director of its Administrative Computing Center.

It is expected that the Burroughs [illegible] system, which is currently in use, will be replaced within the next two years, so that the new director will complete the selection of hardware and be responsible for the installation of a management-information system. The director supervises fifteen employees and reports directly to the Executive Vice President/Provost of the College. In addition to assisting administrative users in developing an online data base, he/she will serve as one of the principal advisors to the Provost and the faculty in the development of campus computing resources.

The preferred candidate will have an appropriate Master's degree and three years experience working with a higher education management-information system. Salary is competitive. Women and minorities are encouraged to apply. Send letter, resume, transcripts and three letters of reference by December 15, 1985 to Dr. Donald R. [illegible], Acting Provost, SUNY/CO, Oswego, New York 13126.

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[illegible]

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St. Louis, MO [illegible]
(314) [illegible]

IDMS [illegible]

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Columbus, Ohio [illegible]

Refer J.O. [illegible]
Attn: [illegible]

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P/A - MVS, COBOL, CICS	[illegible]
P/A - MVS, AMAPS	to [illegible]
P/A - MSA	to [illegible]
P/A - HP3000	to [illegible]
S/P - MVS, Lower CICS	[illegible]
S/P - [illegible]	[illegible]
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Data Base Analyst - IDMS	[illegible]
Data Base Administrator - IDMS	to [illegible]
Technical Support Manager - MVS, IDMS, CICS	to [illegible]

For these and other openings call or send resume to [illegible], P.O. Box [illegible], [illegible], NC [illegible] - (919) [illegible] - Collect.

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[illegible]
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Anderson, South Carolina [illegible]
1-800-[illegible] (Collect)

Data Processing Technician

The Library of Michigan is seeking a highly motivated and experienced person to work independently and assume responsibility for all aspects of operating a one person data center. Primarily responsible for maintaining and operating a system on a daily basis.

Experience with IBM 4300 or S/370 computers and two years of programming in Assembler language is required. Minimum two years experience in DOS/VSE, CICS, operating system. Minimum 3 years of experience in data processing, including in-depth experience with: Assembler and data communications programming; on-line applications; system software generation, loading and maintenance; installation and maintenance of data communication equipment.

Salary: [illegible]-$18.20 per hour, plus excellent fringe benefits. Applicants should send resume to Personnel, Library of Michigan, [illegible] E. Michigan Avenue, Lansing, MI [illegible] by 30 November 1985. Equal Opportunity Employer/Equal Access Agency.

XEROX

Job Update

Business Systems Group

Where Careers Get Growing

Xerox Business Systems Group, a leader in the Office Systems and Electronic Printing Systems industries is growing. That means immediate opportunities for experienced professionals, all over Southern California. The following positions are available in San Diego, Orange County, the San Fernando Valley and the greater Los Angeles basin:

Systems Sales Representatives

Ambitious, aggressive individuals with at least 3 years direct sales experience in the data processing, word processing and/or distributed information industries. You should have a BS in a business discipline. Computer science or management information systems preferred.

Systems Analysts/Office Systems

You will conduct feasibility studies and provide technical and applications support. This is a key role in the marketing of Xerox systems. You should have at least 3 years experience working with office systems, data processing and/or electronic printing systems, with some application design and development experience. Data communications/telecommunications experience preferred. You should have a BS in computer science or management information systems.

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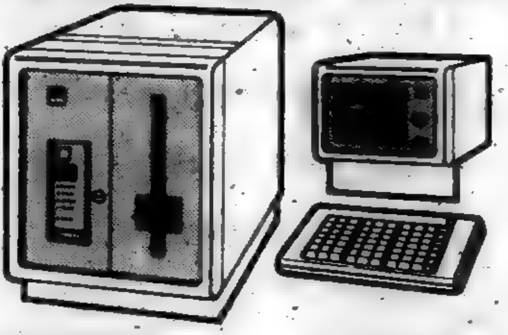

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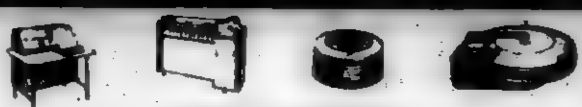

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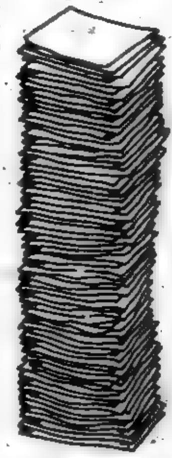

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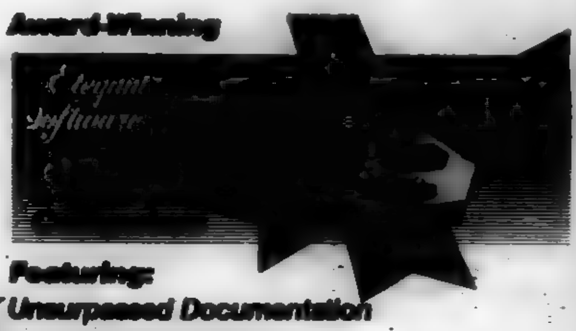

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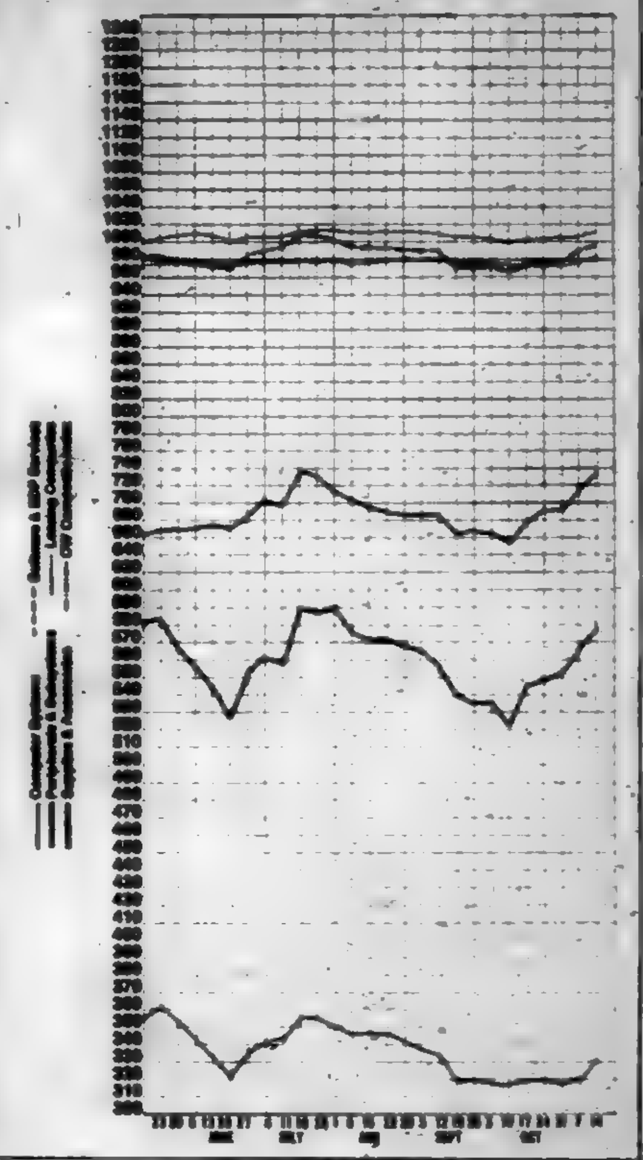

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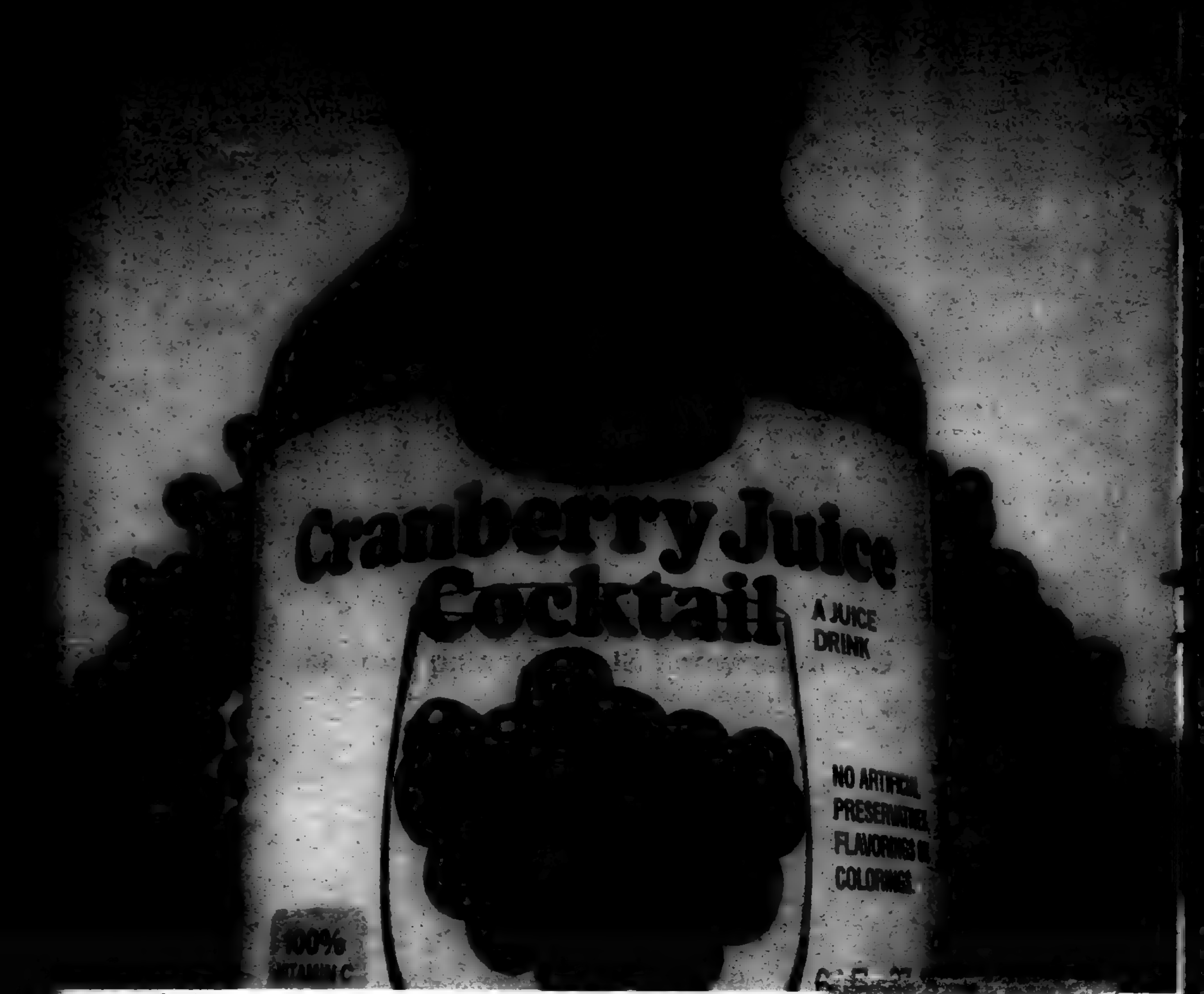
E X C H		PRICE 52 WEEK RANGE (1)	CLOSE NOV 13 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	LEASING COMPANIES				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	COMPONENTS				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

E X C H		PRICE 52 WEEK RANGE (1)	CLOSE NOV 13 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	PERIPHERALS & SUBSYSTEMS				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

E X C H		PRICE 52 WEEK RANGE (1)	CLOSE NOV 13 1985	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SUPPLIES & ACCESSORIES				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



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Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue the last week in December and the first week in January by CW Communications/Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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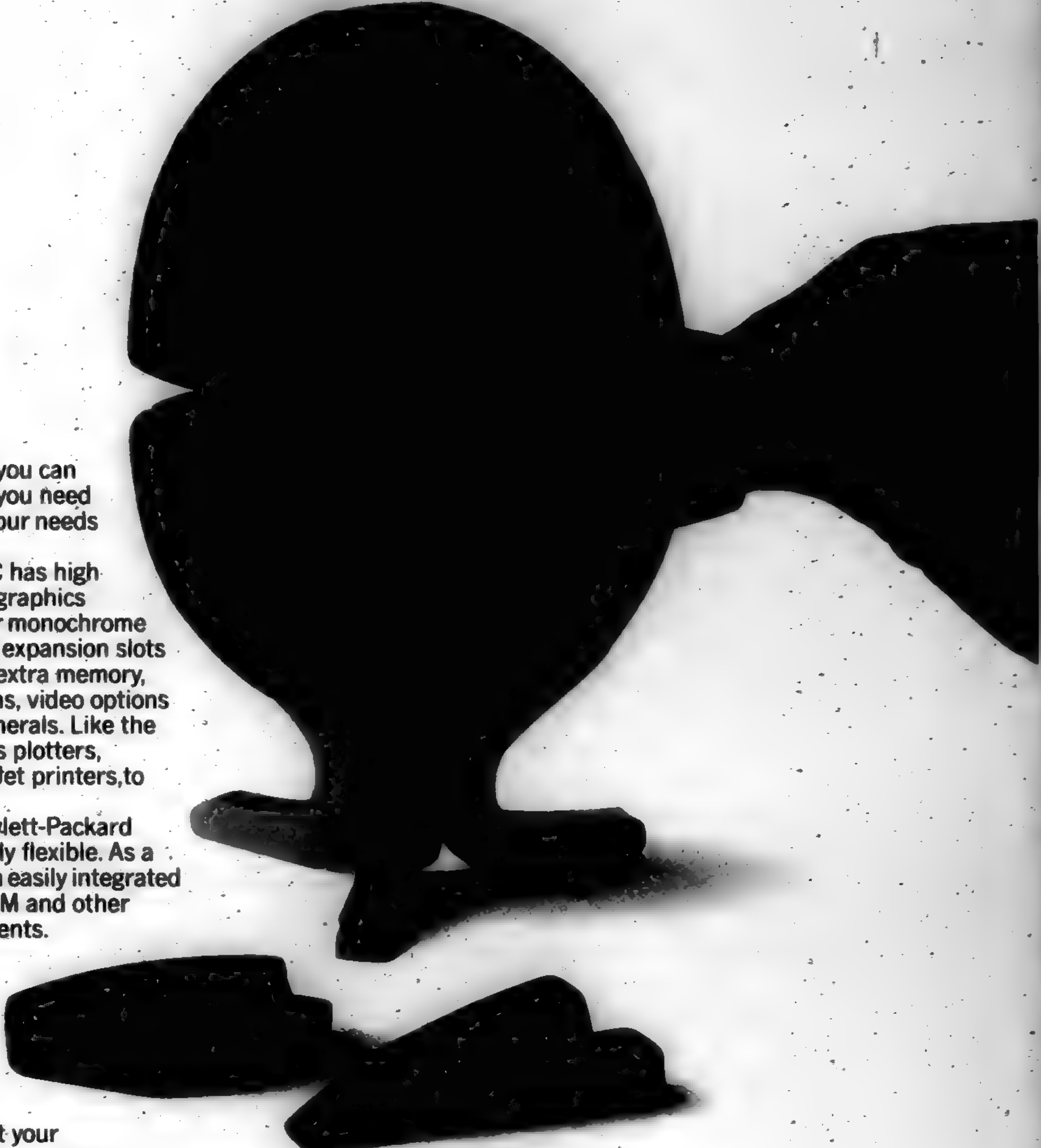

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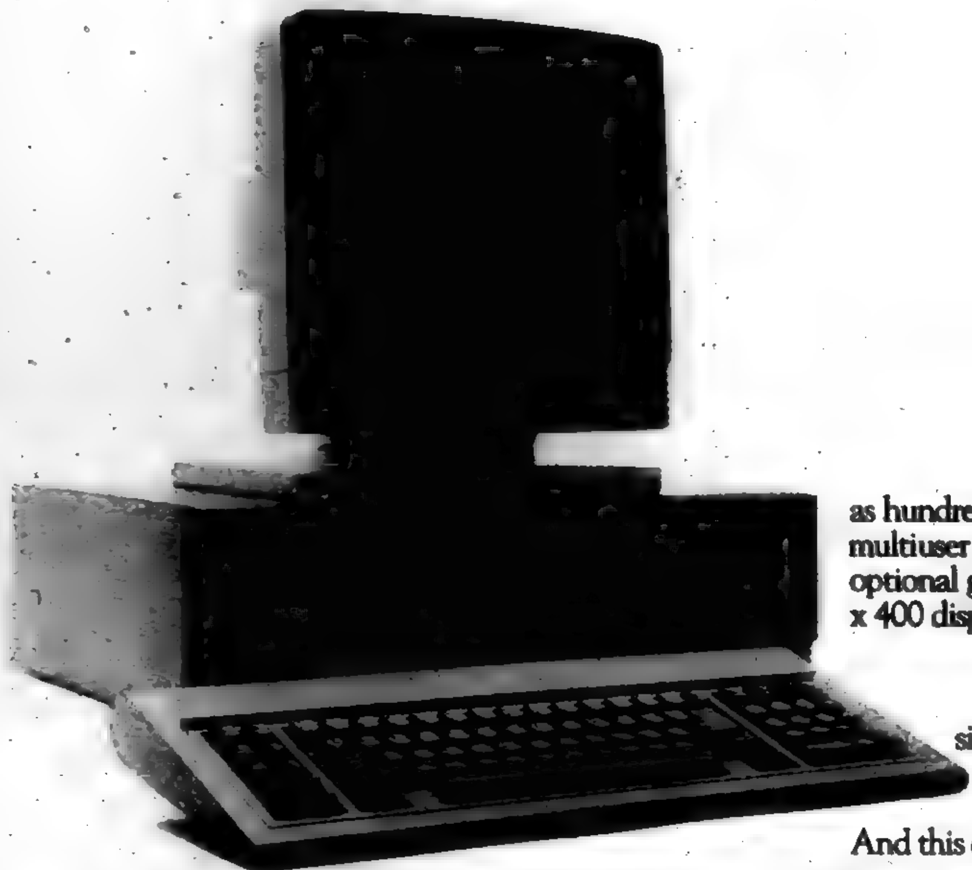

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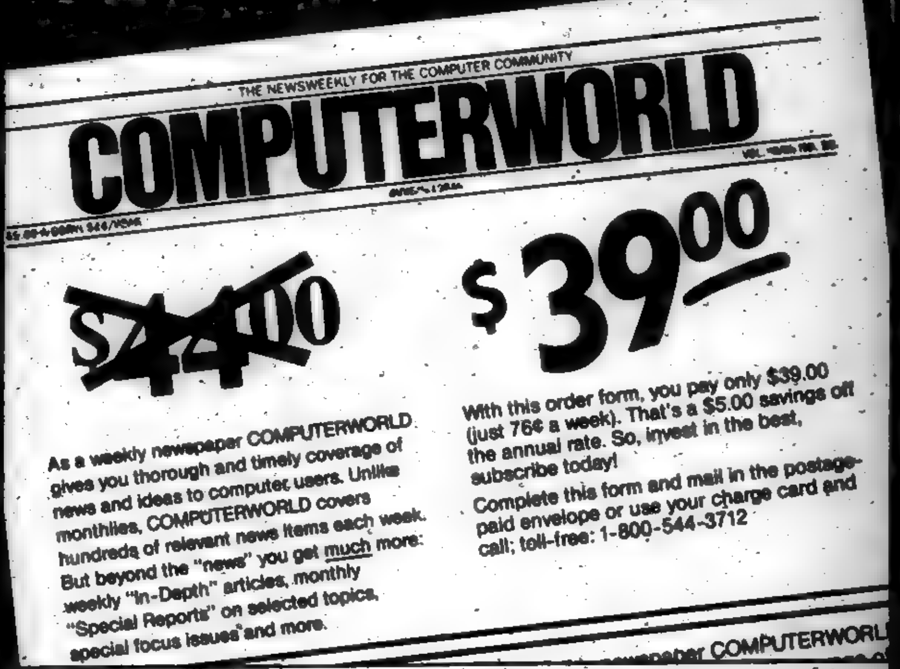

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- 30 Medicine/Law/Education
- 40 Wholesale/Retail Trade
- 50 Business Service (except DP)
- 60 Government—State/Federal/Local
- 65 Public Utility/Communication Systems/Transportation
- 70 Mining/Construction/Petroleum/Refining
- 75 Other User______________

Vendors
- 80 Manufacturer of Computers, Computer-related Systems or Peripherals
- 85 Computer Service Bureau/Software/Planning/Consulting
- 90 Computer/Peripheral Dealer/Distributor/Retailer
- 95 Other Vendor______________

2. **OCCUPATION/FUNCTION (Circle One)**
- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Financial Officer
- 21 Director/Manager/Supervisor DP/MIS Services
- 22 Director/Manager of Operations/Planning/Administrative Services
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
- 35 OA/WP Director/Manager/Supervisor
- 38 Data Comm Network/Systems Mgmt
- 41 Engr/Scientific/R&D/Tech Mgmt
- 51 Mfg Sales Reps/Sales/Marketing Mgmt
- 60 Consulting Mgmt
- 70 Medical/Legal/Accounting Mgmt
- 80 Educator/Journalist/Librarian/Student
- 90 Other______________

3. **COMPUTER INVOLVEMENT (Circle all that apply)**

Types of equipment with which you are personally involved either as user, vendor or consultant
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- C. Microcomputers/Desktops
- D. Communications Systems
- E. Office Automation Systems

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Editorial

Sparking a Revolution

The question of whether IBM's recent token-ring local-area network announcement is too little, too late won't really matter in the long run. It may be true that the users who decided to buy into IBM's previously announced PC network may feel burned by Big Blue. And a vendor like Sytek Corp. may feel it has been sent up the river without a paddle. But even though the product is neither revolutionary nor the ultimate all-in-one panacea, IBM's announcement is bound to begin a revolution in the local-area network industry.

Although the product itself was greeted with an almost universal lack of enthusiasm, sparks started flying immediately. As soon as IBM's press announcement ended, Texas Instruments, Inc. announced a chip set to support the new product. And a whole third-party industry is expected to start up around this new communications system. IBM's strategy of opening up the system is designed to allow independent network operators to support and fill out the product line — a scheme used by IBM to market its PC.

At the very least, IBM's announcement paves the way for connecting bigger systems and the network's open design is expected to initiate a surge of local-area network purchases. In addition, most of the major computer vendors admitted they would probably offer bridges to the network. The apparent exception is Digital Equipment Corp., marketer of Ethernet, that has reportedly maintained the new network is not an industry standard.

It may be a bitter yet familiar pill to swallow. Despite its drawbacks, IBM's entry into the local-area network market has added credibility and legitimized the industry as a whole. Ethernet struggled for years before gaining acceptance among users and vendors, while this new system is hailed as a de facto standard before it's even out the door.

But it won't be an easy path to follow. Although IBM is claiming to offer an open system, connection is difficult at this point because IBM has not disclosed plans for integrating the network with mini and mainframe systems. For the foreseeable future, vendors and, of course, users will still be subject to IBM's whims as to how or when this connection will come about. The seemingly ever present reality of life in the computer industry is not whether but how to adopt to IBM. Vendors would only be doing their customers a disservice and, in the long run, hurt themselves by not providing an IBM connectivity option. It has been a long, hard lesson, but the industry seems to have learned that the only way to beat IBM is to at least play the same game.

Insider

Escaping the Doldrums

By Timothy J. Caffrey

The recent announcement of IBM's third-quarter earnings (down 7%) was accompanied by an oft echoed explanation from John Akers, IBM chief executive officer. In sum, Akers attributed the continued slowdown to the strength of the U.S. dollar, the softness of the U.S. economy and slower overall capital spending. The same unhappy chorus has been sung by most vendors reporting less than stellar sales and earnings. While these broad problems undoubtedly describe the surface of the industry doldrums, they gloss over what appears to be a fundamental change in demand psychology. There are exceptions, but most buyers for large organizations find it difficult to produce a compelling reason to buy computers at the same rate as in recent years.

There are probably several reasons for this hesitance. The most commonly heard are those cited above. When overall economic growth slows, as it has recently, large organizations tighten their belts and rein in plans for new acquisitions. Other reasons are more subtle but equally powerful. For example, while personal computers were touted as productivity tools for the masses, most purchases served two narrowly defined audiences. The first was the group who understood computers, knew their applications (primarily spreadsheet) and recognized them as a way around the management information systems processing monopoly. This vocal minority pushed the machine to the limit, posed as the typical user success story and served as the catalyst for astronomical growth projections.

The second audience saw the personal computer as a symbol of success. The search for excellence was translated as the search for the most powerful desktop computer. Offices across the country were soon adorned with the latest hardware and software. It took little time for the market to meet these demands.

When it came time to justify personal computers, however, new orders slowed appreciably. The reason was straightforward. When money became tighter, buyers were hard pressed to justify further acquisitions. Evidence of promised productivity gains was either nonexistent or difficult to quantify. The acquisition cycle lengthened, the spotlight shifted to departmental processors and justification became even more demanding. The result was demand for low-end processors and peripherals slackened and slowdown and shakeout grabbed headlines.

Given the change in buyer sophistication and expectations, it is difficult to believe the slowdown will be short lived. Some argue that IBM's unhappy chorus may be a market anthem for some time. That assessment is perhaps too grim.

While familiar products have failed to deliver on their promise of productivity gains, new demand factors are emerging. The head of MIS at one of the nation's largest utilities commented recently that the need for quality software and systems engineers far outstripped current supply. Looking to the future, he saw demand expanding and supply contracting. His response has been to focus on the potential for expert systems to meet a part of his long-range requirements.

Broad demographic trends support this expectation. The maturation of the baby boomers will place a significantly greater burden on succeeding generations. Individual productivity will have to increase significantly to sustain and expand current levels of production. This scenario appears incontrovertible. The challenge is to develop products that begin to satisfy this emerging demand in a meaningful way.

You get the sense that general-purpose processors (whether large or small) and generic productivity solutions no longer fit the bill. Demand-specific applications will drive the industry forward. Expert systems are a good current example of this need for market specificity. Defined as programs that solve difficult, highly specialized problems normally requiring human expertise, this subset of artificial intelligence research has begun to produce significant commercial fruit.

Does this mean expert systems are the only viable market and all expert systems will meet with unqualified success? Certainly not. The discussion of expert systems merely illustrates a conviction that new, compelling demand will emerge when products address specific business needs. Expert systems augment the expertise of specific professions. Development tools allow individuals or departments to build customized applications. Creative interface devices reach new user populations. These examples hardly exhaust the opportunities. But we'll remain in the doldrums as long as supply is out of touch with demand.

≡

Caffrey is director, strategies for microcomputers and office systems, for International Data Corp. in Framingham, Mass.

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Q&A

Aaron Goldberg, director, micro advisory services at International Data Corp., a market research firm in Framingham, Mass., is known for his sometimes irreverent, always insightful views of the microcomputer industry. Goldberg shared some of his opinions in a recent interview with Computerworld Focus.

Do you see any major advances in microcomputer technology that will make a big splash in the marketplace?

Don't expect to see any major revelations in the fundamental hardware itself. We're moving into an Intel 80286-based generation of products that provides a faster, more efficient engine to run software. The biggest impact on users will come from soon being able to run large systems applications on [IBM] PCs.

If you're planning on using and managing this equipment, keep an eye on quality. Today, we're seeing hard disk drives for PCs priced at anywhere from $350 to $900 for a 10M-byte system. The $350 drive, however, probably failed testing routines, was returned, tweaked a bit, passed the tests and then unloaded on the market, usually spelling trouble for a buyer who says, 'Gee, that's a 300% difference in cost from the $900 drive.' A more intelligent way is to spread the actual cost over a period of time. The $600 price difference depreciated over five years is about 10 cents a day. In a market where there will be a lot of price cutting, you'll have to concentrate on value, not increments.

The real changes in the micro market are going to come from the software side. We've just seen the first of two new application products, Paradox (Ansa Software Corp.) and Q&A (Symantek Corp.), that are going to be the first in a series of programs to use artificial intelligence to improve software for the PC.

These programs will run on IBM Personal Computers and IBM Personal Computer ATs, but will need more memory. Will the vendors of add-on boards play a role in increasing the use of this new generation of software?

First of all, I think we're going to see the AT become a standard. I can see floppy disk-based AT prices in the $2,500 range by first quarter 1986. Sales will go up fast. The AT's eclipse of the PC will stimulate the AT add-on market, and these boards will go hand in hand with increasing sales of the new software.

Do you have any idea about IBM's next product?

I hate to give it a name, and I certainly don't want to name it PC2 after IBM's formal position on it. If I were IBM, I'd be laughing at analysts (unfortunately, I fit into that group at times) who thought IBM was going to come out and undercut their own price with a new technology PC product. That makes no sense because they'd be leaving money on the table and hurting their initial product.

What makes more sense is IBM's coming out with another 80286-based product before the 80386 is available. That's not definite. They might go straight to the 386 to make a product that in any case will probably come out in the first quarter 1987.

My guess is it'll be a higher-end AT. Bringing out a lower-priced AT will only hurry the price erosion that's already occurring in the AT market. If IBM's smart, they'll bring out an AT with a higher clock speed. I see a much faster AT from IBM, with an 8-MHz or 10-MHz microprocessor, a standard hard disk so IBM can capture some hard disk business that they're losing now to dealers.

Perhaps they'll also add an extended graphics adapter, maybe some other tricks and all of a sudden they have another 286 product, a super AT. It's also going to cost more, up in the $5,000 to $6,000 range, unless the AT prices further their downward migration.

Where does MIS fit into all of this? Will its role change with micro users?

MIS will become less of a back-room score-keeping function and more of an in-house service facility. PCs are one of the first harbingers of this change in MIS. It will really start to happen when all these machines are connected together. It makes sense. If I'm going to leverage and make good use of the resources in my organization, I have to make good use of PCs; therefore, I have to become involved with them, not in terms of running them and writing software, but in terms of support and making sure they're used as a resource.

Have you been following L.U. 6.2?

From a competitive standpoint, IBM; Compaq Computer Corp.; Digital Equipment Corp.; Wang Laboratories, Inc.; and others — the big players with money — realize the personal computer market is still too easy to enter from the low end. If these vendors are going to be successful and control the market, they have to raise the entry barrier. The way to do it is in software, which is the big weakness for all these start-up companies that have very little software expertise.

If you make the PC a product that not only has to satisfy me with my Lotus [Development Corp.] 1-2-3 and single-tasking DOS, but a machine that must also work within a DCA/DIA [document content architecture/document interchange architecture] kind of environment and must have a set of circuitry that supports a P.U. 2.1, Snads [systems network architecture distribution services] or L.U. 6.2 environment, it becomes a bit harder for other companies to pay the entrance fee. For users, L.U. 6.2 is a beneficial advance; in a marketing sense, it is a weapon.

What about the future of the PC?

The PC will decline and fall. It's a four-year-old product. IBM will not spell the death of the PC, however. That'll happen when major applications no longer run on it or don't run satisfactorily. The same thing will happen to the PC that happened to the Apple II [Apple Computer Corp.] in the business environment. Lotus came up with its great 1-2-3 package that only ran on the PC. The same thing will happen with the AT. Lotus might come up with a 4-5-6 product, or it might be somebody else's package. Once something big in software hits the AT, the others will follow.

— Stan Kolodziej

Manager's Corner

By Jim Young

"The more things change, the more they stay the same." The so-called micro revolution is not all that dissimilar to the previous minicomputer revolution. Comparing these two phenomena gives a feeling of deja vu, as once again organizations deal with the integration of new devices into business applications.

During the advent of the mini, computer vendors went into a feeding frenzy of selling as they called on non-data processing customers. Excited by what they heard, capable users shed their Walter Mitty roles and became assertive lobbyists for particular automation strategies. The lack of DP responsiveness to their needs caused them to push even harder for independence (distributing the processing to them). DP fought valiantly for its honor as whole systems were evaluated for potential spin-off to some minicomputer environment. But with a multiyear development backlog and a growing maintenance load, it was a losing cause and DP won out.

Today's microprocessing systems are repeating this trend on a reduced but much broader scale. In retrospect, the application systems at issue with minicomputers are sizable and self-contained and therefore easy to identify and control. Personal computers are cost-justified for more mundane and isolated uses. It is harder to see where the specific needs or wants are within the company landscape. In many cases, however, DP has installed control programs that, with some adjustment and addition, can make the integration of microprocessors and personal computers in companies an evolutionary and popular process and not the donnybrook of years past.

The starting point is detecting the need. This can be everything from fielding requests to instituting an outreach program that finds high payback areas within the company. This is a different approach, which conveys a responsive attitude. Additionally, DP's responsibility to recommend all hardware and software puts it in a position to help many users acquire personalized solutions. A client reference list of successful applications goes a long way to show customers they have come to the right place. Other programs in place that can help this process are the standardization of all equipment, training programs, policies on integration of application plus control of information and support programs such as equipment repair, diagnosis, help desks and the centralized support of user groups, newsletters and so on. This was not the climate in the minicomputer days.

As personal computer use evolves, DP's biggest problem will be finding the high-payback applications. This may entail identifying the outlying, previously unaddressed applications and exercising leadership in their automation. This is no small challenge because of the obscurity and differences of the remaining, untouched needs. There is also a new and burgeoning opportunity for micros to be used within mainstream systems. We may have been fooled by the term personal in personal computers. It is not necessary that these sophisticated devices be restricted to doing Lotus Development Corp. applications or stand-alone word processing. They do not have to apply to purely isolated and nontraditional applications.

Progressive DP shops are already designing the use of these devices into their existing applications. It is possible that they can perform part of a particular application (such as the data collection) or fulfill the analytical requirements of a much larger system. They may front end a large data base machine or interface with multiple applications. In larger applications, the mainframe can be reserved for the integration of data and the actual number crunching. This is our old friend, distributed processing, but it is now done using cheaper, smarter tools. If intelligently, top-down designed into an application, it can reduce costs, increase function and improve usability.

Not a little of this opportunity will be presented by the advancements of technology and the work of third-party software houses. In addition to dealing with in-house development on microcomputers, software is available that is already integrated and takes advantage of microcomputers for selected applications. Sophisticated accounting, personnel and sales applications now available run on the mainframe but use personal computers to interface, analyze and perform other necessary features in a way that minimizes mainframe load and production interference and gives maximum access and function to the involved user.

Ultimately, as the hardware of the future improves with dazzling rapidity, certain software applications can reside exclusively on personal computers. Even today, astonishingly, complex software

(Continued on Page 11)

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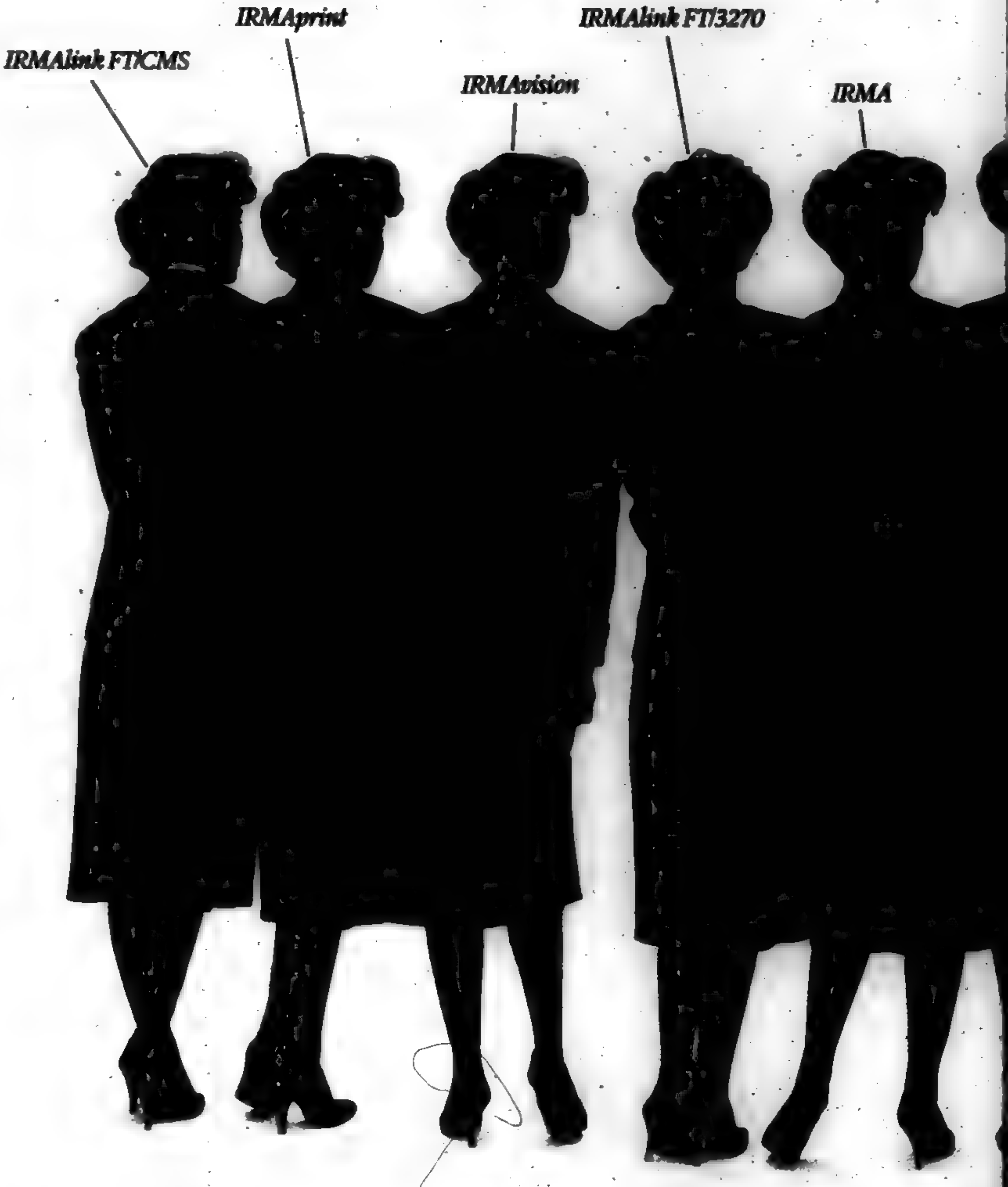

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AT&T Takes Aim At 3270 Mart

AT&T has apparently decided to try and break out of its also-ran position in the 3270 terminal emulation market. After garnering an unspectacular 5.7% of the 3270 terminal market in 1984, AT&T has introduced three new families of terminals and a cluster controller, which the company is betting will put it on track to becoming a major force in the IBM-dominated 3270 industry.

AT&T's strategy will be to market terminals and controller in clustered configurations of eight and 16 terminals, priced from $41,000 to $59,000, according to Ken Kamka, responsible for product planning and management of AT&T's synchronous product line.

Produced by AT&T Teletype, the Skokie, Ill., arm of AT&T's Data Terminal Equipment Division, the new 3270 equipment will be marketed, Kamka said, without the usual tag of being 3270-compatible. Instead, the marketing strategy will promote the products as "beyond what's now available from IBM and others."

The lower-priced configuration will consist of six of the new monochrome terminals, two printers and the 16-port (expandable to 32 ports) 6500 multifunction communications controller. The high-end configuration, termed the multitasking system by AT&T, will consist of the 6500 controller, eight monochrome terminals, six color terminals and two color printers.

Through the controller, users will have the ability to attach to as many as three synchronous hosts, depending on the protocol, Kamka explained. Three bisynchronous lines can be attached to this control unit or to two Systems Network Architecture lines and one bisynchronous lines. There is also the ability for one of those synchronous connections to support X.25 protocol. Kamka added that AT&T will also be offering a module unit that "slides into the controller" and allows the controller to attach to an asynchronous host or, alternately, allows one of the new AT&T 6500 series terminals to emulate a Digital Equipment Corp. VT220 terminal and talk with the asynchronous host.

AT&T's new 6500 family of terminals is constructed of three tiers. At the low end is the 6518, which, according to Kamka, is a basic monochrome display, equivalent to the IBM 3178 terminal. Up the scale, the 6528 monochrome and the 6529 color terminal are available in screen character formats of 27 by 132 and, according to Kamka, are able to perform two full-screen, concurrent host and terminal sessions. The 6538 monochrome and 6539 color terminals, referred to by AT&T as multitasking displays because of their windowing capabilities, make up the high-end terminals. Both models handle four separate and concurrent window sessions and, reportedly, allow a mixture of synchronous and/or asynchronous protocol sessions.

Kamka explained that the capability to switch among various host protocols will appeal to those Fortune 1000 corporations starting to do more business with other companies and coping with a variety of protocols.

Kamka said the company is also about to market a plug-in circuit card for IBM Personal Computers and AT&T's 6300 PC-compatible, enabling the PC to cable into the controller and on to the host, emulating a 3270 terminal. (AT&T can now plug its 6300 into 3270 emulation only through an awkward connection with its old line of terminals.)

AT&T has also announced a 6500 personal computer that Kamka described as analogous to the IBM 3270 PC. Although not scheduled for shipment until the third quarter 1986, the 6500 will be slated for those people who are 3270-oriented, but also want PC capability.

Kamka said AT&T is putting the tools in place to go after IBM, which currently retains about 60% of the 3270 terminal market (based on figures from International Data Corp., Framingham, Mass.). He added that the new terminals employ current ergonomic design and styling, a departure from the characteristic bulkiness of the 3270 terminals produced by Teletype in the past.

The Best Things in Life Are Free

How times change. Free-Link, a generic micro-to-mainframe link from On-Line Software International, Inc. was introduced at Info '85 in New York in October, accompanied by a different kind of marketing strategy. The company is giving away the mainframe portion of Free-Link to data processing and management information systems managers at qualified IBM CICS sites.

The micro portion of Free-Link will be available to personal computer users for $495. The free software offer is scheduled to expire February 14, 1986.

After that time, the mainframe portion will cost $6,000 for the DOS version and $10,000 for the OS version.

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In the News

IBM Previews Long Awaited Token Ring

A token portion of the long awaited token-ring network from IBM has finally been announced. The computers initially supported by the network include most of the IBM Personal Computer family: the PC, Portable PC, PC XT and PC AT. The missing siblings are the PCjr and the 3270 PC.

The IBM token-ring network will allow PC users to share files, applications and other resources at data transmission speeds of 4M bit/sec. In addition, the network features automatic error detection and the capability to bypass a failed station without interrupting service to other users. Of equal importance is that IBM is opening up the network to industry participation, according to Stephen B. Schwartz, vice-president and assistant group executive of IBM's Information and Communications Group, Telecommunications Products Organization. "This will allow others to develop software applications and additional hardware to add more function to the network," Schwartz said. IBM has already offered early prototypes and specifications to several manufacturers whom IBM has said are interested in developing products for the network.

IBM also announced the extended specifications of the IBM Cabling System to include unshielded telephone twisted-pair wiring to connect devices around the ring. Up to 72 PCs can be connected using new or already installed unshielded telephone cable. Up to 260 PCs can be connected using data-grade cable.

Much of IBM's announcement was considered by industry cognoscenti to be full of sound and fury, possibly signifying nothing. That IBM will at some point extend the token ring to include departmental and mainframe computers is probable. When this will happen is anybody's guess, and IBM isn't talking.

Michael Bobrowicz, research analyst at the Gartner Group in Stamford, Conn., thought the announcement of the token-ring network was significant only because it had IBM's name on it. An important disadvantage, Bobrowicz explained, was the necessary memory requirement (from 128K bytes to 504K bytes) to put a personal computer on the local-area net if you want to use the mainframe System Network Architecture access package. Not all industry gurus, however, cast jaundiced eyes upon IBM's announcements. Michael Killen, president of Strategic, Inc., an industry research company, thinks the token-ring network is significant. "It's the first visible sign that IBM has made some progress implementing the token ring. I'm sure IBM's top management is elated that they finally have something to show for all their work." Killen also stated that all the other communications companies developing bridges, gateways, interfaces and other types of local-area nets now have some signpost for IBM's direction. "[These vendors] can now announce products that the marketplace will accept and believe in because everyone is working toward the same standard," Killen said.

Manager's Corner

(Continued From Page 6)

packages that run independently on microcomputers are available. Applications such as manufacturing resource planning, fixed assets and payroll all have competent micro versions that are appropriate for larger companies. Micro networking means that sizable departments can use these applications through multiple workstations. Local-area nets can further link together enclaves of single application micros. Function will eventually grow as these links permit broader and broader access.

These advances are shrinking the exclusive domain of mainframes. While many justified uses of the mainframe remain, much of its role will be usurped over time. To anticipate this trend, systems design must make more varied use of hardware alternatives and use contemporary solutions for the most cost-effective user-responsive results. By anticipating future hardware and software announcements, selections of microprocessors in the use of mainstream systems can only position departments to be flexible and receptive enough to take advantage of the new announcements.

It is said that those who do not learn from history are condemned to repeat it. Let's not return to the user/DP design battles where we argue over hardware and who owns it. DP can prevent this by pinpointing opportunities to use personal computers in mainstream business applications.

■

Young is MIS director and responsible for user technology at a major Massachusetts manufacturing firm. He has worked in the industry for 15 years.

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In the News

Micro Links Used at Most Basic Level

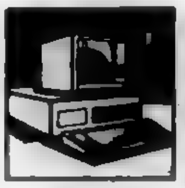
Though 90% of corporate computer users have microcomputers communicating interactively with the mainframe, most of the micros are simply acting as emulators of standard terminals and not taking advantage of the distributed intelligence offered by the personal computer. This finding is from a survey entitled *PC-Mainframe Systems in Practice*, from Xephon Technology Transfer, a consulting firm in Newbury, England. The survey suggested that very few corporate computer users are creating truly integrated PC-mainframe systems.

Emulation of standard IBM 3270 terminals was found to be the most common way of achieving a personal computer/host link. Despite IBM's reluctance to support asynchronous protocols, however, the Xephon survey also found that asynchronous/TTY connections are widely used by the IBM user base, "'mainly because it's the closest thing to a universal standard for communications across public telephone networks," Ken Hough, Xephon's U.S. agent, explained.

Users in the survey evaluated three types of link products: the Irma add-on board from Digital Communications Associates, Norcross, Ga.; IBM's 3270 emulation products; and asynchronous connections requiring a modem.

According to the survey, users thought the Irma boards easy to use and reliable, but suffering from slow data transfer, lack of windowing capability and a high price. Users thought IBM's 3270 emulation products were strong because of IBM's service backing and straightforward connections, but lacked sufficient software, windowing and good graphics. Finally, the strengths of the asynchronous connections centered on low cost, ease of use and PC support, but suffered due to slow operation and poor data integrity.

Business Market To Upswing



The business/professional market for personal computers should experience a distinct upturn in 1986,. according to *The Personal Computer Market*, a report issued by International Data Corp., a Framingham, Mass., market research firm. The report identified three major reasons for the turnaround: the continued influx of the Intel Corp. 80286-based micros, which should help convince users the older 8088-based computers are technically obsolete; the appearance of a landmark software program that will only run on 80286-based products (following previous examples such as Visicorp.'s Visicalc, written for the Apple Computer, Inc. Apple II and Lotus Development Corp.'s 1-2-3, written for the IBM PC); and an increase in time and number of applications typically done by the end user.

Site License Outcome Still Unclear

A sluggish microcomputer software market may begin to loosen the tight restrictions software vendors hold toward program copying. Though many of the software firms dropping copyright protection are smaller operations, the recent decision by Microsoft Corp. of Bellevue, Wash., to drop its copyright protection on its word for networks program is giving user organizations hope that some of the other industry leaders will follow suit.

"The economic climate is a major reason for the changing attitude toward copy protection," Dave Browning, director of vendor relations, Capital PC User Group, Inc., Gaithersburg, Md. "There is also increasing pressure from large corporate users who have established equity in a vendor's software product. These users expect the vendor to be a little more lenient when it comes to copy protection." The question will prove to be a continuing struggle between users and vendors with the outcome up for grabs.

Corrections

In the October issue of Computerworld Focus, *the company referred to as CCA is Computer Corporation of America, not Computer Communications Associates (Page 12).*

In the same issue, Bruce Poole's company, California Software, Inc. is located in Santa Monica, Calif., not Sherman Oaks, Calif.

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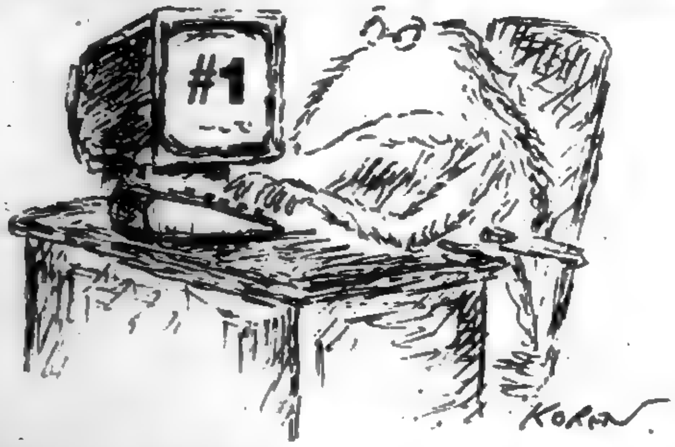

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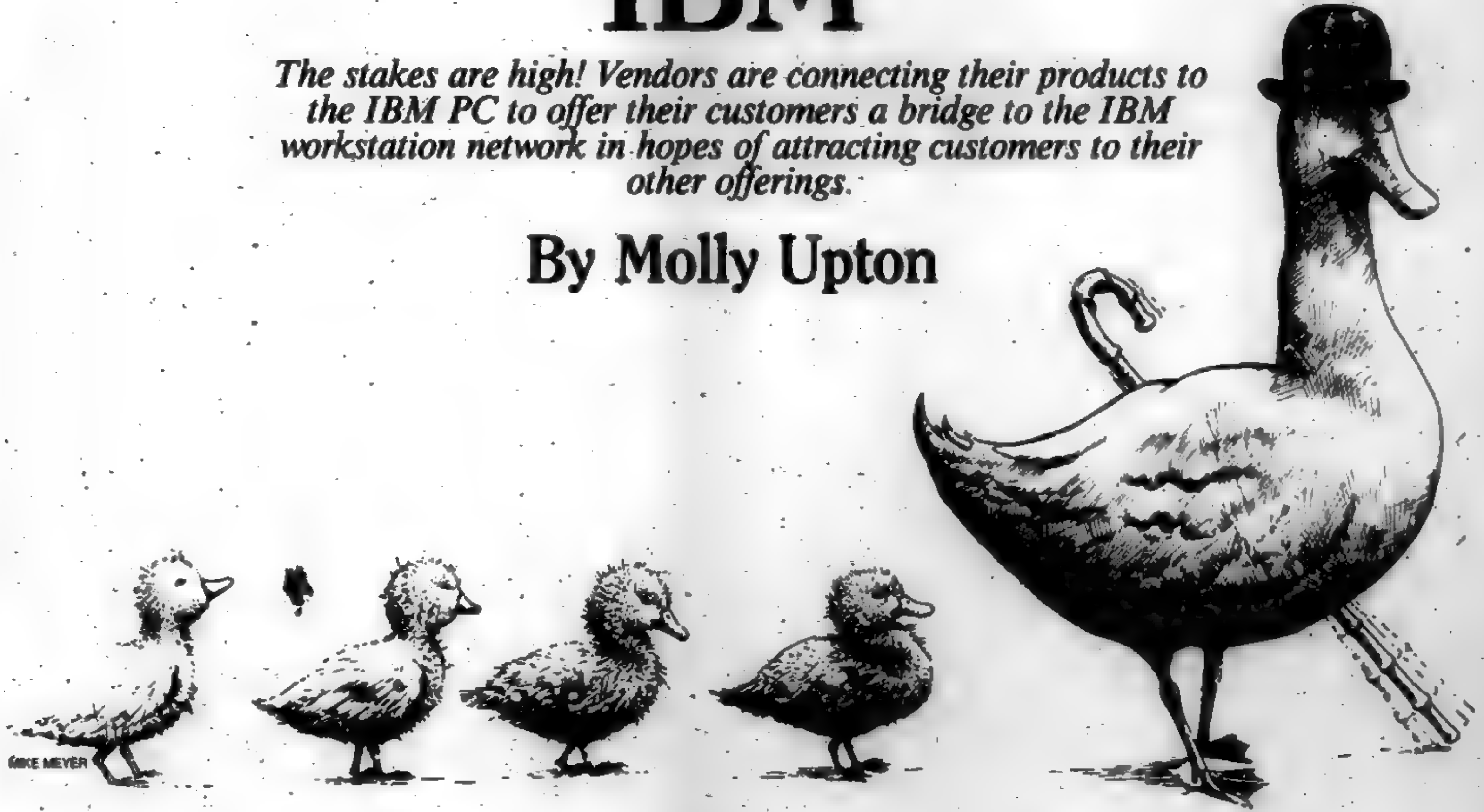
Vendors Line Up Behind IBM

The stakes are high! Vendors are connecting their products to the IBM PC to offer their customers a bridge to the IBM workstation network in hopes of attracting customers to their other offerings.

By Molly Upton



Several vendors of office automation systems are lining up behind IBM in order to expand their market shares by taking advantage of the installed base of IBM Personal Computers and compatibles.

What is the reality? At the beginning of 1985, the IBM PC had captured no less than 42.6% (1.1 million units) of U.S. personal computer shipments into the business/professional market, according to International Data Corp., Framingham, Mass. Desired applications for this group consist of management productivity applications — spreadsheet, word processing, financial modeling and personal data base/file maintenance.

The stakes are high here. Non-IBM vendors risk losing a substantial portion of their OA business to IBM if they are not flexible; losing the workstation part of a system is seen as a small price to pay for survival.

Vendors have approached this new reality in two ways:

- They offered their own brand name on a personal computer that is IBM compatible. Those who've fallen short of compatibility have also fallen short in market share.
- They incorporated the PC as an intelligent workstation in their product line. Departmental OA vendors such as Wang Laboratories, Inc., Digital Equipment Corp., Data General Corp. (DG) and Hewlett-Packard Co. (HP) as a group are rapidly moving beyond terminal emulation to off-load highly interactive applications such as word processing onto the PC. HP even offers the same query interface on the PC as on its own 3000 family.

There are two criteria for success using these approaches: Vendors should offer full IBM compatibility for their personal computers and provide equivalent facilities such as host access and file swapping for both the PC and their proprietary personal computers. Wang, for instance, is still trying to make its own personal computer more desirable than the PC for use with its VS system. A realistic analysis of this strategy might reveal that Wang would win more in additional VS sales and software than it would potentially lose in workstation orders by endowing IBM users with the same facilities enjoyed by its personal computer users. These include equivalent ease of switching between PC and VS environments, file conversions and virtual storage on the VS.

Happily for users, the real nub of the matter now changes from will the vendor link the PC to its product to will the vendor offer the equivalent integration capability on the PC as it does on its own workstation — the new issue.

There are a number of approaches (hardware, software and hardware/software) being used by vendors to spin the PC into their own webs rather than lose the whole orbit to IBM. Also, there are various areas of compatibility with independent systems (text, two-way data exchange between their files and MS-DOS and terminal emulation), but few offer all three elements (see Figure 1).

Within the mini to personal computer category, HP may currently have the lead as it has endowed the PC with the most comprehensive links to its 3000 series. Having the same data access software (called HPAccess) is very appealing as the user doesn't have to learn different methods to access Ashton-Tate's Dbase II, Phoenix Computer Corp.'s Condor or HP's Image data bases.

Virtual file capability, while now necessary, will ultimately pale in desirability compared with the ability to transfer files between MS-DOS and the departmental system's applications.

Off-loading word processing onto the PC to provide better response time and save the host's cycles has been the central thrust of recent announcements by the departmental minimakers. Which company probably had the most emotional agony in deciding to allow links with the PC? Perhaps DEC with its line of three workstations. But it's possible Wang went through similar angst in packaging its word processing software and a keyboard for the PC.

Some recent company moves are the following:

- DEC will at last allow the PC to be used as a workstation for All-In-1 and has announced WPS Plus on the PC.
- DG decided the world needs a DG personal computer workstation, and it also offers a version of CEOwrite for that device as well as for the PC.
- Wang has announced its keyboard and software to provide Wang word processing on a PC in either a stand-alone or linked-to-VS fashion. There are no current plans to link the PC with OIS.
- HP announced and is shipping its own PC AT version, Vectra, which sports a complete word processing package called Advancewrite. HP also offers its Memomaker on the PC.

It's quite likely that the next area of focus will be on the physical connection aspect. Coax was all right for terminals, but with intelligent workstations it makes sense to provide for peer-to-peer facilities as well. The new dividing line might be who offers a local-area network interface — either to independent local-area nets or to their own local-area net. Here's an area for vendors to offer value-added software that makes it easy for the PC to exchange files with the departmental system and so on.

Now that Wang is pushing its new WP Plus, its old standby version is now available to the masses of IBM users who've suffered through the IBM keyboard. The Wang keyboard included in the $695 price adds the Wang cursor keys to most PC applications and the keyboard switches according to the application being used — whether MS-DOS or Wang WP Plus. You need the word processing package and connection software/hardware in order to perform word processing on the PC and upload it to the Wang VS. A PC in terminal emulation mode cannot perform word processing.

The package includes sort, math, merge print and spelling. There's an interactive tutorial for the novitiates. Floppies can be swapped with the Wang PC and documents edited without conversions.

WP Plus requires 256K bytes and two floppies or a hard drive and PC-DOS 2.0 or 3.0. WP Plus costs $695 when bought on a stand-alone basis and was scheduled for delivery in October. Wang is wisely bundling WP Plus and keyboard with both its local and remote connection offerings for the PC.

Most likely the availability of the Wang package will impact Multimate Corp., which has really made its money by offering Wang-like word processing (despite the IBM keyboard). Upon request, Multimate provides users with a back-end file conversion program so documents transmitted are received in Wang format. The real winner will likely be the program that supports the most printers and so on and also provides the best screen response time.

	Digital Equipment Corp.	Data General Corp.	Hewlett-Packard Co.	Wang Laboratories, Inc.	IBM	AT&T
Word processing on IBM PC	A	A	S (Memomaker)	A	S	No
Virtual files	S (Decnet)	S	S	No	S	A (Starlan)
MS-DOS formats to native format*	S	S	S	No	**	S
Uniform DBMS access on IBM PC and mini	No	No	No	S		(Informix)
Word processing with DCA on own PC	No	No	S (Vectra)	No	S	3rd parties

Key: S = Shipping, A = Announced

* Accepts flat files. Data General Corp. and Hewlett-Packard Co. provide conversion for certain software.

** Replaces an existing file on the System/36.

Figure 1. Levels of Connectivity With IBM Personal Computer

Wang's local office connection includes a card for the IBM PC (256K bytes or more) that must be located within 2,000 ft from the VS system. With software and keyboard, the price is $1,895; delivery is scheduled for December.

The remote office connection includes a telecommunications card (up to 9,600 bit/sec) enabling PC users to run VS applications, especially office applications. The remote office connection including keyboard and WP Plus is priced at $1,200; shipment was scheduled to start in October.

The PC can now be equipped with WP Plus software. These PCs can be linked with VS via either local or remote connections, and the PC and VS can each edit the others' documents without any conversion. But there is always one more feature that users want. In this case, the IBM user, whether linked locally or remotely, cannot store MS-DOS files. The Wang personal computer user, however, can.

In converting files from MS-DOS to VS, the remotely connected PC and Wang personal computer user go through the same procedures of converting to binary files. However, the locally connected Wang personal computer has an advantage over its IBM counterpart — it can use the Wang-supplied personal computer to VS data exchange that provides file format conversion. The IBM user needs to convert to binary files.

DG also got in the ball game and is extending its word processing into the PC users' realm with CEOwrite as well as on its new MS-DOS-based workstation dubbed Dasher/One and its DG/One portable computer.

CEOwrite can act as a stand-alone or be integrated with CEO systems. You have a choice of interfaces in addition to the standard CEO menu (such as function key, mnemonic commands and pull-down menus). This approach may be adopted by others. Features (among others) include glossary, forms merge, hyphenation, table of content generation as well as list processing. CEOwrite software costs $395 and is available 60 days after order.

CEOwrite needs 256K bytes; CEO Connection 2.2 needs 512K bytes. The CEO Connection software link provides single keystroke access to the CEO main menu from the above MS-DOS workstations. It supports bidirectional transfer and conversion of CEO word processing files on the MV host and MS-DOS files generated by CEOwrite, Micropro International Corp.'s Wordstar, Satellite Software International's Wordperfect and spreadsheets supporting data interchange format (DIF) or print image formats. You can also go directly from the main menu to CEOwrite rather than fumbling with MS-DOS commands.

The CEO Connection sells for $5,000 on the first AOS/VS machine and $2,500 on subsequent units; the license is $295 for the DG/One and $395 for the PC. In addition, the MV host can act as a virtual MS-DOS file server regardless of the source (PC, Dasher/One or DG/One).

DEC followed the rest of the gang with its September announcement that it too will off-load its word processing. WPS-Plus/PC reportedly offers full compatibility with DEC's full range of WPS-Plus products. It offers built in communications for transferring documents to Microvax and VAX systems running WPS-Plus and creates no additional hardware investment. WPS-Plus/PC runs on IBM PC and XT systems running PC-DOS 2.1, 3.0 or 3.1 with at least 384K bytes of memory, two floppy disks or one floppy disk and a hard disk. It will be available in December and costs $595.

Earlier, DEC acknowledged the existence of the PC by Decnet-DOS on the PC or XT. Decnet-DOS costs $490 on the VAX/Microvax and $500 on each PC. With Decnet-DOS, the PC is a node in the network and can store virtual files on the Decnet, which runs on whatever physical connections there are between the PCs and the VAX/Microvax.

In what could prove to be a real blockbuster move, DEC is offering All-In-1 on the Microvax. The standard features include WPS Plus, All-In-1 mail, time management, desk management, information management, help functions and computer-based instruction. The price is $12,600 and it is available now. The Microvax offering will support DEC's departmental software such as the sales and marketing as well as the business operations (Bossystem) for financial and operations management.

To customize All-In-1 features, however, you need the All-In-1 Generator Package ($5,500) and a VAX 11/750 or larger system. Run-time licenses for customized packages cost $12,600 for each Microvax II.

HP has taken an interesting approach — offering the PC some of its Touchscreen's applications (without the touch) in an attempt to make interaction between the PC and HP 3000 easier. These include Memomaker (word processing), Personal Card File, Advancelink (terminal emulation and file transfer) and HPMessage (Email).

Once burned, twice shy is the old axiom, and this time HP has decided there are virtues to being fully IBM compatible in the PC arena after watching Touchscreen garner a less-than-hoped-for market share.

In the AT round of machines, HP Vectra is ranked operationally compatible with the PC AT and has some competitive qualities (such as being up to 30% faster and having a 30% smaller footprint while accepting AT cards). But the most notable aspect is how HP has made it an integral OA element. HP emphasizes you can start a Personal Productivity Center at any level — even with two PCs. Vectra Office represents a high-level word processing system that is PC compatible and offered by a major vendor with lots of support.

The Advancewrite package is a greatly enhanced version — expedited and tailored to the Vectra keyboard (30 function keys) — of Samna Corp.'s WP that's available in three levels. HP customized the videodriver and also expedited the printing facility. The screen is of relatively high resolution with 640 by 400 pixels and its clarity when scrolling is a challenge to any dedicated word processor. While Level III includes a spreadsheet, you cannot insert graphics into WP yet; that facility is scheduled for first quarter 1986.

The price for the Vectra Office configuration (640K-bytes memory, multimode and color-adapter cards, dual RS-232 C cards and keylock) is $5,229 for dual 360K-byte floppies (1.2M floppies are available) and $6,604 for a 20M-byte hard disk system with one floppy. Prices include a monochome display, Advancewrite I and MS-DOS 3.1. Users may select different Advancewrite levels for the price difference. Advancewrite I (footnotes) is $295, Advancewrite II (spelling check, table of contents, mailmerge, glossary) is $550 and Advancewrite III (spreadsheet, full text search) is $695.

Vectra does not include read-only memory-based terminal emulation capabilities embodied in the Touchscreen.

Instead, you may add Advancelink 2392 software ($295) to allow access to the 3000's electronic mail package (Deskmanager) as well as other applications.

HP also unveiled a local-area net dubbed Officeshare that is based on 3Com Corp.'s card and MSNet with some goodies from HP such as transparent data location and so on. Officeshare can link Vectra, Touchscreen I and II and PCs as well as 300s to an 802.3 network.

Officeshare can function as a local-area PC net with a dedicated controller (either a Vectra or a Touchscreen) or as a point-to-point link between PCs and a 3000 when the PCs have Advancelink 2392 software. Software for the Vectra server costs $2,298; it costs $848 to link a Vectra onto the network. Although there's a price involved, this is a feature that isn't available with IBM's System/36 and PCs.

Although Honeywell, Inc. isn't usually thought of in the same breath as these mini vendors that have effused an OA attitude, it too has a link between MS-DOS-based PCs and its mainframes. The PC78000 software now includes file transfer that allows file transfer between MS-DOS machines running Kermit and Gcos 8 systems, between MS-DOS machines and Honeywell DPS 7 or Multics host systems with Kermit. The extended PC7800 package costs $495 per PC.

CPT Corp., another vendor, has taken a couple of approaches to integrating the PC. It has put its word processing on a PC in the form of CPT Personal Typewriter and also terminal emulation via the CPT Open Connection.

The CPT Personal Typewriter ($300) requires no hardware modifications and permits access to DOS files. Billed as a subset of CPT word processing, basic features include calculating, sorting and use of a keyboard program key. It requires a 256K-byte memory. Documents can be transferred via the SRS45 or the Office Dialog System to the 8500 series and the Phoenix and Phoenix Jr. You can make a printer file of Lotus and transfer it to CPT, where it could be edited sans formulas. It didn't handle underlines particularly well when seen last winter.

Built upon the Unix-based CPT Office Dialog (alias Convergent Technologies, Inc.'s Megaframe) that can network up to 128 workstations and PCs, Open Connection ($2,000) provides access to word processing, filing, central printing and electronic mail to local and remote terminals.

NBI, Inc., another vendor, was one of the first to embrace PCs. It allows PCs (and its own) to link with Oasys 64 via a multinet twisted-pair link. You need a $600 card in the Oasys.

For more than a year, Syntrex, Inc., a vendor, has offered its Syntrex connection that consists of a $900 board and software for a 256K PC. This allows users to convert PC files into Syntrex text files for incorporation into other text documents, distribution or access by other Syntrex stations. In another example, Datapoint Corp., a personal computer maker, has a $695 adapter card that fits within a PC and a $75 software package that allows the PC to connect with the Arc network and to emulate a Datapoint workstation. There is also some file translation capability between MS-DOS and Datapoint.

Personal computer maker Xerox Corp. provides a board and software ($795) to allow a PC to interconnect with its Ethernet scheme. Once connected, the PCs can use the other network resources such as printers and servers. Text files in an Epson print format can be printed out on any network printers (after being converted to the Interpress Architecture). Mail sent by PCs can be read by any other network workstation.

While personal computer maker Convergent Technologies, Inc. has not yet joined the trend, it should be able to as it has the ability to convert MS-DOS and Ctos files.

■

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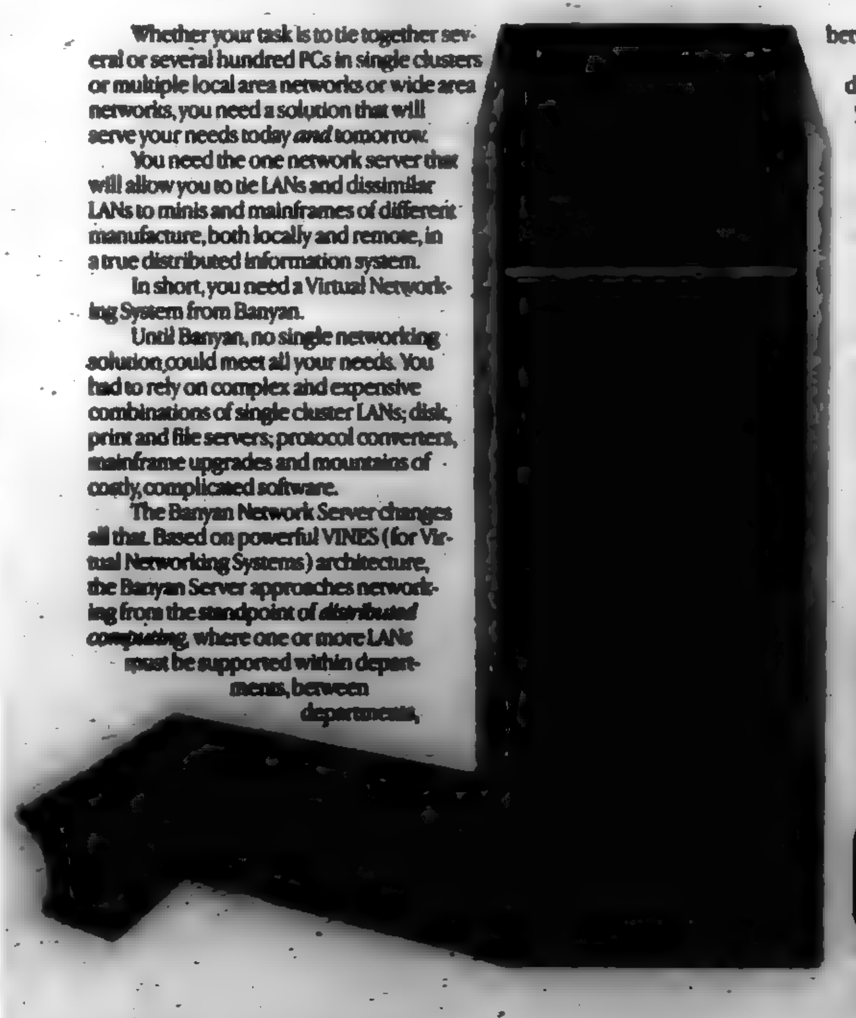

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UNLOCKING THE MICRO MARKET

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By Amy D. Wohl

Although thousands of personal computers are still being bought, a pause is taking place in microcomputer mania. Fortunately for personal computer vendors, this is a pause that will refresh. Users are not losing confidence in the concept of the personal computer, but rather they are making certain the personal computers they had already bought were being used. Perhaps equally important, it is a case of the market waiting for the next generation of products.

Millions of desktops remain bare, unadorned by microcomputers. This is a temporary state to be corrected with dollars, an increase in computer literacy, increased usefulness of more software, better personal computer prices (that is, more computer for less money) and more interesting office system environments (attaching personal computers to each other and to shared data and devices).

But what can we buy now and should we? An interesting pattern emerges.

The first generation of computer users have long become our local gurus, dispensing advice (and sometimes amused scorn) as they watch new users struggle to use machines that are far friendlier and more capable than the original personal computers with which they started out. Gurus tend to use the newest, shiniest personal computer in the office. Today that means an

IBM Personal Computer AT with everything, attached to a Hewlett-Packard Co. Laserjet printer. This power-user workstation has more computing power than many mainframe computers offered in the 1970s. A few early personal computer pioneers, however, run counter to this trend. They like to hang onto the first personal computer they bought and scorn those less hardy souls who want user friendliness or hardware that is recognized by the repairman.

Newer users employ mainly IBM PCs. The standard for most office users today is an IBM Personal Computer XT with maximum memory, moving up to an AT if the user wants faster processing, more storage (the newest ATs offer 30M bytes standard, 60M bytes available) or more prestige. New users often get PC hand-me-downs, with the newest machines going to more experienced PC hands, with their greater capability needs.

Generally speaking, business personal computer users use the business PC (that is, they buy IBM PCs). A vocal minority buy IBM-compatibles from vendors such as Compaq Computer Corp., Sperry Corp. and many IBM competitors. Interestingly, personal computer products that are better (faster, with more graphic capability, cheaper, more rugged) than the IBM PC are not generally successful unless they are also completely IBM-compatible. Now vendors are bringing out the second generation of clones, and they are designed to win; hence, they tend to be entirely IBM-compatible. The newest users are not into traditional PCs. They want to employ the power of the PC, but are often creative folks who relate to words or images rather than numbers. For them, user-friendly devices like Apple Computer, Inc.'s Macintosh are appealing. And they haven't failed to notice that the Macintosh is now a stamp of affluent consumerism, appearing on desks, in trendy apartments and in advertisements for everything from cream cheese to banking services. An amazing number of these noncompatible IBM PC users have begun to appear. Recent clients in major corporations and smaller service companies have included a number of Macintosh users. And a surprising number of computer industry writers swear by the little devils.

This seems to mean that we are growing up in a two-world business: an IBM and IBM-compatible world in which most business products are bought and sold and an Apple Macintosh-compatible world which can touch (but not yet very securely) the IBM world. Industry commentators expect this touching to become more intimate over time, as Apple tries to leverage itself into the IBM world and third-party hardware vendors jump onto the bandwagon.

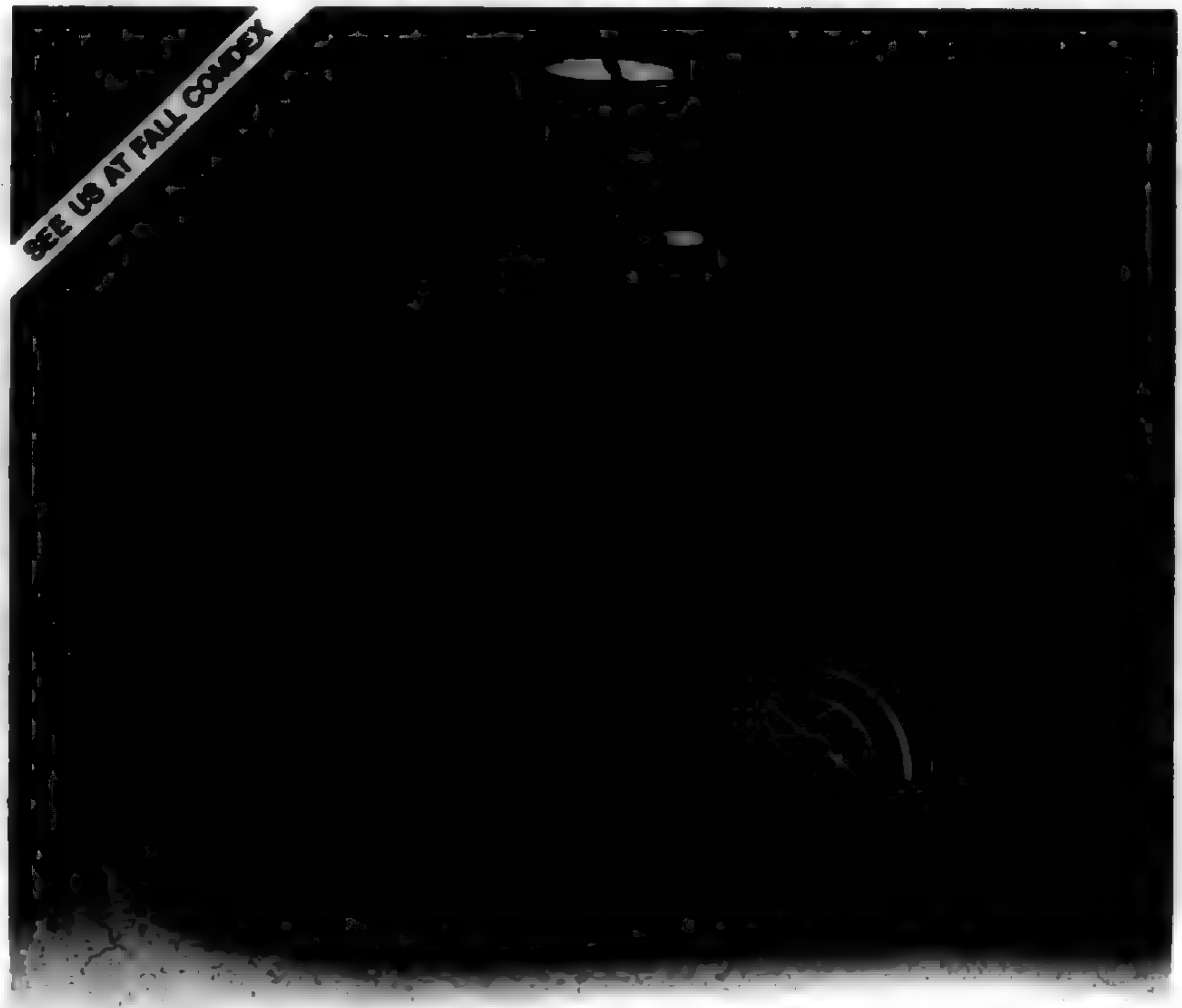
A third world exists, of course, made up of machines that are struggling for market share. This includes products such as single-user Unix machines, most notably the AT&T Information Systems 7300; noncompatibles like Digital Equipment Corp.'s Professional 300; special purpose, industrial strength micros from Apollo Computer, Inc. and Sun Microsystems, Inc.; all of the proprietary operating system portables; and new toys that could become business machines like the Commodore Business Machines, Inc.'s Amiga. Most of these systems will never be sold in sufficient quantity to create a market for software; therefore, almost no software will ever be developed for them. This vicious cycle prevents the machines from ever being successfully used because most personal computer users are not looking to write their own software, but rather to buy some.

We are growing up in a two-world business: an IBM and IBM-compatible world and an Apple Computer, Inc. Mackintosh-compatible world.

We will, of course, make an exception for the Unix-based machines. This marketplace continues to grow, albeit much more slowly than contemplated. Eventually, it will be another standard, but not likely one that challenges IBM's MS-DOS machines for market dominance.

The years 1985 and 1986 will be noted for when personal computer users (in volume) started to recognize the limitations of individual personal computers and began to scheme to interconnect them into useful multiuser systems. This could mean buying local-area networks plus servers and software (such as Xerox Corp.'s Ethernet, IBM's PCN, AT&T's Starlan). Or the user can choose from among dozens of systems that can serve as integrators for personal computer workstations. Dozens of choices exist, from every vendor's office automation system (for example, DEC's VAX with All-In-1, Wang Laboratories, Inc.'s VS with Wang Office or IBM's System/36 with Personal Services/36 and PC Attach) to a variety of general purpose minis, superminis and mainframes.

The notion of buying micros first, as individual personal productivity tools, then buying the systems that tie them together and permit office automation to take place, has become far more pervasive in the marketplace than any sales of



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Vendor	Model	IBM Compatible	Microprocessor	Memory (Minimum/Maximum)	Storage	List Price (Base System)
IBM	Personal Computer	Yes	8088	256K/640K	Floppy (360K)	$1,995
	Personal Computer XT	Yes	8088	256K/640K	Floppy (360K) Hard (10M)	$3,895
	Personal Computer AT	Yes	80286	256K/3M	Floppy (360K, 1.2M) Hard (30M)	$3,995
Apple Computer, Inc.	IIc	No	68C02	128K/128K	Floppy (360K)	$1,295
	Macintosh	No	68000	128K/512K	Floppy (360K)	$2,195
Digital Equipment Corp.	Rainbow 190	No	8088	640K/896K	Floppy (800K) Hard (10M)	$6,495
	Professional 380	No	PDP 11/23	512K/2M	Floppy (800K) Hard (10M)	$6,025
Hewlett-Packard Co.	150	Yes	8088	256K/640K	Floppy (360K) Hard (15M)	$3,495
	Vectra	Yes	80286	256K/3.6M	Floppy (360K) Hard (40M)	$3,199
Compaq Computer Corp.	Deskpro	Yes	8086, 8088	128K/640K	Floppy (360K) Hard (30M) Tape (10M)	$2,240
	Deskpro 286	Yes	80286	256K/8.2M	Floppy (360K, 1.2M) Hard (70M) Tape (10M)	$4,244
Texas Instruments, Inc.	Professional	Yes	8088	128K/768K	Floppy (360K) Hard (10M)	$2,395
AT&T	6300	Yes	8086	256K/640K	Floppy (360K) Hard (10M)	$3,010
	7300	No	68010	512K/2M	Floppy (360K) Hard (20M)	$5,095
Wang Laboratories, Inc.	APC	Yes	80286	512K/2M	Floppy (360K) Hard (67M) Tape (43M)	$3,465
Data General Corp.	Dasher/One	Yes	8088	256K/640K	Floppy (720K) Hard (10M)	$2,100

Figure 1. Personal Computer Hardware

integrated and complete OA systems. Every vendor has dashed to get onto this bandwagon: personal computer vendors offering their own local-area net and file servers and integrated systems vendors rushing to offer the ability to connect IBM PCs to their systems as alternative workstations. We call this easy-to-start process bottoms up systems design.

In order for this useful notion to work, it is necessary to exert some self-control. It is not possible for every user to buy any personal computer they might choose and then to interconnect the result into a smoothly running whole. In fact, not only does the hardware require some compatibility, the software the personal computers are utilizing also requires some standardization. Ahead in the future (way ahead) are systems that permit any workstation to connect to any system and any software package to talk to any other.

But what happens next? The game continues. Count on IBM to announce a new generation of PCs pretty soon (probably first quarter 1986). But don't worry they might be noncompatible with the PC or PC-compatible you already own. Not even IBM could stand up to what the market would say if their next generation of products is less than friendly to those millions of PCs we've already bought.

IBM will probably choose a compromise position. Look for a PC2 announcement (called something else, of course) to focus on what's new — maybe faster processing, bigger disks, more memory, an alternative operating system or user environment — and to reassure users the good, old world of the MS-DOS IBM PC is still there on the new machine.

Soon, perhaps in the next announcement, we expect IBM to find a way to make certain highly attractive features available only to IBM software users (most likely some high level of integration or some glamorous interface). This will be a requirement sooner or later if IBM is to meet its ambitious goals in the personal computer software market.

Expect some of the research IBM is doing in other areas will turn up in improved and enhanced PC products, things like reduced instruction set (Risc) machines, bit-mapped, high-resolution displays, truly friendly software and so on. Of course, other vendors are also working on these technologies; action from them can also be expected.

But we expect IBM to hold on to its strong lead in the business PC marketplace. Features of this market continue to include the following:

- A strong affinity for data processing control and, therefore, a preference for vendors popular with DP staff. Read mainly IBM.
- A strong desire to standardize on a single product line of compatible products to ease the organization's way into an integrated multiworkstation environment. With its strong headstart, this trend is clearly in IBM's favor.
- A big influence on other markets for whomever controls the office marketplace. That is, most home buyers of high-end systems (and nearly all portable buyers) are looking for a machine that can do office work at home (or on the road). Therefore, the value of compatibility is very high, and you know who wins this one.

What happens to the other vendors? IBM-compatible vendors live or die at IBM's pleasure. That is, IBM will support pricing policies that give vendors room to breathe as long as vendors continue to prove IBM does not have a personal computer monopoly and fail to sell more product than IBM is willing to give up. Incidentally, this could mean success for a new vendor like AT&T Information Systems with its beginning-to-succeed 6300 PC-clone and could spell hard times for Compaq Computer Corp. if IBM has a fixed amount of market share in mind for its competitors and no need for two successful competitors to prove its point to the Justice Department lawyers.

We suspect the market will break out this way:

- Compaq gets to live. They are a well-managed company with a superior product, and they aren't big enough to elicit extreme levels of concern from IBMland. (You could argue that they have now gotten too big for IBM to pick them off, but that is a different article).
- The multiproduct companies that produce an IBM-clone for their own customer base get to live, but they will never get the significant market shares they crave. It doesn't matter whether they offer a superior product. Compatibility and small blue letters on the box are what customers crave. The key to success here is to produce a true IBM clone or to hide a true clone under your superior product. All else seems to fail.
- Single-product clone vendors get to disappear. They're almost all gone or are going now, and the rest are having problems.
- Innovative products that are IBM PC-compatible get breathing space, but not big market shares.
- Innovative products that are not IBM PC-compatible don't get much of anything, except ignored in the marketplace. Of course being ignored might still let you sell a few hundred thousand boxes. (Ask Apple how Macintosh is doing.) And if your noncompatible product shows promise, someone else is sure to provide a kit that makes it more-or-less compatible, perhaps in the nick of time. Colluding to make sure IBM compatibility somehow occurs is probably a very good idea.

In the next round, if IBM's idea of innovative isn't very good (it's going to be hard to be innovative now that IBM's PC organization has been co-opted back into the Big Blue way of thinking, IBM Zen, I suppose), and someone else is very innovative yet still very IBM compatible, remove all the current leg irons and start thinking about singing a new song.

If you'd like to help us have a merry Christmas, do let us know that your very innovative, very compatible product is on the way. We'll want to wish it a Happy New Year.

■

Wohl is president of Wohl Associates, a consulting firm in Bala Cynwyd, Pa.

Laptops: Why Isn't the Market Booming?

By Jenny Charlesworth

The deciding factor of who will win in the laptop computer market may be a result of which vendor is most active in tracking and addressing user needs. Several areas of greatest concern among users appear to be screen resolution, available memory, price and IBM's entry into the market.

According to a study by Market Intelligence Research Co. of Palo Alto, Calif., the briefcase-size computer (fits in a briefcase, under 15 lb) is going to take over the portable computer market by 1988. Analysts at Market Intelligence Research have two predictions: The market for briefcase-size computers will reach $11.3 billion in 1990, far surpassing the handhelds and suitcase models, and technological advances (such as improved display quality, larger memory sizes and lasting power supplies) will be arriving soon, along with lower prices.

Major factors to consider in the selection of a display are resolution, contrast and color. Currently, you can choose from four main options. Liquid crystal display (LCD) is the most commonly used due to its low power consumption, durability and light weight. Images on the screen are created when an electronic charge activates two polarized circuits within the LCD, creating a dark image. If not used under optimum lighting conditions, it can be impossible to read. Electroluminescent display (ELD), an alternative to the LCD, offers high resolution. ELD provides its own light source from behind the display; users no longer need to rely on light from the environment.

	1984	1985	1986	1987	1988	1989	1990
Sales Force Automation	30,000	36,000	48,000	75,000	105,000	125,000	142,000
Professional Travel	136,950	160,200	178,500	192,000	202,000	214,000	225,000
Other	8,000	13,000	22,000	27,000	32,000	40,000	53,000
Total	174,950	209,200	248,500	294,000	339,000	379,000	420,000

Source: IDC — 9/30/85

Figure 1. Shipments of Portable Personal Computers in U.S. Market

Another alternative is gas-plasma display (GPD), neon gas captured between electrode grids that light individual pixels when charged. The charged neon then generates light. GPD is more easily read than LCD, but costs more. CRT displays, a fourth option, are used in personal computers, but are too large and consume too much power to be used in laptops. Several companies, however, have developed folded, flat CRT displays that are smaller and lower in power usage.

Memory capability is one laptop feature that has become comparable to the desktops. Most portables today have some read-only memory and random-access memory and most have built in or optional floppy disk drives for additional storage. Units for business feature 128K bytes, some a minimum of 256K bytes. Unfortunately, storage is limited by size of the unit; as a result, vendors need to be geared more toward 3½-in. diskettes. Though some laptops still use 8-bit processors like the Zilog, Inc. Z80 or Cmos 80C85, most of the newer models such as the Morrow Pivot, Grid Systems Corp. series, Data General Corp. Data General/One and Hewlett-Packard Co. 110 use variations of the 16-bit 8086/8088 series of microprocessors.

The cost of portables may be the major obstacle to overcome in user resistance. But buyers may already be seeing the beginning of a price war with DG's Data General/One September price reduction announcement."It is now possible for customers to recognize the benefits of portability without paying a significant premium for that advantage," Cliff Bream, vice-president and general manager of DG's desktop division, said.

No doubt prices will fall as manufacturing costs go down. "Everyone thinks the price threshold for the market is lower than the machines are now, so people are not going to buy them for $3,000, but they will buy them for $500. Somewhere in between you start to get a lot of units sold," Steve Bosley, client service manager of micro services at International Data Corp. in Framingham, Mass., said. (See Figure 1.)

But where does IBM stand in this small-is-beautiful market? Results of a recent IDC study showed the market impact of the rumored IBM laptop should not be underestimated. According to IDC, the product will be very similar to Data General/One and HP 110 and offer LCD screen, battery power and some level of compatibility with the present PC-DOS environment.

The IBM laptop, code-named Clamshell or Ozone, is not expected to be a major contributor to IBM's revenue, according to IDC, primarily because the market is not nearly as large as it was once expected to be. In fact, IDC predicted that the market for laptops will probably be less than 10% of the total personal computer market.

Interestingly enough, IBM may not be the only company subject to rumors concerning the portable market. It has long been speculated that Compaq Computer Corp. and Apple Computer, Inc. may also be in the running for market share. There is a generation of portables and portable users to learn from, and both Apple Computer and Compaq Computer are reported to have done development work in the laptop area.

However, according to IDC's Bosley, "The market is too small — 175,00 units sold is nothing."

Charlesworth is publications administrator for Computerworld Focus.

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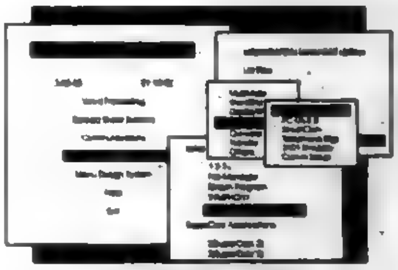

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Industry watchers have recognized that market potential and the competition in the micro third-party service arena have become intense. Major manufacturers such as Xerox Corp., Honeywell, Inc. and TRW Corp. helped legitimize the third-party service field when they entered the business; now, older mainframe and mini service providers are making a big push to gain market share in the micro area.

A total of more than 400 companies are working to gain part of a business estimated to grow from $390 million in 1985 to $970 million in 1990, according to researchers at Input, a market research firm in Mountain View, Calif.

"The third-party market is not the unknown quantity it was a couple of years ago," John Erlandson, manager of the customer support program at Input, said. "Now, we see a lot of companies getting into the third-party market. This lends a lot of credibility to the market."

An intense competition among these companies, which has worked to the customer's advantage as companies build customer bases through quality service, is the result. "The competition is fierce," Rudy Heydu, general manager of MTTR, Inc., a high-technology field service company based in Trevose, Pa., said.

"Everybody can find a niche, but what's going to happen long term is that not all the vendors can make it," Heydu continued. In that effort to be successful, third-party micro service companies can provide just about any kind of maintenance the customer wants.

For large customers, third-party service providers will set up a maintenance area on site, stocked with the most commonly needed spare parts. This type of service is expensive, but usually the quickest.

But much of the growth in the third-party micro service field has come from on-site service. Most companies will respond to a call for help within four hours, as long as customers maintain contracts on their machines. Monthly fees on contracts usually include time and material charges. "Most customers just want someone to come in and fix their machines," said Thomas Quinn, vice-president of sales and marketing at First Data Resources Field Service Co. in Westlake Village, Calif., a wholly owned subsidiary of American Express Co. That's because customers begin to recognize the potential of their microcomputers. "Businesses have become accustomed to using their machines, and they want them repaired immediately," Michael Chamberlain, senior vice-president of field operations for Sorbus, said.

Third-party companies will also pick up and deliver a down computer or they will accept defective machines through the mail. But service of this type is useful only for customers who don't mind a couple of days of down time.

The price range for service is just as varied. Depending on customer requirements and the machine to be serviced, contracts range anywhere from $80 to $400 per month, a representative from Input said. For machines not covered under a contract, third-party companies generally charge between $60 to $100 an hour for labor.

National third-party service companies maintain hundreds of offices throughout the country. They forge agreements with system manufacturers to supply them with spare parts, which are maintained in these regional offices. "We can track a spare part right down to the field engineer's luggage," Sorbus' Chamberlain said. Reputable companies will sponsor ongoing training in system technology for their field repair staffs.

Third-party companies have picked up a major chunk of business from customers who find traditional service arrangements are just not suitable for micros because of the mix of products they put together. "Most large corporate users are sophisticated enough to put together systems from various industry offerings," Chamberlain said. "An independent maintenance company has the capability of maintaining all the pieces of the system."

Third-party companies have picked up a major chunk of business from customers who find traditional service arrangements not suitable for micros because of the mix of products they put together.

Third-party service also makes it easy for companies with scattered offices to maintain their micros. "When you have a company based in one small area, other types of service are attractive to the end user," Quinn said. "When you get into a larger geographic area, a national service company makes it much easier to do the service."

But the multitude of firms providing independent service makes choosing a company a difficult task. Regional reputation is a key indicator of a company's performance, according to George Harmon, chairman of the board of Service Intelligence Corp. in Westlake Village, Calif., a service consulting firm. "The smart end user is going to be calling for references," he said.

It's also important to make sure a third-party company can service all of a customer's needs. "End users have to look carefully at whether or not a company is capable of servicing their whole product line," Harmon said. "There are a lot of them who specialize in certain areas."

Users need to also look at what kind of backup support the third-party service company offers, what its spare parts maintenance is, what kind of educational programs it offers and its relationship with the manufacturers. And customers should protect themselves by explicitly spelling out service requirements in a contract with the service company, maintenance company executives said.

Some personal computer dealers offer service contracts with third-party companies rather than doing the service themselves. Those dealers can often recommend the maintenance company to fit a customer's needs. Just in case the user is looking for some more protection, insurance companies have even gotten into the service business. National Warranty Corp. located in Wheat Ridge, Colo., sells service insurance through dealers. In the event that a customer's service arrangements with the dealer or system manufacturer doesn't work out, National Warranty will provide service through a third-party company. The company sells both 18-month policies and three-year policies.

Most third-party companies maintain that their prices are about 20% lower than those of traditional service arrangements with manufacturers, and the cost of service is expected to decrease significantly in the future because of the competition and the resulting efficiency of these companies, Erlandson said. "In the old days, it was expensive to service micros. There were only a few out there. Now, with a million personal computers installed, it's much more efficient."

Micros are cheaper for companies to service than larger systems, another reason maintenance prices are expected to drop. This reliability used to make large customers wary of establishing service arrangements. Not so any longer, Wolff said. "There is a substantial trend setting and growing group of people who are aware of the need. Even first time buyers are realizing the potential of service," he said. "There are so many horror stories about broken machines that people are recognizing the value of service. One guy told us about a dentist who spent $19,000 on a system that's sitting idle because it's always broken and he can't figure it out."

In fact, most service companies estimate the typical micro system needs repair an average of one time to two times per year. Disk drives and printers cause the most problems, but a few days of down time on anything helps convince customers that service is something they need, Chamberlain said. "Most people are initially reluctant to make a commitment to service, but when their machine breaks down, they want it fixed right away."

Maintenance companies have not yet dealt with a major user service need — software support. "We anticipate that software support will be a crucial problem in the future," Input's Erlandson said. "How to separate software from hardware problems. The user isn't aware of the intricacies. As software becomes more complicated, it will be a tough area for manufacturers to deal with. It's a huge need."

Software is not our business, countered Sorbus' Chamberlain. "We do not service software," he said. "In training, we respond a full week with software, so we can determine if the problem is a software problem. We help out as much as we can, but we can't solve a software problem."

Depke is a senior writer with Micro Marketworld, *a computer retail trade publication of CW Communications, Inc.*

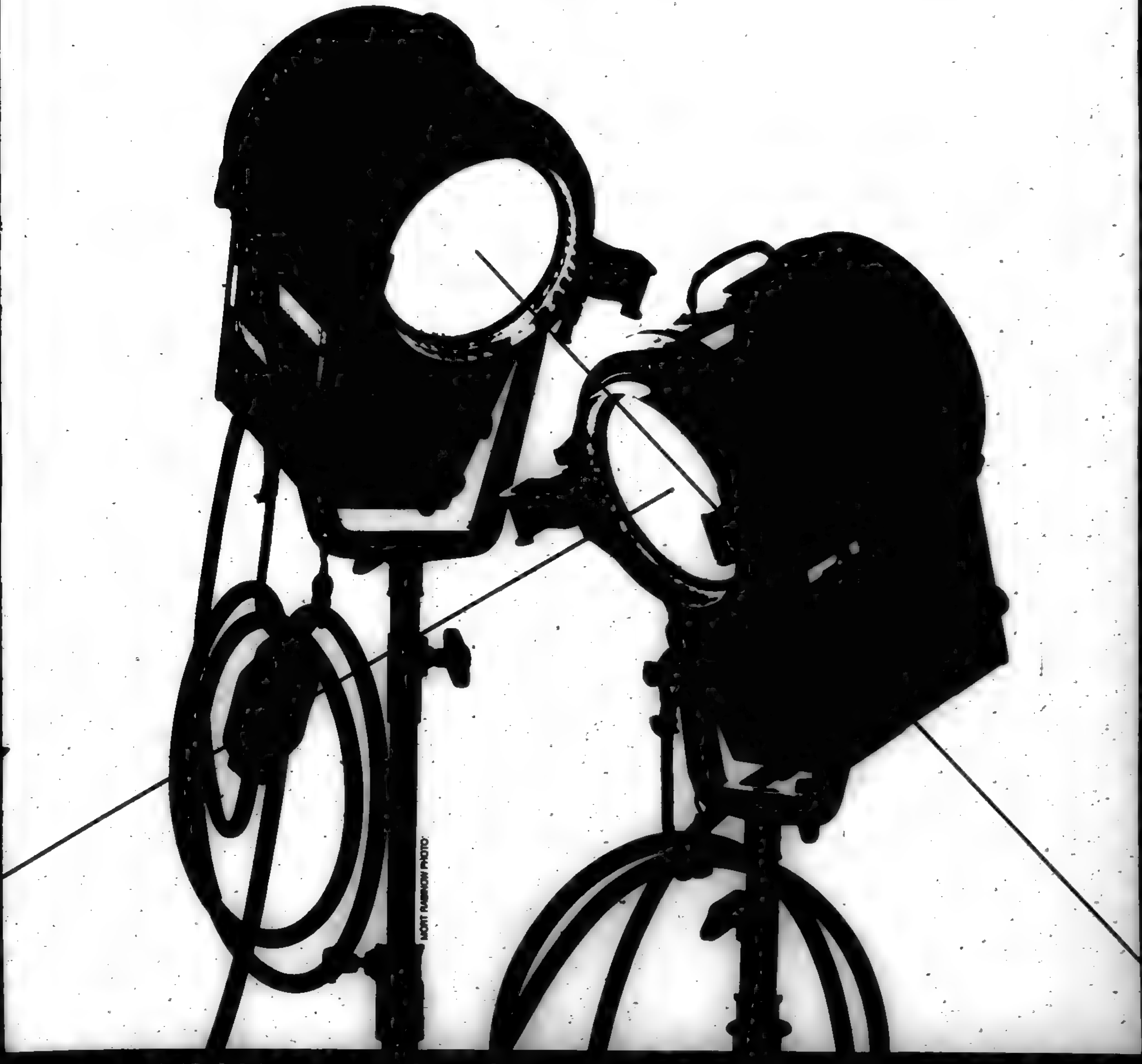
Spotlighting Desktop Laser Printers

By Lee White

Although the mere thought of lasers no longer only conjures up images of Flash Gordon, it's still hard to believe that laser technology will be sitting next to that commonplace item, the personal computer.

There are reasons for the attention now being focused on these new personal computer peripherals. Desktop laser printers are fast, usually producing up to 8 pages per minute. Their 300-dot by 300-dot resolution is spectacular. In most cases, text and graphics combine easily on the same page, making a low-cost in-house publishing facility feasible.

But the drawbacks may outweigh the advantages. Eight pages per minute is fast; 19 pages per hour, the maximum number recommended, is less attractive. Price ranges of $3,000 to $7,000



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and more put the desktop laser out of the reach of many. Quite a few of the printers cannot operate within a network. Software incompatibility and increased maintenance and supply costs complete the picture of the fledgling desktop laser printer market today.

What exactly is a laser printer and how does it differ from the more commonly used and understood daisy wheel and dot matrix printers?

Tom McMurray, product marketing manager in the Terminals Business Unit at Digital Equipment Corp., explained laser printing technology as a totally enclosed low-power beam that scans back and forth across the surface of an electronically charged belt made of photosensitive material. The laser beam discharges all areas of the belt that will not be printed, leaving an electronic image of the page. The belt then passes near a magnetic roller covered with oppositely charged toner particles. The toner is attracted to the latent image on the belt, forming a toned image.

Farther along the paper path, the page passes between the belt and another charging element that attracts the image from the belt onto the paper. This image is then firmly affixed via heat and pressure fusion. The belt is erased and recharged for the next page.

As with draft printers, laser printers form images using dot matrix patterns. Laser printers, however, pack more dots into the same area. This creates superior print quality for characters, lines, forms and fonts.

Computer companies have targeted laser technology for intensive research in order to develop more economical laser printers. Consequently, quality of lasers and other components has increased while costs have significantly decreased in the last several years. New technology has reduced costs to the level where laser printers are almost feasible for single- and multiuser computer systems, while they were initially cost-effective only for use with mainframe computers and high-volume form printing jobs.

Not everyone, however, has jumped on the laser bandwagon. Management at Brother Industries, Ltd., an old-timer in the typewriter and printer market, has no laser printer entry and no plans at this time to bring one to market. According to Robert Hawthorne, director of product development at Brother Industries, their typical customer needs letter-quality printing but often on odd-sized paper and multipart forms, applications that nonimpact printers cannot provide. His other concerns include the issue of software incompatibility and that most of the software is written for daisy wheel and dot matrix printers.

However, Hawthorne doesn't rule out laser printers as a future product for his company. "As the price of laser printers comes down and the software matches [occur], we will be interested in a laser printer. In fact, we're interested in having the opportunity to OEM one from another vendor," Hawthorne said.

Another nonplayer in the low-end laser printer market is Big Blue itself. But IBM's nonstatus is probably temporary, according to Aaron Goldberg, director of Micro Advisory Services at International Data Corp. (IDC) in Framingham, Mass. Goldberg explained that the opportunities for profit are greater these days in the peripheral market.

Because IBM has rarely let a profitable market niche escape it, its entry into the laser printer area might occur soon. "I think it is a natural move for IBM to want to get into this very important peripheral area. I wouldn't bet that [IBM would sell] its own machine, but I think they will be selling something," Goldberg predicted.

Most of the consultants contacted agreed with Goldberg's optimism about the laser printer market. Hedy Taub, senior researcher with Richardson, Texas-based Future Computing, Inc. said Future Computing sees the low-end, desktop laser printer market as a very strong one. "We see it as a growing market, replacing solid font printers in the office environment and really being used for a lot more applications and tremendously expanding its user base."

Despite drawbacks, laser printers are expected to do well financially. Low- and medium-usage laser printers, however, will augment rather than supplant other types of printers.

The market for desktop laser printers is brand-new. The age of the desktop laser printer for personal computers was born in 1984, according to a report entitled *Printers in the Office 1985*, published by IDC in September of that year. It began with Hewlett-Packard Co.'s Laserjet and was followed by the Apple Computer, Inc.'s Laserwriter, Xerox Corp.'s 4045 and DEC's LNO3.

Laser printers have the ability to print text and graphics on the same page, are extremely quiet and offer near-perfect resolution. Disadvantages include very low volume ability, nearly nonexistent envelope addressing ability, lack of compatibility with many software packages, need for more care and maintenance than dot matrix or daisy wheel printers and increased supply costs.

Of the above disadvantages, perhaps the most burdensome is the low volume ability or duty cycle. Although most of the low-end laser printers can produce 8 or more copies per minute, manufacturers suggest the maximum duty cycle is approximately 3,000 copies per month (about 150 copies a day or 19 copies per hour).

What happens if you leave the printer on and try to push it beyond its recommended limits? "Quite simply, you'll have a meltdown," Gerald Babb, vice-president of marketing for Corona Data Systems, Inc., said. "[Laser printers] have to be turned off and cooled down for so many hours during the day. Continuous operation over a long period of time will literally cause a premature death. It will not sustain itself."

Despite drawbacks, however, laser printers are expected to do well financially. According to the IDC survey, shipments in 1984 were 16,000 units, but forecasted shipments for 1990 are expected to reach 185,000 printers. Because of the limitations inherent in the breed, however, low- and medium-usage laser printers will augment rather than supplant other types of printers.

Jim Minervino, research analyst in the Printer Market Program at IDC, provided figures as of September 25, 1985 that were even more impressive. According to the research, forecasted sales for desktop laser printers will reach 234,000 in 1990, and the installed base at that time is expected to reach over 1 million units.

Minervino sees technological advances proceeding at a faster clip than originally thought. He credited this primarily to the commercial availability of the Canon U.S.A., Inc. engine, which revolutionized the industry. He also predicted lower cost and slightly slower printers with duty cycles doubling within the next two years.

"There is a rumor going around that at Comdex in November Ricoh [Corp.] will introduce a 5-page-per-minute printer that will sell for under $1,000," Minervino said. This would make laser printers affordable for almost all business personal computer users, especially those whose personal computers are part of local-area networks.

The following is a sampling of some of the low-end, desktop laser printers currently available:

■ Hewlett-Packard Co. (HP) offers two laser printers for the microcomputer market. Both Laserjet and Laserjet Plus are based on the Canon LBP-CX technology. Laserjet operates with HP's own family of personal computers, in addition to the IBM Personal Computer and IBM PC-compatibles, Apple Computer, Inc.'s Apple II and Macintosh, Texas Instruments, Inc.'s Professional, DEC's Rainbow, Tandy Corp.'s Tandy 2000 and computers from AT&T Information Systems, NCR Corp., NEC Information Systems, Inc. and Wang Laboratories, Inc.

Laserjet registers a noise level of less than 55 db, printer output resolution is 300 by 300 dots/in. and print speed is 8 copies/min. In addition to the standard typewriter Courier 10 font, which comes with the printer, four other fonts in plug-in cartridges are available. The printer uses standard cut sheet paper, legal-size paper and European sizes A4 and B5 and will process bond letterhead, envelopes, labels and transparencies designed for photocopiers. Laserjet also comes with a built-in sheet feeder that can handle 100 sheets at a time. Two-sided printing can be accomplished manually. The disposable printing cartridge lasts for about 3,000 pages.

Laserjet is 18.5 in. wide, 28.2 in. deep (with trays) and 11.4 in. high and weighs 71 lb. It is priced at $2,995.

Laserjet Plus has all the capabilities of Laserjet, but adds 512K bytes of memory and provides users with advanced graphics, down-loadable fonts and electronic forms capabilities. Laserjet Plus costs $3,995. Laserjet printer owners can upgrade to Laserjet Plus with an upgrade kit costing $1,495 through December 31, 1985; after that, the kit will cost $1,995.

■ Corona Data Systems, Inc. LP-300 laser printer is also based on the Canon LBP-CX engine. The printer operates with all IBM PCs and IBM PC-compatibles. In addition, LP-300 has an Epson America, Inc. Emulator, allowing the printer to process all Epson MX-80/100 and RX-80 escape codes.

LP-300 has a noise level of less than 55 db, offers 300 dot/in. output resolution and prints up to 8 pages/min. Thirteen fonts are provided on the software diskette packaged with the system with 26 additional fonts available. The printer accepts all standard paper types in letter, legal and European A4 and B5 sizes. A paper tray for automatic feeding is standard with the system. The print cartridge is good for 3,500 pages.

LP-300 measures 18.5 in. wide by 16.2 in. long by 11.4 in. high and weighs 55 lb unloaded. The entire system sells for $3,395.

■ Also based on the Canon LBP-CX engine, Apple's Laserwriter can be shared by up to 31 users in a work group via Apple's Appletalk personal network. In addition, through a built-in program to emulate the Diablo Systems, Inc. 630, IBM PCs and IBM PC-compatibles using many software programs can print directly on the Laserwriter with no software modification.

Laserwriter has an operating noise level of less than 55 db, provides print resolution of 300 dots/in. for both text and graphics and has an output rate of up to 8 pages/min. Although Laserwriter produces the best output on 16 lb to 21 lb single sheet copier bond paper, the printer will accept most letterhead and colored stock from 8 lb to 34 lb and standard overhead transparency material from the automatic feeder. Envelopes and labels can be manually fed.

In addition to the ordinary fonts, Laserwriter is the first personal computer printer to be awarded license to use the original Helvetica and Times typefaces, making Laserwriter a particularly good choice for desktop publishing applications. The toner cartridge lasts for 2,000 to 3,000 pages.

Laserwriter measures 18.5 in. wide by 28.2 in. deep (with trays) by 11.5 in. high and weighs 77 lb. The suggested retail price is $6,995, including toner cartridge.

■ DEC's contribution to the laser printer market is LNO3, based on the Ricoh engine. LNO3 operates both with multiuser and single-user systems. At this time, the printer is compatible only with DEC computers.

LNO3 provides text resolution of 300 by 300 dots/in., simple business graphics resolution of 150 dots/in. and prints at 8 pages/min. LNO3 comes with 16 resident fonts. Optional fonts are available in precoded read-only memory (ROM) cartridges or in host media that are downline-loadable to 128K bytes of random-access memory (RAM) cartridges, offering 24 fonts/page.

Of particular interest are the paper handling capabilities of the DEC printer. The paper input tray holds 250 sheets and the exit paper path automatically collates output in a 250-sheet output tray. LNO3 handles 8.5 in. by 11 in., 16 lb to 24 lb cut sheet paper. Transparencies can also be printed by loading plain paper copier acetate into the input cassette. Toner is added every 3,000 pages, the print belt is changed every 10,000 pages.

LNO3 is 15 in. high by 21 in. wide by 23.5 in. deep, weighs 80 lb and costs $4,195.

■ Xerox Corp., long the leader in the high-speed copier market, recently introduced its new desktop laser printer, the 4045 Laser CP. In addition to its ability to be shared by up to four personal computers, Laser CP can also operate as a distributed printer in IBM 3274/3276 networks using IBM Systems Network Architecture Data Link Control (SNA/SDLC) as well as in IBM Systems 34/36/38 environments.

The printer has 128K bytes of memory with optional memory expansion of 384K bytes to provide bit-mapped graphics printing and for receiving fonts from host computers.

Unlike most other laser printers in its price range, Laser CP provides for 10 page/min output and its duty cycle is 5,000 pages/month. The printer includes two resident standard fonts and offers up to four optional ROM cartridges, allowing up to 36 different fonts to be loaded and accessed from the cartridges. A 250-sheet paper cassette holds letter- or legal-size paper; optional cassettes are available to feed 8.5 in. by 13 in. paper or European size paper. Laser CP also accepts colored or prepunched paper, transparencies and gummed labels.

Laser CP requires 22 in. by 28 in. of space on a desktop and sells for $4,995.

■ QMS, Inc. (formerly Quality Micro Systems) has a desktop laser printer called Smartwriter. Based on the Canon LBP-CX engine, Smartwriter is compatible with the IBM PC family and all IBM PC-compatibles. Smartwriter boasts some niceties that most other laser printers either do not offer or charge extra money for including support for Qume Corp., Diablo, Epson and American National Standards Institute X3.64 escape sequences, 7 standard fonts, support for parallel interface and reversible image and boldface fonts.

QMS's printer operates at a noise level less than 55 db and provides 300-dot by 300-dot resolution output. Like most of the others, Smartwriter puts out 8 pages/min for up to 3,000 copies/month. The printer comes with an input tray that holds 100 sheets and an output tray that accepts 50 sheets. Two-sided copying can be done manually.

Smartwriter measures 18.7 in. wide by 11.4 in. high by 16.3 in. deep and retails for $3,850.

■

White is a senior writer at Computerworld Focus.

IBM's entry into the laser printer area might occur soon because it has rarely let a profitable market niche escape it.

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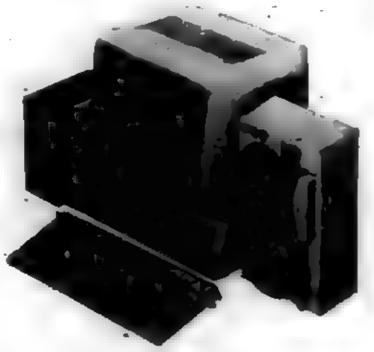

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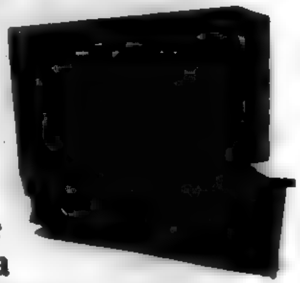

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DAVE JOLY

3270 Emulation: Vendors Bait The Hook

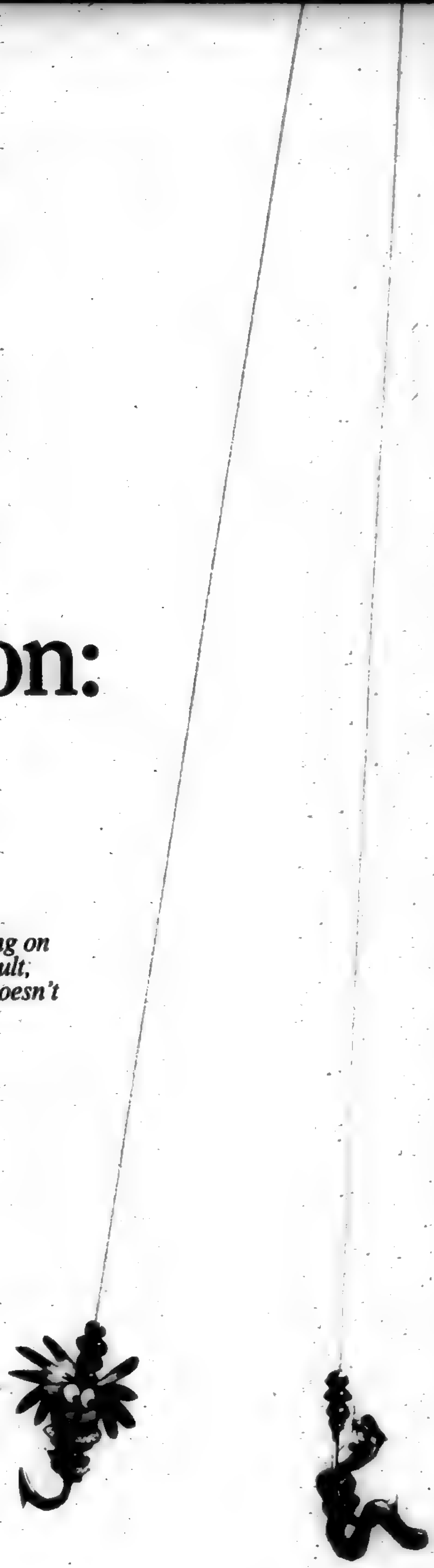
Terminal emulation is here to stay. Vendors are jumping on the 3270 bandwagon and offering alternatives. As a result, more and more users are realizing that terminal care doesn't have to mean staying with IBM.

By Stan Kolodziej

As users and vendors push toward interactive local/host processing, the 3270 market continues to be hot, although IBM Personal Computers and compatibles keep cropping up as a possible alternative. In most cases it's up to management information systems to make the difficult choice.

The 3270 terminal market, despite growing pressure from PCs and compatibles, registered a growth of over 19% in 1984, accounting for unit shipments of over 633,000, according to International Data Corp. (IDC), a Framingham, Mass., market research firm. During the same year, IDC reported the U.S. installed base of 3270 terminals reached 2,882,000. High growth rates are expected to continue through the end of the decade; not bad for an industry said to be teetering on the brink of extinction a few years ago, a market waiting for the PC juggernaut to arrive.

"There is no doubt there will always be a dedicated market for 3270 terminals that will not be touched by personal computers," Greg Blatnick, senior industry analyst at Dataquest, Inc. a San Jose, Calif., research group, explained. "The dedicated terminal users are part of what we call 'terminal heaven,' rows of clerical people performing data entry, order entry and data retrieval tasks for which the stand-alone processing power of the personal computer is not needed. People are surprised



that this dedicated market is still growing and still segmented from the brunt of the personal computer office market."

MIS is being torn in several directions. Users are asking for personal computers for their applications, but the micros have all too frequently proven to be headaches for the MIS department. The 3270 technology is a proven entity with which MIS is familiar.

The 3270 emulation board market for PCs and compatibles is healthy enough, but Ilene Goldman, research analyst at IDC, outlined a number of problems with PC 3270 emulation products that have slowed the full potential for their sales. Problems with file transfer from mainframes to PCs, problems with data security and the annoyance of a PC's memory being suspended until the data exchange between PC and mainframe is finished have taken their toll.

A further drag has been the aggressive 3270 terminal quantity discount pricing thrown in by IBM combined with prices of emulation boards that have remained in the comparatively high range of $1,000 to $1,500. (With good discounts, users can get 3270 terminals for under $2,000.)

According to Blatnick, "You also have to remember that communications with mainframes have been an afterthought with most PC customers. PCs are stand-alone machines . . . that are only used about 10% of the time. MIS departments know this.

"MIS feels a lot of negatives toward PCs from their experiences of the past few years. PCs are expensive machines that are a hassle to train on and difficult to integrate with each other," Blatnick added.

"The new pressure to integrate PCs with mainframes and get more use from micros is being stalled by some of the negative comments MIS departments have heard about PC emulation boards, local-area networks and other 3270 emulation products. What MIS sees in terminals is familiar: time proven technology, simplicity and attractive pricing. I don't think terminals will make a big dent with established PC users — PCs are part of the American dream of owning your own property and users are stubborn to give them up, but terminals could make some inroads in the new office markets," Blatnick concluded.

Not long ago, the only real alternative to the 3270 terminal was the protocol converter box. Now the alternative 3270 market is varied and includes, along with emulation boards, facilities such as network gateways, local-area networks, advanced cluster controllers, mainframe software and even private branch exchanges. A key factor in the future of the 3270 market, however, rests heavily with IBM — the people who started it all 15 years ago.

A great deal of attention has recently been centered on IBM's Logical Unit (L.U.) 6.2 communications protocol, and for good reason. The L.U. 6.2 protocol could eventually free the IBM mainframe from the role of director of communications access and data transfer between various devices on IBM's Systems Network Architecture (SNA) networks.

MIS is torn in several directions. Micros have often proven to be a headache for MIS, and the 3270 technology is an entity with which MIS is familiar.

The L.U. 6.2 protocol is a completion of the sixth layer (presentation services) of SNA that controls communications among application programs across various devices and communications networks. This type of peer-to-peer communications permits any device supporting L.U. 6.2 to transfer information directly to any device supporting the protocol without the mainframe directing communications access. In addition, the L.U. 6.2 protocol enables micro users to simultaneously request multiple conversations with different mainframe processes. The L.U. 6.2 protocol will replace the master/slave relationship with present 3270 emulation micro-to-mainframe links. Using program-to-program communications, two application programs running on different machines can transfer data no matter what languages are used.

L.U. 6.2 will have repercussions in the 3270 market. Personal computers from any vendor supporting the L.U. 6.2 protocol will be able to talk directly to IBM mainframes without first having to be repackaged to resemble dumb terminals. Micro users will benefit from not having to configure their micros to look like other machines. L.U. 6.2 will also enable micros to access mainframe data without having to disengage its main memory while in a micro-to-mainframe session.

Such a de facto standard could also help MIS departments relieve their mainframes of micro-to-mainframe polling burdens, which have been handled by powerful mainframe software programs. According to Teri Williams, assistant editor at Datapro Research Corp., Delran, N.J., "It will provide MIS with some breathing space to handle other applications."

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IBM has implemented L.U. 6.2 on CICS, the 5520 administration system, and its System/36 and System/38 minicomputers, but it has not yet introduced L.U. 6.2 for its microcomputer line, though Williams thinks IBM could come out very soon with a version within its PC Personal Services software.

The true impact of L.U. 6.2 will probably not be felt in the 3270 market for several years. IBM will gradually test the commercial waters with L.U. 6.2, slowly extending it across its product lines. In any case, IBM has made the L.U. 6.2 specifications open enough to provide hardware and software developers (such as Rabbit Software and others) with ample lead time to incorporate L.U. 6.2 into new products once the expected IBM L.U. 6.2 products arrive. With L.U. 6.2 still in the future, the present battle for the 3270 market remains in the realm of terminals and emulation boards.

IBM will gradually test the commercial waters with L.U. 6.2, slowly extending it across its product lines.

Ron Carlini, vice-president of marketing at Telex Computer Products, Inc., Tulsa, Okla., takes a pragmatic approach to the whole question of 3270 emulation, "Terminals are a low-risk investment in an SNA environment. With billions of dollars in software already embedded in these networks, it isn't cost-effective to redo micros to make them fit the mold."

Despite drawbacks, there are enough pluses with PC 3270 emulation boards to make it a hot growth market. Venture Development Corp., a Natick, Mass., consulting firm, estimated U.S. shipments of emulation boards/communications software totaled 125,000 units in 1984, will reach 283,000 units in 1985 and climb to almost half a million units through 1986.

"Boards will always be attractive because they save users from adding extra coax and an extra footprint," Jim Weber, consultant at PA Computers and Telecommunications, Princeton, N.J., explained.

Even with the presence of major players such as Digital Communications Associates, Inc. (DCA) of Norcross, Ga., and Techland Systems, Inc. of New York City, companies have swarmed into the emulation board market. Like the microcomputer software market, large corporate customers are becoming a little more conservative about which companies they do business with. Sometimes, however, customers have little choice.

"We would have liked to have looked around a bit, but our software applications company in Chicago made it clear that their software only supported one company's emulation board," Peter Santarelli, senior information center technician/network specialist at the New Hampshire Insurance Group, Manchester, N.H., explained. Santarelli's insurance company currently has about 40 emulation boards from CXI, Inc. of Palo Alto, Calif., plugged into PCs that are spread out among the firm's insurance agents and branch offices in New Hampshire.

The CXI Remote Plus boards operate with modems at offices not possessing an IBM 3274 or 3276 cluster controller. Agents can use the boards and modems to dial in remotely through the firm's cluster controller in the Manchester head office and into the IBM 3033 and 3083 mainframes. Software that calculates premiums for various lines of commercial insurance coverage sends the processed data back through the cluster controller into an agent's PC. There, optional software purchased from CXI, called 3278/79 Plus, allows agents to do windowing on their screens for the viewing of one host session and one personal computer session.

In spite of some malfunctioning boards and errant software, Santarelli and his staff are planning to increase their installed board total to 200 within a year (within a total IBM PC and IBM Personal Computer AT figure of 400). They will be used for both remote processing and in-house requirements. For the latter, Santarelli has already begun installing CXI's 3278/79 standard coaxial connection boards that connect directly to the cluster controller. A bonus is the ability of the boards to work with file transfer software designed for DCA's large installed base (estimated at over 150,000 by DCA) of Irma emulation boards. The company has also begun testing some SNA-3270 boards from Pathway Design, Inc. located in Wellesley, Mass.

Santarelli's reasons for staying with emulation boards are fairly typical and sound ones: "Quantity purchase discounts have kept the cost per board well below $1,000, but we also didn't want minicomputer-type applications. We wanted processing power right at the desks of users."

Those companies who have made it to the top of a crowded 3270 emulation board market have usually done so by

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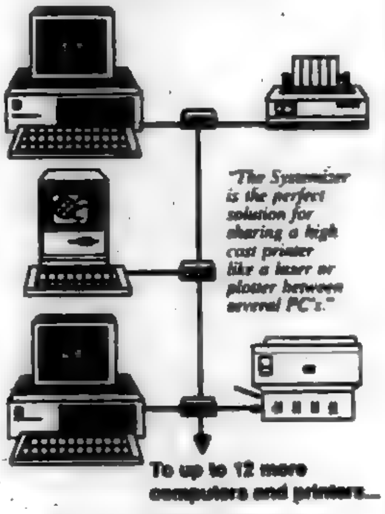
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getting into it early and backing up a good product with good distribution and large quantity discounts. DCA's Barbara Tobias explained, "Board prices over a quantity of 40 or 50 are very negotiable." A DCA distributor added, "We cater to the Fortune 500 companies and usually place 25 to 50 boards in one pop. It's not unusual for us to reach well over 200 boards with a major account over the course of a year."

From an early jump, DCA has never looked back on the success of its PC Irma boards, expanding the line to the IBM Personal Computer XT and PC AT, while keeping in the forefront with new offerings such as the Irmalink/Windows software package that (like the CXI software) allows PC users to display a single host session and a PC session on their screens simultaneously. DCA has just released its Smart Alec interface board that enables communication between PCs and IBM Systems /34 /36 /38.

"Users are confused with the numbers of [emulation] products out there," Ray Boggs, senior consultant with Venture Development, explained. "Any company that wants to thrive will have to keep expanding their lines. Users are looking for one-stop shopping."

Though AST Research, Inc., Irvine, Calif., is more noted for its success in the expansion board market, its Pcox emulation board has been a success due, in large part, to its multitasking ability that enables a user to run a PC-DOS operation while a 3270 session is running in the background.

Windowing capability and a hot key feature (allowing a user to end one operation, then return to the same spot without logging off) have been major reasons the Blue Lynx emulation board from Techland has been a close competitor of the Irma board. Techland has also been busy expanding its line of emulation products with remote 3270 emulation, its 3270 Gateway product for IBM PC Network users and a product that will compete directly with DCA's Smart Alec for the growing 5251, 5291 and 5292 terminal emulation market.

3Com Corp., a maker of local-area network products out of Mountain View, Calif., has recently released its Ether3270 gateway software that allows PCs attached to 3Com's Etherseries local-area network to emulate 3270 terminals. To handle several such PCs, 3Com has devised a method whereby one of the PCs on the network or the company's new 3Server file server are equipped with IBM Synchronous Data Link Control (SDLC) cards and a synchronous modem enabling them to function as 3274 cluster controllers. Cost is about $1,500 per server.

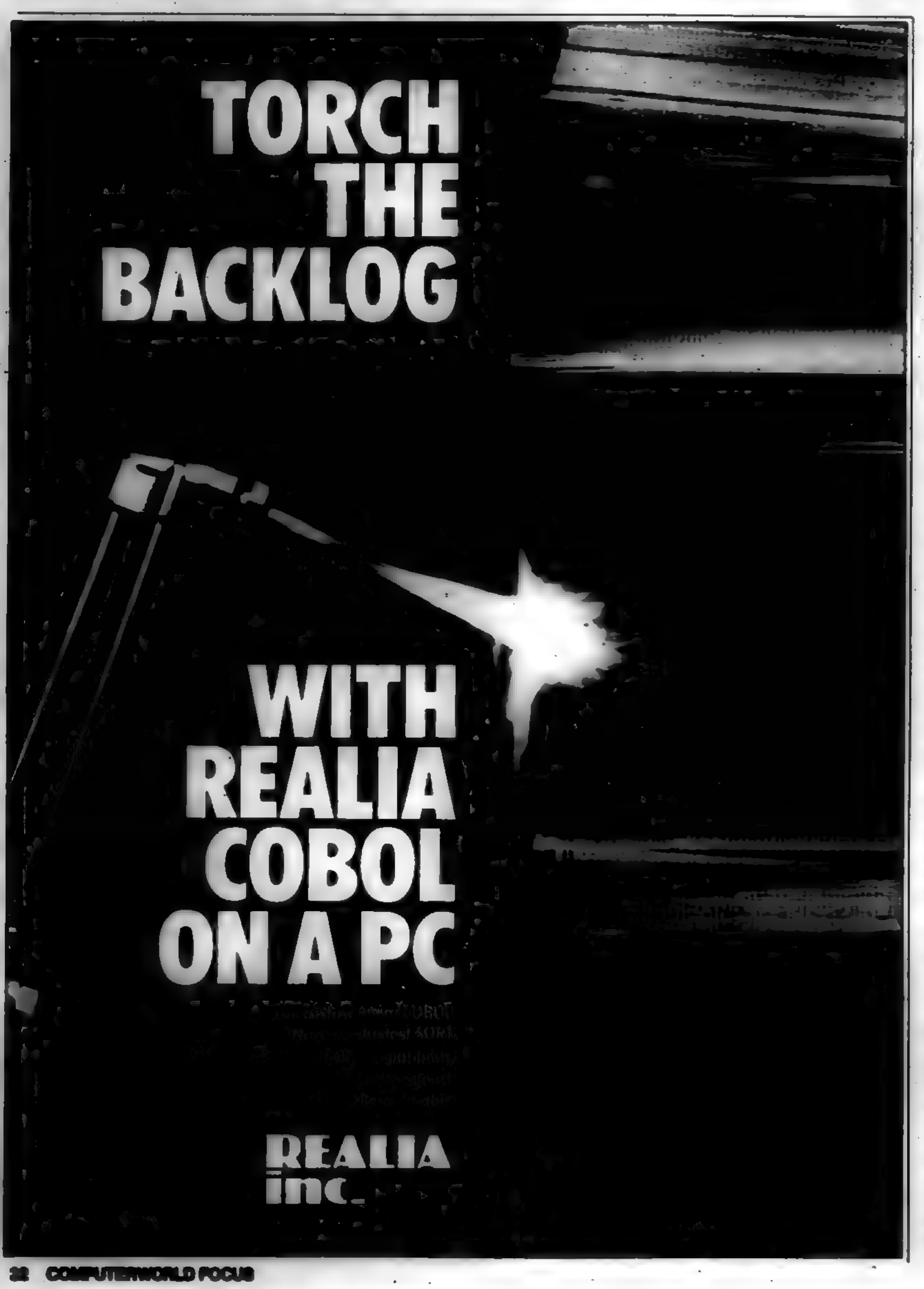
A maker of departmental computing systems, Motorola/Four Phase Systems of Cupertino, Calif., is scheduled to introduce its Mainline product in early 1986. Mainline, according to Dennis Donahue, senior product marketing analyst at Four Phase, will enable a user to extend 3270 communications not just within the traditional single mainframe limitation, but with up to eight IBM mainframes, while also providing "programmatic communications control" among the mainframes from the user's PC. Mainline is not priced at this point, but Donahue said it will be supporting the company's Vision-Linc software ($3,500) that enables 3270 emulation users to access the Vision line series of data base management programs running on the company's Series 4000 and 5000 computers.

Those at the top have gotten into it early and backed up a good product with good distribution and large quantity discounts.

Winterhalter, Inc., Ann Arbor, Mich., has been beta testing Datatalker 2, a new version of its 3274/76 emulation controller. On the surface, Datatalker 2 represents an enhanced controller offering the kind of value-added features that should prove attractive to those interested in 3270. According to Don Redding, Winterhalter's vice-president of product development, Datatalker 2 will come bundled with the following: Applications Program Interface (API) that allows a user to integrate 3270 emulation directly into an applications program; Quickscreen, a program for reducing line traffic; Calctran, a file format conversion program; and File Transfer, a program for IBM CMS and TSO environments. "It's now a question of bundling in more than the next guy," Redding explained.

Mainframe-based software is also becoming more inventive. A new package called 3270-Plus from Rabbit Software takes advantage of the multitasking features of the Unix operating system to emulate a 3274 controller as well as IBM's device-specific L.U. types.

The package includes a module called Program Interface Module (PIM) that permits direct application program-to-application program communication between a microcomputer and a mainframe.



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John Doherty, Rabbit's president, has classified PIM as a forerunner of IBM's much anticipated L.U.-type 6.2 protocol.

"Even private branch exchanges are beginning to offer 3270 and Ascii conversion technology," Goldman at IDC said. "The alternative market is small, but users who have been grabbing at anything now have more than enough alternatives to wait and be selective."

The 3270 terminal market takes up the lion's share of the 3270 world, making up almost 70% of the total market in 1984, according to IDC. Within that segment, IBM's share is placed conservatively at anywhere from 60% to 70%. Far down the earnings column comes Telex (about 10%); followed by ITT Courier Terminal Systems of Tempe, Ariz., (about 7.8%); AT&T Teletype of Skokie, Ill., (5.7%); and Lee Data Corp. of Eden Prairie, Minn., (3.7%). (These are IDC's 1984 figures, but Goldman said there is little reason to believe they will significantly change in the near future.)

While the 3270 terminal market is robust, it is not manna from heaven for all players. Besides IBM, only Telex registered a good 1984, according to IDC, but it too is feeling the effects from a recent series of IBM price slashing and new product announcements such as the 3179 and 3179 Model G, the 3180-1 and 3180-2 and the 3161 and 3163 Ascii terminals — all of which are departures from IBM's mainstay 3278 line.

Goldman said IBM's strategy, at least in the short-term, seems clear: Keep offering low-cost, low-profile terminals and deliver them quickly, introducing some value-added features (such as graphics) that until now have been the responsibility of the so-called plug-compatible manufacturers (PCM) like Telex and Lee Data. PCM are trying to keep out of IBM's destructive path. Telex, which Goldman said possesses an excellent marketing force and good timing for new product introductions, has introduced its new 078 and 079 12-in. screen terminals at prices Carlini said "reflect our work and success at keeping production cost curves down."

ITT Courier has taken a different tack with the introduction of its Applications Processor, a microcomputer system packing an Intel Corp. 80286 microprocessor and capable, the company said, of providing ITT 9200 terminal users with standard 3270 host communications. It also comes bundled with Q-Office word processing software and Intel's Idis spreadsheet and data base management programs. ITT Courier, in effect, has created an enhanced 3274 controller full of value-added material to help solidify its customer base.

AT&T also means business. It is leveling its sights and taking aim at IBM with three just-introduced families of 3270 terminals and a cluster controller (see In the News, Page 10). AT&T will market its terminals in configurations of eight or 16 terminals, a controller and two printers, starting at $41,000.

The real future of the 3270 market, however, lies with IBM.

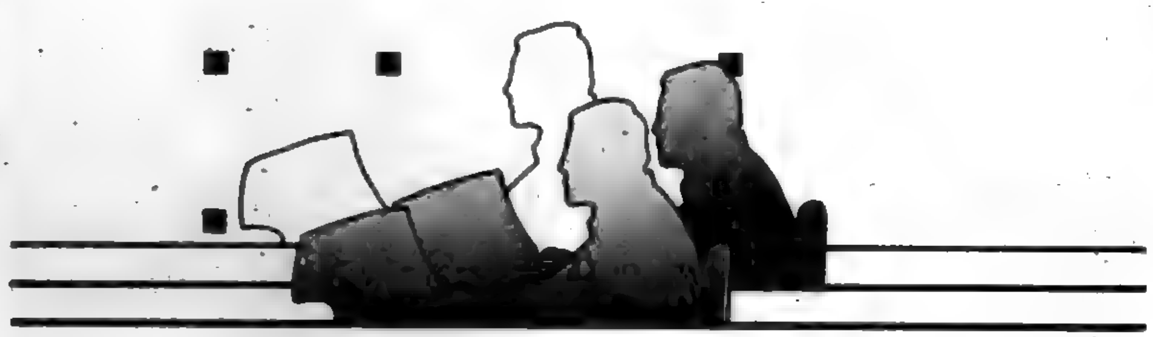
Its high-end 6538 and 6539 terminals will feature windowing, handling four separate and concurrent asynchronous/synchronous sessions with a top-of-the-line terminal price of $2,890. Ken Kampa, responsible for product planning and product management of the synchronous product line at AT&T, said, "The new product line has been developed to achieve a high presence in the commercial marketplace."

The real future of the 3270 market, however, lies with IBM. Besides the L.U. 6.2 protocol, there are other possibly imminent product announcements from IBM that could alter the outlook of 3270. IBM has been rumored to be on the verge of introducing a new 3274 cluster controller that industry watchers say could support up to 64 devices, provide multiple port connections to the host(s), local-area network connections, wide-ranging terminal support (for example, PCs, voice data, Ascii, 3270/PC as well as 3270) and hard disk storage.

IBM's garden of PC products, many of which sport built-in 3270 communications, is a confusing array of family products. Currently, within the 3270 micro family alone, there are AT 3270, AT 3270 Model G and AT 3270 Model GX and the 3270 PC series. Resulting confusion has probably made the third-party emulation board and software markets more attractive to PC users.

■

Kolodziej is a senior writer at Computerworld Focus.



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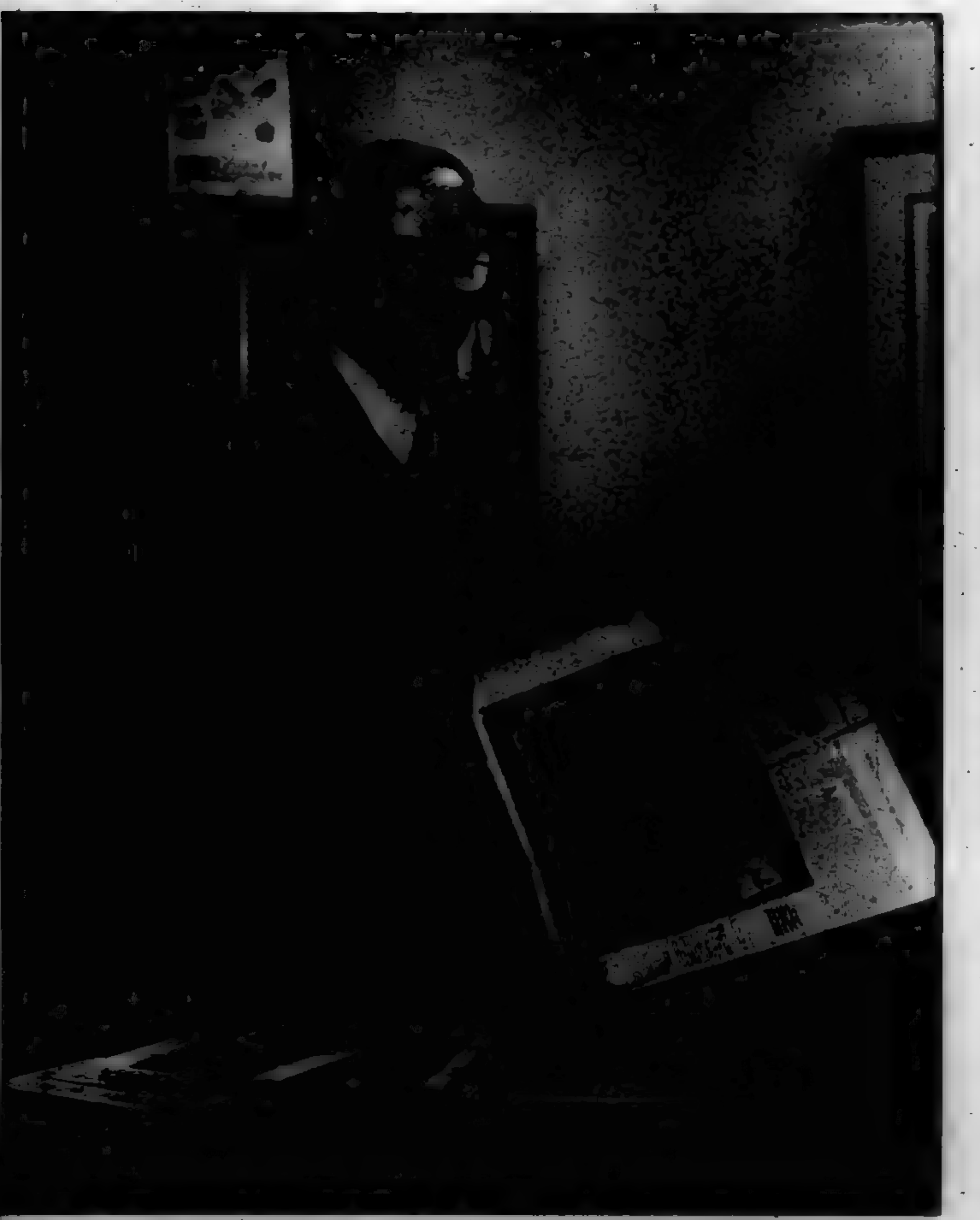

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MORE IS BETTER

IBM PC add-on boards are still selling, but a hot PC AT market is spelling expansion relief for more micro users. What kind of variety and power are add-on board vendors offering for those who want more byte in their machines.

By Stan Kolodziej

Not very long ago, vendors of add-on boards for IBM Personal Computers and compatibles were a concerned bunch.

The good news had IBM coming out with a new microcomputer, but the bad news had Big Blue supplying it with so many built-in features that the add-on market could be frozen out, stuck instead in a crowded PC board market.

The fears proved unfounded. When the IBM Personal Computer AT finally appeared last year, relief was evident. IBM had left the AT wide open for third-party board vendors to create a new market.

Though the AT has been out for over a year now, sales of multifunction and expansion boards for the AT and its growing list of compatibles have been slow in getting up to speed, due in large part to early problems with the AT's disk drives and IBM's hesitation, until recently, to ship in large volumes.

No matter. Board sales for the IBM PC and its compatibles are still climbing. Tim Riggins, an analyst at Future Computing, Inc., Richardson, Texas, placed unit sales of both PC multifunction and expansion boards at 1.7 million in 1985, representing $700 million in sales. That's up from 1 million unit sales and $415 million in 1984. By 1987, Riggins predicted over 3 billion PC boards will be sold and the market will reach $1 billion.

Not everyone, however, sees a rosy PC add-on board market. "The add-on board business will be in a precarious position because of the growing differences between cost and retail prices," Aaron Goldberg, director, micro advisory services at International Data Corp. (IDC), a Framingham, Mass., research group, explained.

As with so many maturing markets, the PC add-on board market, although only four years old, is being dominated by a few major vendors taking in the yeoman's share of revenues. "About five companies have 85% to 90% of the market," Riggins explained, "with AST Research, Inc., [Irvine, Calif.] the big player." Future Computing's survey of computer retail stores showed that AST Research's Sixpack Plus IBM PC multifunction boards were outselling other boards by a ratio of about five to one. AST Research was said to have reached the 500,000 board installations number, and Riggins calculated that the company could account for up to 45% of multifunction board sales.

Others that are running at the heels of AST Research include Tecmar, Inc., Solon, Ohio; Quadram Corp., Norcross, Ga.; Persyst/Emulex Corp., Costa Mesa, Calif.; and Hercules Computer Technology, Berkeley, Calif.

Multifunction boards are generally distinguished from expansion boards by the number of functions they provide. An expansion board usually concentrates on providing a single personal computer feature such as graphics or memory expansion, while multifunction boards can put several features on a single add-on board.

A multifunction board, for example, could plug into an AT and provide additional memory up to 1M byte or 2M bytes (user-expandable through 64K-byte and 256K-byte chip increments), a parallel printer port, two asynchronous RS-232C communications ports and an optional game port for graphics. All of these features are packed onto one board that only requires one AT expansion slot and costs less than $600 in today's marketplace. For under $250, however, a user can also buy a single-purpose board that can hike an IBM PC's memory up by 256K bytes.

The most popular features of multifunction boards include memory expansion, internal clock and input/output functions. Other features might include graphics and color capabilities for IBM monochrome monitors, built-in modems, print memory buffers, disk emulation for pseudo memory expansion, security lock-out features and sometimes even bundled-in software. For example, AST is bundling Borland International, Inc.'s Sidekick program into its Sixpack Plus multifunction boards, and Tecmar has long included its Treasure Chest software package with its top multifunction boards.

The IBM PC is a natural promoter of what is termed the add-on board aftermarket. The PC's processor speed was slow even for 1981 microcomputer standards. Now its 4MHz Intel Corp. 8088 processor seems excruciatingly listless when not employing coprocessors built into add-on boards and designed to increase the 8088's speed. Most software today needs far more than the basic 64K bytes of memory the PC provides. Again, memory add-on boards can remedy the problem.

To aggravate matters, the IBM PC is a computer not easily integrated with printers and other peripherals, while its own color adapter handles only four colors. In fact, if users want to handle sophisticated software, statistical processing, increase memory and storage, do color graphics or add some data security, they will probably go to expansion and multifunction boards.

Add-on boards are also now packing enough power and features to make management information systems stand up and take notice. Motorola, Inc., Phoenix, Ariz., for example, has just introduced an IBM PC expansion board that it claims allows a PC with a 10M-byte hard disk to serve as a multiprocessor host for AT&T Unix applications. The PC/68000 includes the 10-MHz Motorola 68000 microprocessor, cache memory, 2M-byte dual-ported random-access memory along with bundled proprietary Motorola System V/68 operating system. At $4,500, it doesn't come for a song, but it gives an idea of how single board advances are offering to extend the use of IBM PCs in corporations.

Despite the PC's inherent limitations, IBM's reputation carried it to success, and the market for add-on boards followed in the jet stream. Riggins maintained, "the PC ironically created thriving aftermarkets based on its own inadequacies." It's a symbiotic marriage that works: The IBM PC created the add-on board market, and that same market is prolonging the life of the PC, even extending the PC's reach into previously exclusive and hostile areas such as laboratory testing and industrial process control.

The add-on board market, however, is getting crowded. Datapro Research Corp., a market research firm in Delran, N.J., reported that the number of current add-on board vendors supplying the PC, AT and compatibles market could be as high as 250 in the U.S. That figure does not include the growing number of offshore companies, primarily based in the Far East, that are using off-the-shelf components and cheap labor to unload board clones in the U.S. market, undercutting prices of established U.S. board makers. In retaliation, U.S. firms have begun taking representatives of these offshore companies to court for patent infringement and have issued warnings to consumers about the lack of service and warranties backing these imported boards.

"More board companies will go with proprietary technology to head off those companies putting standard components on boards, bundling them with software and selling both for slightly more than the retail price of the software," said Goldberg at IDC.

Despite crowding, the board market does seem to leave room for innovation. At a recent PC Expo show, for example, a number of vendors displayed PC expansion and multifunction boards offering power and features not available even a year ago. One unusual multifunction board is the Modem Accelerator from Datran Corp., Los Angeles, Calif. The company said the Modem Accelerator is a microprocessor oriented toward human language. The board uses a read-only memory-based dictionary containing 28,000 words and 4,000 phrases. The command Compress Filename compresses the text — using a 5-bit assignment logic instead of Ascii — to one third its original size. When this is completed, the board's accelerator transmits data at three times the normal speed of the modem, while another modem accelerator at the other end decompresses the data.

Single purpose boards are also finding room for some unconventional features. The PC-Elevator from Applied Reasoning Corp., Cambridge, Mass., places an Intel 80286 chip on a plug-in board, adds some proprietary software along with 2M bytes of random-access memory to produce what the company called a "softboard" that lets the PC or IBM Personal Computer XT run AT applications under a DOS 3.0 or 3.1 environment. Applied Reasoning claims the board increases the speed of the PC to 50% faster than the AT, while allowing existing PC programs to be run without change.

Another example of board ingenuity is Hardcard from Plus Development Corp., Milpitas, Calif., which offers a 10M-byte, 3½-in. Winchester disk drive that has been eased to fit on a single PC add-on board. The company claims it comes complete with electronics, controller and file management plus "one time installation software."

The market for add-on boards is also becoming more complicated with the recent introduction of some vendor standards that their promoters hope will become de facto standards, helping to stabilize the market and increase profits in the bargain. Last April, Lotus Development Corp., Cambridge, Mass., and Intel

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Corp., Santa Clara, Calif., came out with extended memory specifications (EMS), a way to extend memory beyond the 640K-byte DOS 3.0 limit. Shortly thereafter, Microsoft Corp. of Bellevue, Wash., joined the Intel/Lotus team to create EMS 3.2, another version of the standard. Not to be outdone, AST Research, Quadram Corp., and Ashton-Tate, Culver City, Calif., have joined forces to push their own EMS into the market.

Expanded memory, which used to be known as bank-switched memory, allows applications to use memory beyond the built-in limitations of the machine's microprocessor. Bank-switching fools the processor into thinking it has more memory by quickly switching back and forth among memory banks once a bank's capacity is reached.

Whose standard will prevail? "Given that IBM and Microsoft have linked up or are going to continue to work together, I think that what will come out of that relationship will determine what the hook is to extended memory specs," Goldberg declared. "For all Intel and Lotus or AST and Quadram want to make it, IBM and Microsoft will tell you how it really is."

Add-on boards supporting the Intel/Lotus EMS specs are just now starting to appear on the market. The Memory-Companion/PC board, for example, from STB Systems, Inc., Richardson, Texas, offers bank-switching capability for PCs, XTs, ATs and compatibles. STB Systems claimed the board provides up to 2M bytes of memory for software programs using the Lotus/Intel EMS. AST Research has also introduced a board called Rampage that uses an enhanced superset of EMS, which the company claims is more flexible than the specification itself.

"If [board] companies don't incorporate Lotus/Intel memory specs from here on," Bill Weber, consultant at PA Computers and Telecommunications, Princeton, N.J., concluded, "they're going to meet a lot of market resistance. There's also going to be big pressure on software companies to provide programs taking advantage of the extra byte space provided by EMS and the board makers."

EMS relies on sleight of hand programming to increase memory, but it can do nothing to increase speed, which will also be a requirement to fully use EMS. A number of add-on board companies are filling niches aimed at users who need to take their existing PCs and XTs into the same speed lane as the AT, without paying the AT price tag.

These so-called accelerator or turbo boards are generally single-purpose expansion boards packing a high-speed coprocessor — usually an Intel 8086, 80186 or 80286 — and additional memory chips. Some of the boards also manage to find room for the Intel 8087 math coprocessor, which gives the computer that much more clout with applications carrying heavy number crunching.

An example is Quadram's Quadsprint, a board featuring a 10MHz Intel 8086 coprocessor along with 4K bytes of cache memory that acts as a memory buffer to speed system throughput.

Although IDC predicted only about 30,000 of these accelerator boards will be sold in 1985, the $1,000 to $2,000 price range is attractive enough for value-added resellers and original equipment manufacturers to plug them into PCs and XTs, bundle or customize vertical application software and market it to the thriving professional and departmental computing markets. (Accelerator boards are finding a solid base of users in the financial community where business analysts need the extra speed for handling quick calculation and recalculation of financial statistics.)

"For all Intel and Lotus or AST and Quadram want to make it, IBM and Microsoft will tell you how it really is."

"The AT has really made PC users aware of how slow the PC is," Weber explained. "Accelerator boards will make the transition to the future generation of very fast personal computers a little easier."

As for a logical limit to the number of features multifunction boards can provide on a single add-on unit, both development costs and user resistance will probably act as a drag on the development of true all-in-one boards. To begin with, estimates can place the costs of doubling the features of a multifunction board to several hundreds of thousand of dollars. In any case, users might not be that anxious to purchase all-in-one boards should they appear.

According to Riggins, "Quadram is a prime example of a company trying to get more functionality on their boards without real success. Their attempt, for example, to increase sales by incorporating graphics on their Silverquad and Goldquad multifunction boards is not paying dividends. There is a point of diminishing returns.

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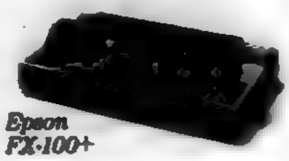

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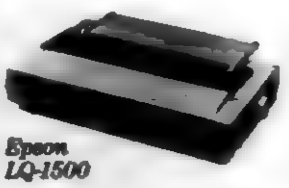

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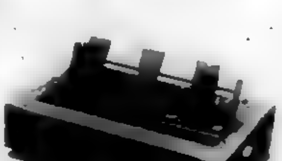

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memory expansion. Surveys indicate a user probably wants something like a good, dedicated graphics board than something integrated with software programs such as Symphony [Lotus Development Corp.], and perhaps packing other features," Riggins concluded.

After its slow start, the AT aftermarket is gaining momentum, but opinions vary as to its exact health. Riggins at Future Computing predicts a much tougher AT market for add-on boards, already stalled slightly from IBM's recent introduction of its own AT graphics adapter.

"There's no question that the AT market will require board companies to produce devices with more functionality than ever before," Riggins concluded. "The IBM PC experience has made compatible makers better prepared, both in technical terms and in marketing, this time around with the AT. Users are also more sophisticated. AT board makers will have to be in a position to bring something better than what the AT compatible makers are bringing to market, and that will require a lot of resources. The AT aftermarket won't be for the little guy."

Datapro has tallied at least 50 current AT add-on board makers and found that most carry a broad line of products rather than one or two. Expansion of product line seems to be the rule for survival. In the Datapro survey, 60 companies accounted for 300 board products, an average of five boards per company. "From the start we knew we had to be more than a one product company to succeed in this business," Martin Alpert, president of Tecmar, said.

Though the swing seems definitely toward the AT and compatible market, Future Computing's survey of over 600 U.S. retail outlets found that only the Advantage multifunction board from AST Research was meeting sales expectations in the AT add-on market.

Board vendors are hoping, however, that more users like the Cleveland Clinic will find the extra processing punch the AT commands over the IBM PC irresistible. The Cleveland Clinic, a research hospital in Cleveland, Ohio, has been busy removing its Burroughs Corp. B20 and B30 workstations, replacing them with 200 ATs over the course of the next year. Part of the plan involves using Maestro AT multifunction boards from Tecmar, 40 of which have already been installed.

A spokesman for the clinic explained that although the Burroughs machines handled multiuser processing they lacked adequate third-party software. "There are only 256K bytes on the ATs delivered from IBM," he said, "so we're getting some extra memory up to 1M byte per machine. We want to be ready when the new generation software [based on EMS] appears."

The Maestro boards provide two memory blocks. The first block upgrades the AT to a maximum of 640K bytes, the maximum amount of memory usable by DOS 3.0. The 640K-byte capacity provides enough memory for most of today's popular programs such as Lotus' 1-2-3 and Symphony. The second block can upgrade memory to 2M bytes through the use of 64K-byte and 256K-byte chips.

Tecmar maintained that this additional memory could be employed in multiuser environments running multiuser operating systems such as AT&T's Unix and Microsoft's Xenix. Maestro's built-in extras include one serial and one parallel port along with its Treasure Chest package of 24 software modules, which it bundles free of charge. A Maestro board with a base 128K bytes costs $589; climbing to 2M bytes using 10 256K-byte chips will run nearly $4,600.

AST Research's Advantage board, apparently the early leader in the AT add-on market, features three banks of 18 sockets for memory chips on its main circuit boards and an additional three banks on a daughter board. With its two levels loaded to their capacity, the user has over 3M bytes of memory. The board comes with standard serial and parallel ports and has a base price of $595.

Other board makers that are serious contenders for the AT market are STB Systems with its Grand Byte board that starts at $395 and goes to over 2M bytes and Sigma Designs, Inc.'s Maximizer board that also goes to beyond 2M bytes and has a base price of $549.

AT board vendors offer memory expansion in controlled increments, mainly because as yet there is little software available that can fully use 640K bytes of memory, let alone 1M byte. With gradual memory expansion, users can increase memory to coincide with the arrival of the newer programs requiring ever greater chunks of RAM.

Also, prices of memory chips are falling. The prices of 64K-byte chips might even have hit rock bottom, some analysts say, making the continuing price reduction of 256K-byte chips even more attractive. Many corporate users will no doubt wait further, hoping prices will plummet even more.

Though overall the future of the aftermarket for IBM PC and especially the AT looks bright, vendors are beginning to worry again. The much anticipated PC2, or next generation of IBM PC, is haunting many vendors. Again, it's the specter of closed architectures and too many built-in features.

"They'll always be room for worry here," Weber of PA Computers explained. "It's part of the business."

■

Kolodziej is a senior writer at Computerworld Focus.

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Supermicros: Solution In Search of A Problem

The price of computing power is coming down. At the same time the memory gets fatter, speeds race higher and operating systems become more compatible. Soon there may be a chicken in every pot and a supermicro on every desk.

By Lee White

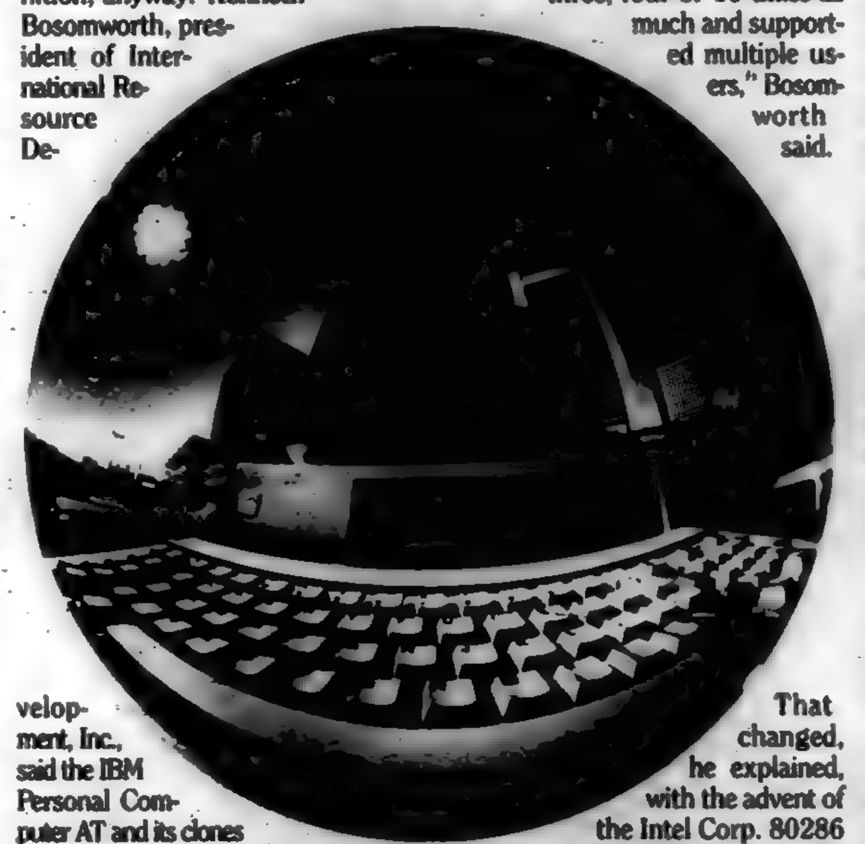
Figuratively speaking, what's gray and fuzzy and resides in limbo? Why, the supermicrocomputer, of course.

Although the supermicrocomputer is not in widespread use in U.S. corporations and is only slightly more visible in the academic and scientific communities, this may change soon. Industry watchers agree that within the next few years the supermicrocomputer will have a significant impact on the computer hardware market and an even bigger impact on the traditional MIS department.

What the experts don't agree on, however, is the definition of supermicrocomputer. Larry Lefkowitz, associate editor of the microcomputer group at Datapro Research Corp., defined the machine as "something more than a microcomputer and something less than a minicomputer."

The supermicro is more a marketing distinction than a technical one, according to Tim Caffrey, director of Strategies for Microcomputers and Office Systems at International Data Corp. in Framingham, Mass. The supermicrocomputer, Caffrey said, "is a microprocessor-based system, but the microprocessor is powerful enough and the operating system so designed to support more than one user. It can be a shared logic system, comparable to a minicomputer. That's sort of a marketing distinction, to separate it from a personal computer."

How important is such a definition, anyway? Kenneth Bosomworth, president of International Resource Development, Inc., said the IBM Personal Computer AT and its clones cannot be compared to the Altos Computer Systems, Inc. and Fortune Systems Corp. systems and added that a definition of supermicrocomputers is not as useful or meaningful as it used to be. "Before machines like the [IBM PC] AT came out, there was very definitely a dividing line between what people knew as a single-user personal computer and what usually cost three, four or 10 times as much and supported multiple users," Bosomworth said.



GEOFF O'CONNELL PHOTO

That changed, he explained, with the advent of the Intel Corp. 80286 and Motorola, Inc. 68000 microprocessors, which made personal computers so powerful that they melded into the supermicro arena.

The dividing line between personal computers and supermicrocomputers may occur in relation to microprocessor power and operating systems like Bell Laboratories, Inc.'s Unix and Microsoft, Inc.'s Xenix that allow for multiple users. But the division between supermicrocomputers and minicomputers also appears to be fuzzy. Jim Renalds, industry analyst with Dataquest, Inc. said that supermicrocomputers are generally based upon nonproprietary processors like those made by Intel, Zilog, Inc., Motorola or National Semiconductor Corp. Furthermore, Renalds said, supermicros support a limited number of users, while the typical minicomputer supports anywhere from 30 to 200 users; and the storage capabilities of supermicros run from 20M bytes to 200M bytes, while minis can reach 1G byte or 2G bytes.

Using Renalds' definition, Digital Equipment Corp.'s Microvax II fits into the minicomputer category. Microvax uses DEC's own 78032 processor, its own operating systems (MicroVMS, Ultrix-32M and ELN) and offers a maximum 2G bytes of storage. Yet all the industry experts and DEC spokespeople call the Microvax a supermicro.

Another machine that does not fit Renalds' definition, but is indeed a supermicro, is the IBM System/36 PC. While the standard System/36 is a minicomputer, the

System/36 PC uses the IBM 5364 processor, an IBM proprietary operating system (System/36 System Support Program) and can support four local workstations, including the attached PC, systems printer and any combination of two PCs, printers or System/36 displays. In addition, up to 64 remote workstations can be attached.

While exceptions seem to be the rule when it comes to defining a supermicrocomputer, for the purpose of this article a supermicrocomputer is defined as a 16- or 32-bit microprocessor-based computer that runs an operating system capable of supporting more than one user and has an entry-level price less than $20,000.

Before a great hue and cry enters the stratosphere at the $20,000 cutoff price, it is necessary to define the audience. There are millions of microcomputer users in small- and medium-size companies and in departments within large companies who have either outgrown their micros or now find a need to communicate with other microcomputers in their companies or departments. In the case of small companies, $20,000 is a very steep price. In the case of departments within large companies, $20,000 is hard to justify when there may be multiple multimillion dollar mainframes for the using. It is for these reasons that supermicros like the Altos 3068 with a minimum configuration price of $23,490 are excluded.

The above definition also precludes including some very strong players in the supermicro market, notably the Compaq Computer Corp. with its Compaq Deskpro 286. Although it has the Intel 80286 chip, runs at 8 MHz, can be configured with 8.2M-byte random-access memory and 70M-byte hard disk storage, a spokesman for the company said Compaq does not support Xenix (although Xenix does run on the 286). Until such time as Compaq considers Xenix a viable operating system, there is no multiuser capability.

For the same reason, Corona Data Systems, Inc.'s Mega PC is not included. Although literature stated Mega PC supported up to eight users, Microsoft, Inc.'s MS-DOS is the only operating system; therefore, the box is acting as a file server only.

The technical specifications of the supermicros within our definition appear in chart form (see Figure 1, Page 46). Of more immediate interest, however, is the impact of the supermicro in the marketplace.

According to a survey performed by Dataquest, in 1984 worldwide shipments by U.S. vendors were 230,000 units at an average of $18,000 per system (including printers) for a total dollar value of $4.2 billion. The estimate for 1985 is 295,000 units totaling $5.4 billion, again with the average cost per system of $18,000. Dataquest forecasts a 28% annual growth rate with the price per system staying the same, but the price/performance ratio rising. The 10 vendors who were 1984 leaders in the supermicro market were Burroughs Corp. (13%); Altos (5.8%); NCR Corp. (4.2%); Televideo, Inc. (4.2%); Fortune (3.3%); Tandy Corp. (3.0%); Compupro, Inc. (3%); DEC (2%); Molecular Computer Corp. (1.8%); and Cromemco, Inc. (1.8%). The total market share of these leaders is 42.1%, leaving 57.9% of the market share to 165 different vendors, according to Dataquest.

With 175 vendors in the supermicro market, some of which tout entry-level prices that hover around $5,000, there is little doubt that the era of the no-frills personal computer is coming to an end. Luanne Kruse, an analyst with Future Computing, the Dallas-based market research company, stated that office personal computers will increase in power and performance and bump up against the supermicros.

Supermicros will play a significant role in the hardware market, according to Harvey L. Poppel, partner in Broadview Associates, the Fort Lee, N.J., merger and acquisition firm specialising in the information industry. "[The supermicro] changes the competitive dynamics of who's got what position. In some respects, you can think

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Entries will be judged on significance, rarity, date, completness and condition. Items particularly sought include pre-1980 machines, early serial numbers (get those number 1's out), machines made for purchase outside of North America (even modern machines are sought in this category); first releases of software such as first releases of operating systems, languages and mass-marketed and original applications; and pre-1980 photographs, newsletters, manuals and other records. The Computer Museum is a private non-profit educational institution. All donations are tax-deductible according to the provisions of the Internal Revenue Service. Thinker Toys is a registered trademark of George Murrow & Murrow Designs, Inc.

of the supermicro as the collision ground between the micro suppliers and the mainframe and mini suppliers," Poppel added.

According to Kruse, Future Computing believes that the winners in the supermicro market will be based on the IBM PC AT's Intel 80286 processor, for the same reason that the winners in the micro market were all IBM PC compatible. "We think the machines are going to be making that switch to the 80286. We've just seen the announcement of the Hewlett-Packard Co. Vectra and the Sperry Corp. PC/IT. We think in a couple of years' time they [80286-based computers] will be the center of the marketplace and could represent 50% to 75%," Kruse said.

Along with the impact of the supermicro on the marketplace, there will definitely be an impact on the corporate MIS department. Broadview Associates' Poppel sees the rising popularity of the supermicro as a continuation of the trend toward making more power immediately accessible to the end user. He explained that this power exists not only in the microprocessor, but also in the downward compatibility of the machines, citing as an example DEC's Microvax II with operating systems and applications and data base management software written for much larger systems.

How will this affect the MIS director and the often huge MIS department? Poppel stressed that the evolutionary trend toward more power on the end user's desk will continue to erode the role of the MIS executive as controller of a company's computing capabilities. "This [advent of the supermicro] enables vendors to sell directly to end users who are becoming more and more literate and capable of developing their own applications. This will allow users to get out from under whatever bottlenecks they may perceive to exist in the central site, either from a systems development point of view or a hardware point of view," Poppel said.

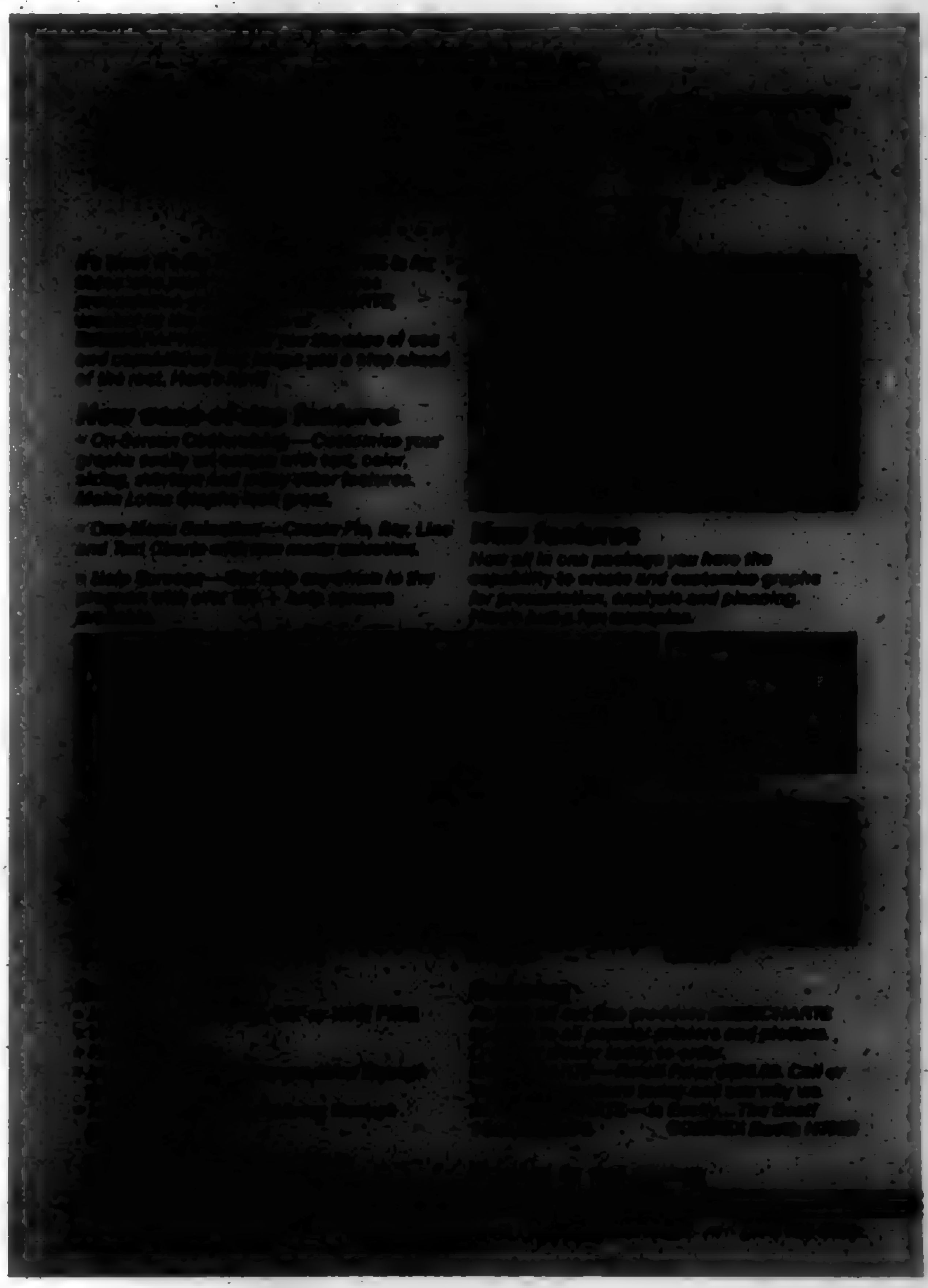
But it's not all doom and gloom for the MIS executive and staff. According to Christine Steitz, senior analyst with Infocorp, a computer market research firm in Cupertino, Calif., a lot of the old traditional MIS power was usurped by the hailstorm of personal computers. Steitz stated that in the beginning MIS recoiled from the horror of the personal computer age. However, these same MIS professionals are now taking control of personal computers and departmental computers, too.

What role will the MIS department play in the future of corporate computing. "I don't happen to think [the MIS role] is to run central data centers or to control all systems development in the company," he said. Instead, Poppel sees the overall management and networking of all the systems in the company as the primary future function of MIS. While "all the things that MIS directors were originally very proud of and built their empires around [will become] less important," Poppel asserts that the enlightened MIS director will not be threatened by the increasing end-user computing power and the resulting decrease in central computing power.

Poppel's sentiments were echoed and expanded upon by John Connell, executive director of the Office Technology Research Group in Pasadena, Calif. Connell maintained that small systems management, whether the systems are stand-alone personal computers, supermicros or minis, should be in the hands of user departments.

Although the MIS organization gives up a certain amount of control to end-user departments, the MIS staff is able to concentrate on the large data base management systems, the heavy transaction processing systems, the network management activities. "I think in the long haul it's good for the industry and it's good for the profession because you take high-powered people with their graduate degrees in computer science and you put them to work on the most complex difficult aspects of the field, and you let the amateurs, the part-time users, do their own thing." ■

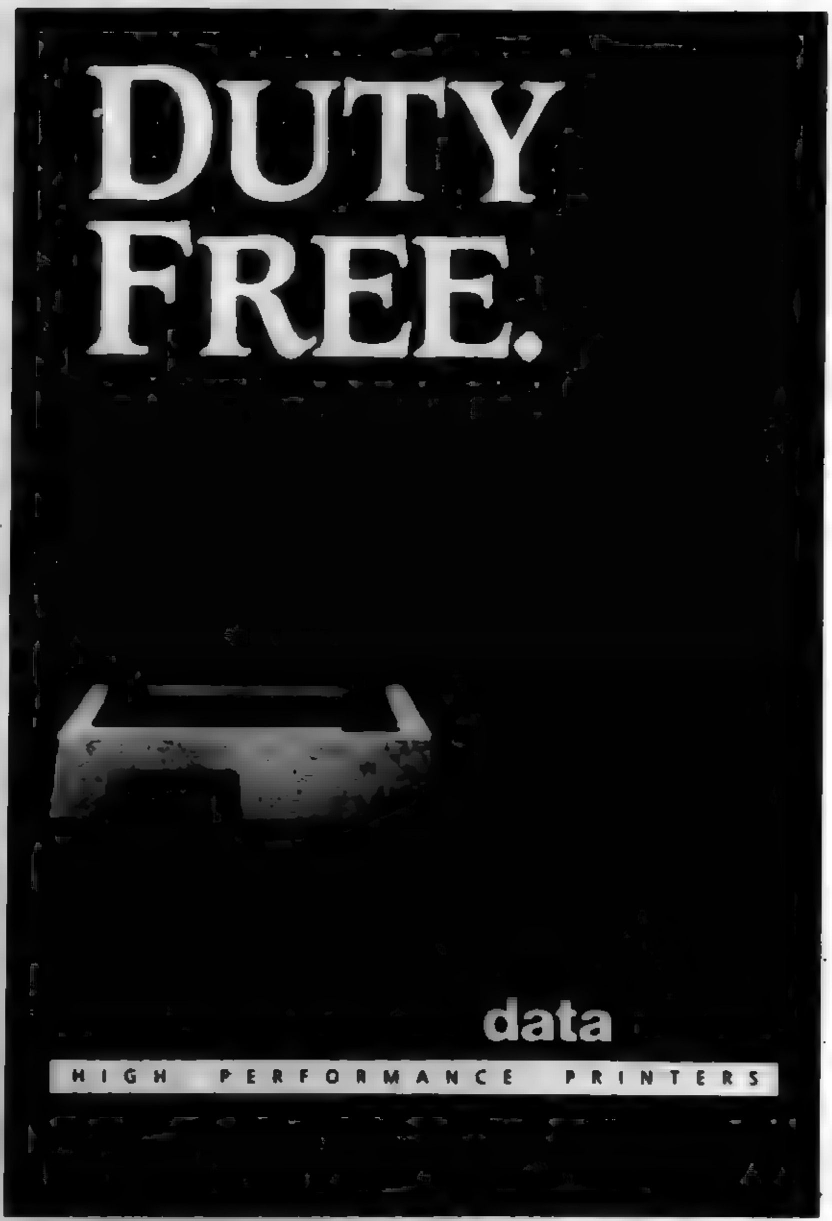
White is a senior writer at Computerworld Focus.



Vendor Model	Microprocessor Operating Speed	Operating System	Maximum No. of Users	Minimum Configuration RAM	 Hard Disk	Maximum Configuration RAM	 Hard Disk	Minimum Configuration Price
Altos Computer Systems, Inc. Model 2086	16/32-bit Intel 80286, 8 MHz	Xenix	30	1M Byte	50M Bytes	8M Bytes	240M Bytes	$14,990
AT&T Unix PC	16/32-bit Motorola 68010, 10 MHz	Unix V	9	512K Bytes	10M Bytes	2M Bytes	20M Bytes	$ 5,095
AT&T 3B2/300	32-bit Western Electric 32000, 7.2 MHz	Unix V	25	512K Bytes	10M Bytes	2M Bytes	72M Bytes	$ 9,650
Convergent Technologies, Inc. Miniframe	16/32-bit Motorola 68010, 10 MHz	Unix V	16	512K Bytes	13M Bytes	2M Bytes	170M Bytes	$ 6,600
Digital Equipment Corp. Microvax II	32-bit DEC 78032, 20 MHz	MicroVMS Ultrix-32M, ELN	30	2M Bytes	31M Bytes	5M Bytes	2G Bytes	$20,000
Fortune Systems Corp. FS 20	32-bit Motorola 68000, 6 MHz	Unix V	5	512K Bytes	20M Bytes	1M Byte	20M Bytes	$ 6,995
IBM Personal Computer AT	16-bit Intel 80286, 6 MHz	PC-DOS Xenix	3	512K Bytes	30M Bytes	3M Bytes	60M Bytes	$ 5,995
IBM System/36 PC	16-bit IBM 5364 *	PC-DOS 5364 System Support Program	4	256K Bytes	40M Bytes	512K Bytes	80M Bytes	$ 5,995
Intel Corp. 286/310 AP	16-bit Intel 80286, 8 MHz	MS-DOS Xenix	16	1M Byte	40M Bytes	2M Bytes	140M Bytes	$11,200
Motorola/Four-Phase Systems, Inc. Series 2080	16/32-bit Motorola 68010, 10 MHz	Unix V	12	512K Bytes	52M Bytes	2M Bytes	369M Bytes	$12,495
NCR Corp. Minitower	16-bit Motorola 68010, 10 MHz	Unix V	8	512K Bytes	25M Bytes	2M Bytes	85M Bytes	$ 6,495
Sperry Corp. PC/IT	16-bit Intel 80286, 8 MHz	Xenix V	9	1M Byte	44.6M Bytes	5M Bytes	89M Bytes	$ 6,834
Texas Instruments, Inc. Business-Pro	16-bit Intel 80286, 6 MHz	MS-DOS Xenix	50	512K Bytes	21M Bytes	3.5M Bytes	40M Bytes	$ 5,795

* Operating Speed Data Unavailable

Figure 1. Sample of Multiuser Supermicrocomputers Under $20,000



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PC World Danmark is the monthly magazine that targets 12,000 IBM PC and compatible users and supplies them with first-hand information on the Danish PC market.

Run reaches 34,000 Commodore owners and potential owners in Denmark. Commodore is expected to grow at 40% per year through 1989. *Run* addresses the Commodore market with timely updates on hardware, software, and programs.

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Hooking Up With the Mainframe

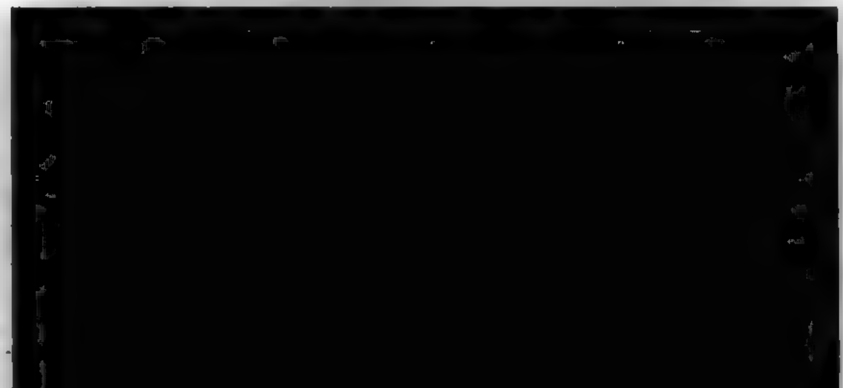
How to best link micros to each other and to mainframe equipment is probably the most asked question by MIS managers today. Here's a down-to-earth look at what's available and what devices to use when.

By Charles G. Teets

In the confusing world of the micro-to-mainframe marketplace, it is left to management information systems to decide the best link for their company's needs. To date, the decision has not been an easy one. For four types of personal computer-to-mainframe products, the following three types of interfaces are currently being used: internal expansion boards, protocol converters and conversion software on the mainframe that allows asynchronous communications products to operate in a full-screen mode as though they were 3270 devices.

The internal expansion boards are the most costly per user and provide the best functionality. They turn the personal computer into a close emulation of several models of 3270 terminals. This emulation combined with the storage capability and programmability of the personal computer allow vendors to implement significant file transfer and file conversion capabilities.

Protocol converters reduce the price per user, but also reduce functionality provided to the user. Some of the storage and programmable features of the personal computer are lost with these external devices because asynchronous communications software is generally required to interface the personal computer to the protocol converter. Some of the transfer and conversion features can be recaptured by programmability and storage capabilities in the protocol converter.


GEOFF O'CONNELL PHOTO

Mainframe software that will allow asynchronous users to access mainframe applications in a full-screen mode is the least expensive and least functional of the three links. All storage and programmability aspects of the personal computer are removed because control is placed on the mainframe.

The four types of personal computer-to-mainframe products now available are simple terminal emulators, terminal emulators with file transfer capabilities, terminal emulators with file transfer and file conversion capabilities and mainframe-dependent applications. The first three types of products — versions of terminal emulators — are used by the mainframe-dependent applications as links between the personal computer and the mainframe.

Simple terminal emulators are becoming a dying breed. Some of the protocol converters and protocol conversion software can still provide this limited functionality, but expansion boards have been enhanced beyond simple terminal emulation. The expansion boards perform most of the file transfer and file conversion capabilities, but some protocol converters can perform simple file transfers.

Mainframe dependent applications fall into two areas: those that closely integrate the personal computer with specific mainframe applications and those that integrate the personal computer into the mainframe environment in a more general way. These products cost much more than the other types of personal computer-to-mainframe products, do not always provide more functionality and require some type of terminal emulator for the link between the personal computer and the mainframe. The high cost results from extensive mainframe software development necessary to allow the personal computer to access the mainframe application easily. Some of the products are restricted to specific mainframe applications and limit overall functionality. The requirement for some additional hardware and software to provide the physical link between the personal computer and the mainframe can add significant cost and complicating factors to the installation of the mainframe dependent application.

Before selecting any micro-to-mainframe link, MIS should consider the following five areas that are critical for most personal computer-to-mainframe users: functionality, ease of use, user interface, documentation and support.

Functionality should always be considered because users may wind up committing large amounts of money to buy personal computer-to-mainframe products that do not work or do not fulfill all of the end user's needs. There are many different features provided by products, and not all of them are provided in any one product. In fact, you will probably never see the ideal product for all users. However, useless functionality in personal computer-to-mainframe products can be a waste of money.

Ease of use is a second aspect to be considered. The easier a product is to understand and use, the greater the acceptance in the organization and the closer it will come to providing for the wants and needs of many users. Some of the newer, more capable products are providing easy-to-use features, but at the same time need someone who is technically oriented to install and configure these features. Users should take care not to get involved with an easy-to-use product that cannot be supported internally.

User interface (closely allied with ease of use) is a third consideration. End users who are not familiar with the complexities of 3270 terminals need a simple, familiar interface. At the same time, experienced users need the ability to get good feedback on operation and solid clues to the causes of problems. A poor user interface can confuse and frustrate inexperienced users and impact productivity.

Documentation is another consideration. New and inexperienced users will shun a product they are unfamiliar with if documentation is difficult to use, incomplete or incomprehensible. Critical areas in documentation include illustrations, glossaries and indexes. Experienced users can become frustrated with documentation that does not contain technical information, details of operation and clues to the inner workings of the hardware and software involved with the product.

Most important and least considered is the issue of support. Not enough buyers consider problems and potential disasters when looking at personal computer-to-mainframe products. What do you do when the chief financial officer cannot get to financial information on the mainframe and the vendor's only support person is out with the flu? How you will be supported is a difficult matter to consider when buying a product like this, but it can become a critical matter at the worst time.

We are starting to see some innovations in personal computer-to-mainframe products. In the future, we will find products that provide a great deal of flexibility while being easy to use, products that make the actual link between the personal computer and the mainframe transparent and allow any link on the market to be used with no obvious indications or concerns on the part of the user, products that allow access to any personal computer or mainframe application and products that blur the distinction between the personal computer and the mainframe by placing resources on each system at the disposal of the other system.

Some of these features are now available. We have recently seen a few products that have provided or implemented virtual disks, easy-to-use menu structures and can accommodate many different personal computer-to-mainframe links. All of these products have a common quality of insulating the end user from the complexity and confusion of personal computer-to-mainframe communications.

Micro Tempus, Inc. was one of the first vendors to introduce a product that simplified the user's task in interfacing to a mainframe. The Tempus-Link product provides virtual disk capabilities that insulate the user from the mainframe environment. All the end user sees is additional disk drives that can be used in the same manner as the local disk drives on the personal computer. Application program interfaces are also provided that allow mainframe applications to access the personal computer's virtual disks. In addition, Micro Tempus has adapted personal computer-to-mainframe links for their product.

Comshare, Inc. recently released W/Information Gateway, a product that provides comprehensive easy-to-use menus, access to mainframe data bases and very good graphics handling capabilities. Experienced users have a great deal of flexibility in setting up the menus, and less experienced users can have those menus customized to their wants and needs. The inexperienced user can also take advantage of the powerful applications and graphics capabilities on the mainframe without experiencing the mainframe's complex environments.

One of the most advanced products is On-Line Software International, Inc.'s Omnilink. This vendor has recently implemented virtual disks, comprehensive menus and interfaces to many different personal computer-to-mainframe links. These were significant enhancements to an earlier version of the product, and the vendor has now placed itself at the forefront of providing the personal computer-to-mainframe product of the future.

There are distinct differences between these products as there are between any personal computer-to-mainframe products. And the aspects mentioned above must be carefully considered as well as the cost when determining what product to buy.

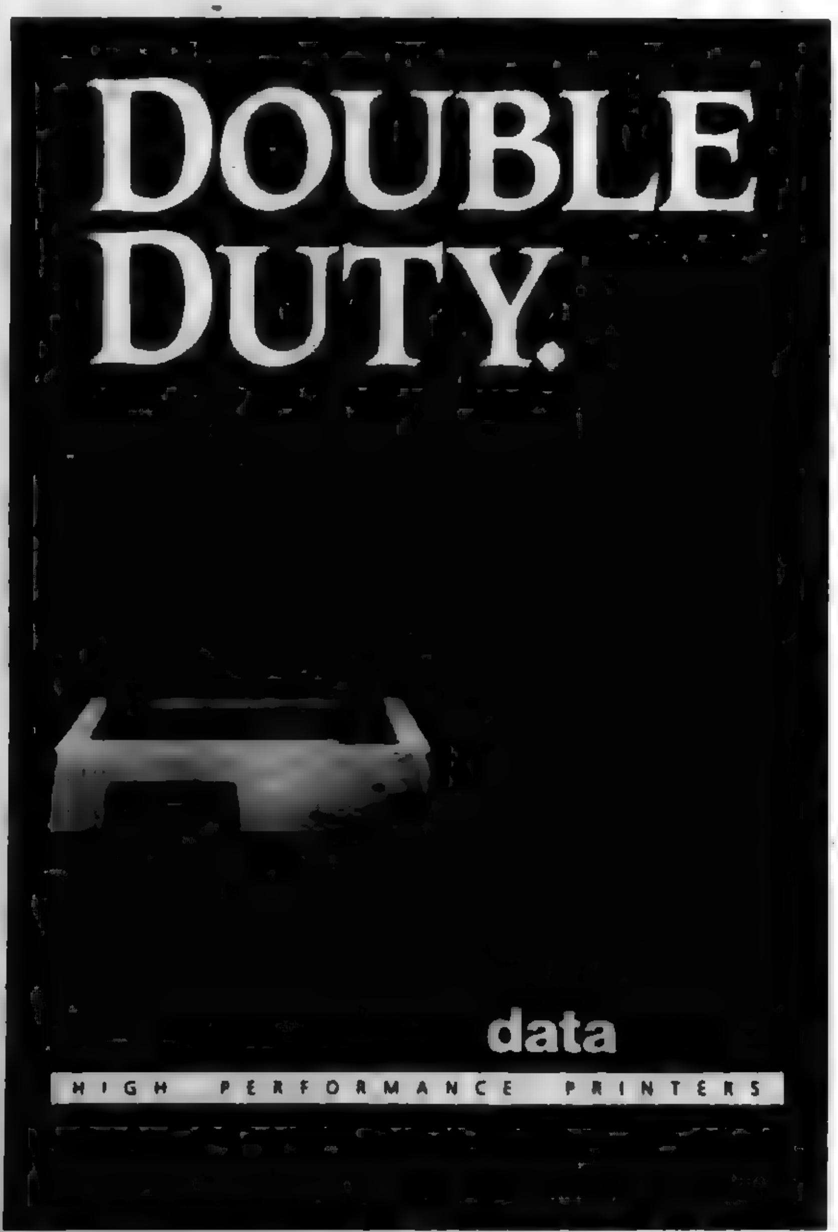
One of the reasons the marketplace in personal computer-to-mainframe communications is so confusing is that so many companies have started up and are then competing for a finite market of business personal computers. It will always remain that way because personal computer-to-mainframe products are not eliminated by significant enhancements in this market. Instead, they are absorbed and integrated into those greatly enhanced products.

The vendors in this area are not trying to change the way IBM does 3270 networks. They are trying to work around the complexities of 3270 to enhance and simplify the way personal computer users can become part of those networks. These efforts started out with simple terminal emulation and grew into complex, comprehensive products.

As personal computer-to-mainframe products become more complex and easier to use, the confusion will shift from what type of product to buy to what product does the best job for the money. Vendors will start to copy the best features of every other vendor's products, and the best selling products will start to closely resemble each other.

The path to the future lies in leaving the complex issues under control of MIS who have the technical expertise to handle them and presenting a simple transparent interface to the end users. A few vendors are taking steps in this direction. And rather than competition making products more complicated and confusing, it is making products simpler and easier for the large number of end users who need access to the vast resources of the mainframe.

Teets is a senior editor and analyst with Data Decisions, located in Cherry Hill, N.J. The information in this article is part of PC Communications, *a 3-volume monthly updated information service.*



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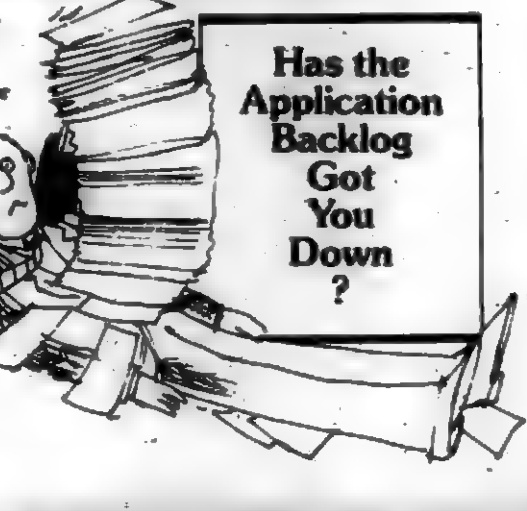

Has the Application Backlog Got You Down ?

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Products

AT&T's Personal Computer 6300 Plus

MORRISTOWN, N.J. — **AT&T Information Systems** recently announced its Personal Computer 6300 Plus and an option board for its Unix PC called DOS-73. According to AT&T, these products will enable its personal computer users to run applications written for MS-DOS and Unix simultaneously, using a concurrent operating system. The operating system, developed for AT&T by Locus Computing Corp. of Santa Monica, Calif., is called OS Merge, and MS-DOS runs as a Unix task with it. In addition, the company announced an upgrade package to convert its 6300 to the 6300 Plus.

Personal Computer 6300 Plus is a 16-bit microcomputer with an Intel Corp. 80286 processor and an optional 80287 math coprocessor. It operates with a 6-MHz clock speed and zero wait states. Main memory for Personal Computer Plus is 512K bytes on the motherboard, upgradable to 1M byte. The computer will support three additional 2M-byte expansion boards for a total of 7M bytes of memory. The floppy disk unit consists of 512K bytes random-access memory, a 1.2M-byte floppy drive and a 360K-byte floppy drive. The hard disk unit replaces the 360K-byte drive with a 20M-byte half-height internal hard disk.

The basic Personal Computer 6300 Plus machine with MS-DOS capability is available immediately. The OS Merge with Unix option will be available in the first quarter 1986. The AT&T Personal Computer 6300 Plus floppy drive unit costs $5,095; the hard drive system costs $6,320. Both systems include keyboard and monochrome monitor. The OS Merge with Unix option costs $395. The DOS-73 board for the Unix PC sells for $995. The upgrade package to convert the Personal Computer 6300 to a Personal Computer 6300 Plus will be available in December for $2,995.

Contact AT&T Information Systems, Room 2D10, 100 Southgate Parkway, Morristown, N.J. 07960.

MARBLEHEAD, Mass. — **Matrix Communications, Inc.** recently unveiled a computer interconnect system that links up to 20 IBM Personal Computers to share peripherals such as printers, modems or disks at an average cost per workstation attachment of $100.

The Alliance series is based on a programmable intelligent cluster controller that connects PCs via RS-232 interfaces at 115K bit/sec and supports from two to 20 IBM or IBM PC-compatible microcomputers and related peripherals in various star configurations. The cluster controller incorporates a multiplex network managed by a Hitachi, Ltd. 64180 microprocessor, using Matrix Communications proprietary software resident in the cluster controller and the user's personal computer. An optional 480K-byte buffer is available for the cluster controller to perform print spooling and electronic mail functions. Because the Alliance currently operates at 115K bit/sec, most business files can be transferred in approximately 10 to 15 sec, according to the vendor.

In addition to the system software that resides in the cluster controller, the Alliance system includes a utility program for administering the network and an interface package that allows each microcomputer to access the network. Installation of the system takes about half an hour, said the vendor, and Matrix Communications also offers a proprietary serial-to-parallel converter to link a parallel device with an asynchronous port.

Scheduled shipments will begin in January 1986. The 8-port model is priced at $895, with a $349 charge for each additional 4-port module. Contact Matrix Communications, Inc., 112-116 Washington St., Marblehead, Mass. 01945.

Matrix Communications, Inc.'s Alliance

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CW Communications has two publications covering the Italian market: *Computerworld Italia* and *PC Magazine*.

Every week, 35,000 MIS/DP executives read *Computerworld Italia*. Modeled after *Computerworld*, its sister publication in the United States, *Computerworld Italia* covers the latest developments in hardware, software, terminals and supply products.

And every month, 30,000 IBM PC users and potential buyers read *PC Magazine*. The editorial focuses on a wide range of topics including software, hardware, in-depth articles and programs.

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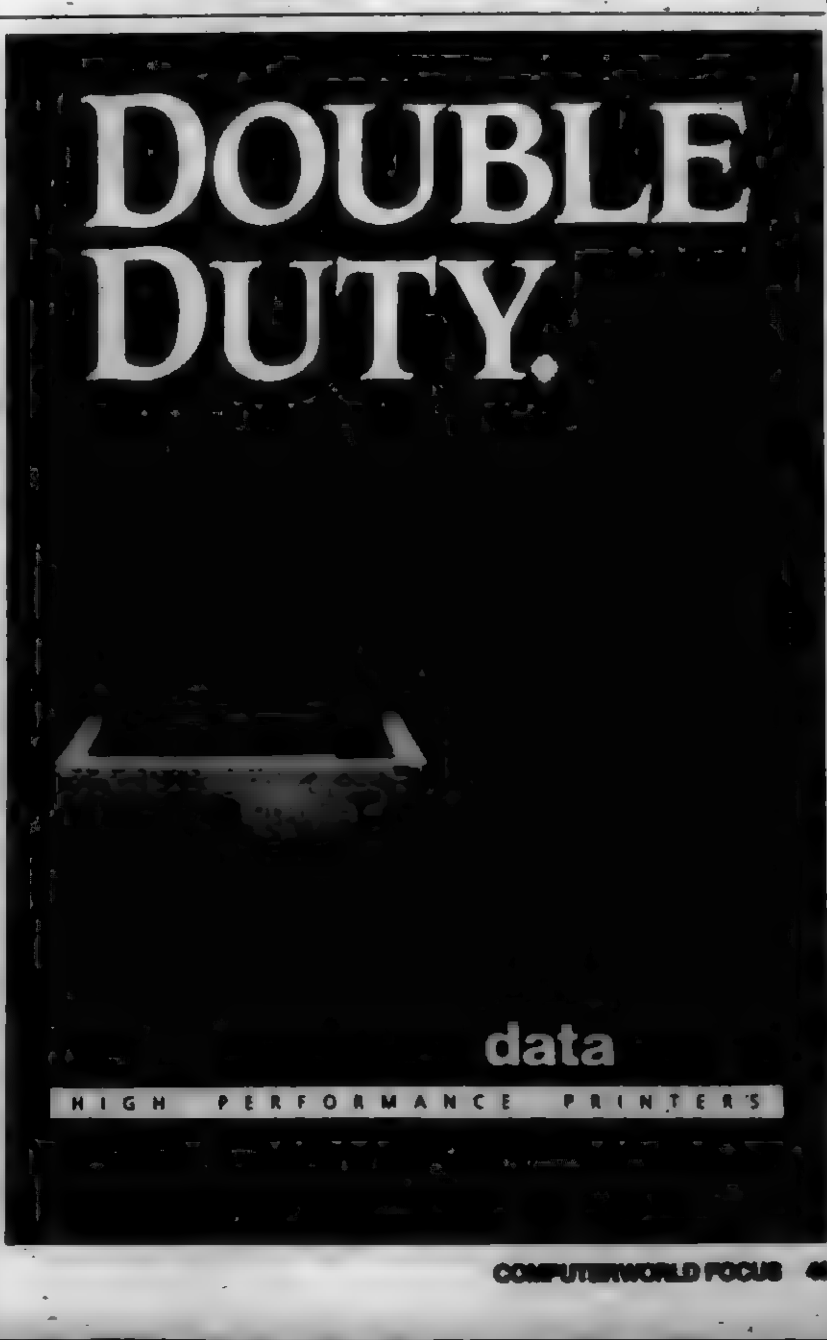


Products

RYE BROOK, N.Y. — **IBM** has introduced Pageprinter, capable of providing letter-quality printing and high-resolution graphics for sharing by IBM Personal Computer users, including those on IBM local-area nets. The table-top unit produces text and graphics with a resolution of 240 by 240 pixels by electrophotography, a print technology using photoconductors, toner and a print head containing gallium arsenide phosphide, light-emitting diodes and no moving parts. Pageprinter prints at speeds up to 12 pages/min on 8½- by 11-in. cut-sheet paper and up to 9.6 pages/min on 8.4- by 14-in. legal-size paper. According to the vendor, the duty cycle for Pageprinter is up to 18,000 copies/month.

PC users can select from 61 standard type fonts stored on a diskette in the Pageprinter; System/36 and System/38 users can choose from 54 stored fonts. In addition, when Pageprinter is attached to a large IBM processor using the VM operating system, users can select from a store of 67 standard fonts or 148 optional typographic and mathematical fonts. The unit has two paper cassettes — one holds up to 550 sheets and one holds up to 250 sheets. Finished jobs are automatically delivered to the output tray face down in sequential order.

Pageprinter can be attached to as many as eight PCs. Many more PC users on the IBM Token-Ring or PC networks can share the printer by directly attaching it to a print server PC containing PC Network programs. The printer can serve as a text-only unit for the System/38 and System/36 5360 and 5362 models and can be used as a full-function text and graphics printer when attached to IBM System/370 models 138 through 168, 4300, 3030, 3080 and 3090 series processors under the VM operating system. Pageprinter has a purchase price of $7,490 and will be available in November for PC and VM systems and in February 1986 for System/36 and System/38 systems. Contact IBM Information Systems Group, 900 King St., Rye Brook, N.Y. 10573.

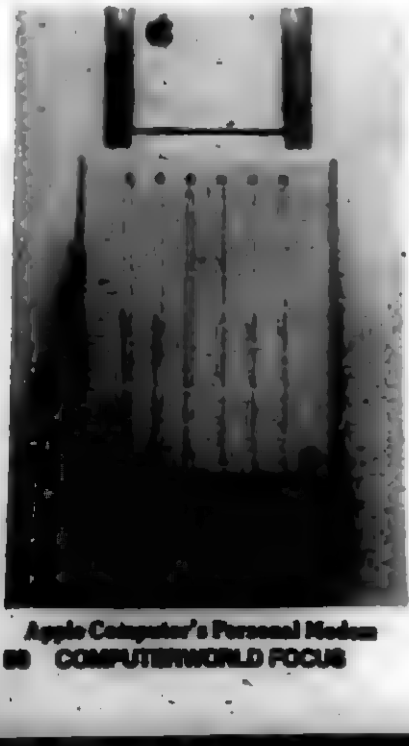
Apple Computer, Inc.'s Hard Disk 20

CUPERTINO, Calif. — **Apple Computer, Inc.** has announced a number of new products to enhance its Macintosh and Apple II lines.

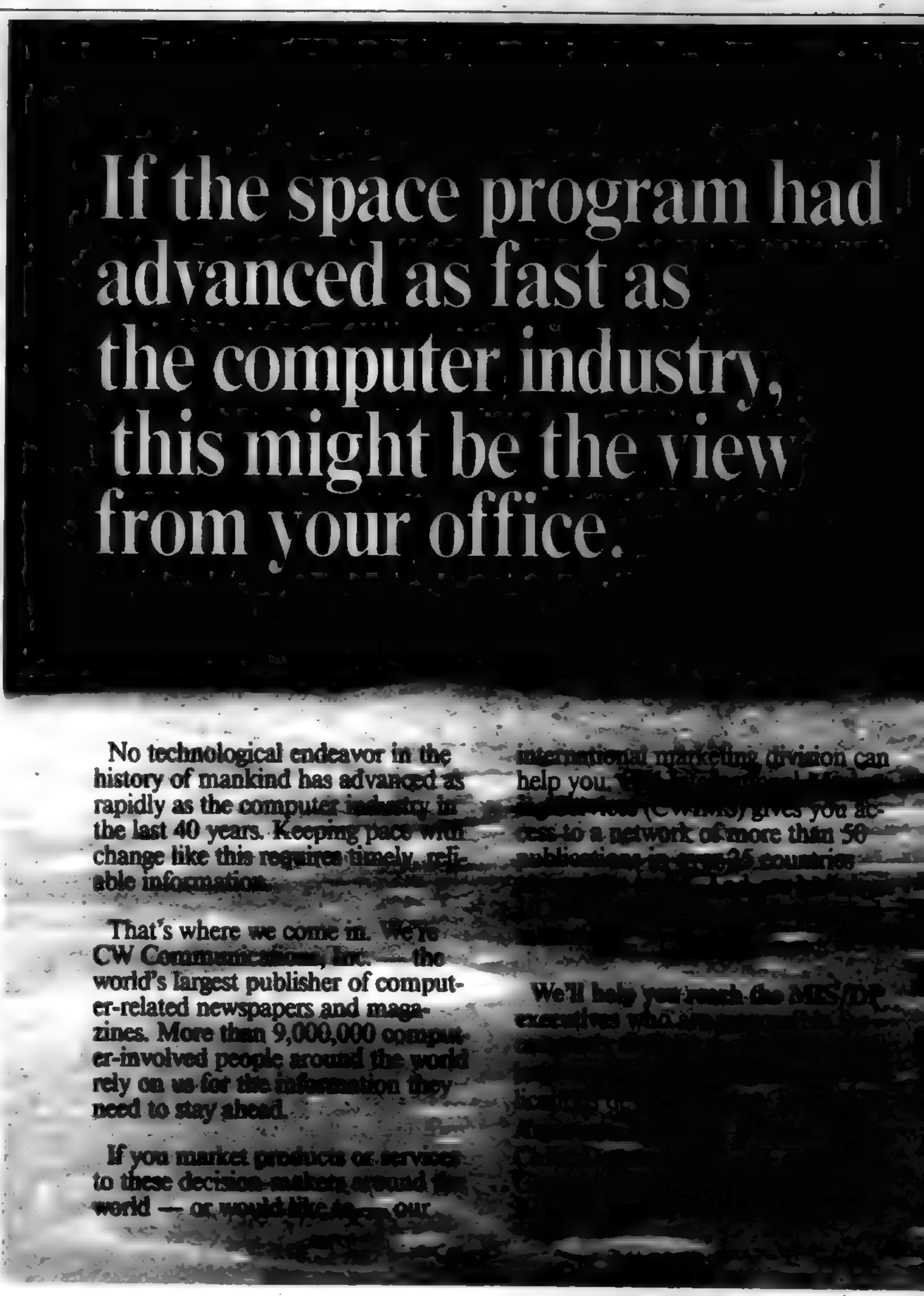
Among the new products for the Macintosh are a 20M-byte hard disk for Macintosh 512K users; Switcher, a software utility that allows users to work with several programs at once; Imagewriter II, a dot-matrix printer with an optional 100-sheet sheet feeder; and Apple Personal Modem, a Hayes Microcomputer Products, Inc.-compatible 300/1,200 bit/sec modem.

For the Apple II, the company announced Unidisk 3.5, a 3½-in. floppy disk drive that can store up to 800K bytes of information, more than five times the capacity of Apple's current 5¼-in. drives.

The 20M-byte hard disk drive for the Macintosh costs $1,499; Switcher is available for a yearly license fee to software developers of $250 per application; Imagewriter II sells for $595 (plus $225 for the sheet feeder); and the Apple Personal Modem costs $399. Unidisk 3.5 for the Apple II series of microcomputers is $499. For more information, contact Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014.


Apple Computer's Personal Modem

SANTA CRUZ, Calif. — **The Santa Cruz Operation, Inc.** introduced its Microsoft Corp.'s Xenix System V operating system on an AT&T Personal Computer 6300. According to the vendor, Xenix V is the first version of Unix developed outside of AT&T to be verified as System V by AT&T's software verification standards. Xenix applications are binary compatible with both Santa Cruz Operation's IBM Personal Computer XT- and AT-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compatible versions of Xenix System V. In addition, applications developed for IBM's current PC AT Xenix 1.0, which is based on System III, will run unchanged on SCO's Intel Corp. 80286-based Xenix System V. The vendor also said that utilities that are part of the Xenix system are binary-identical in both its Intel 8088/86-based Xenix System V and its Intel 80286-based Xenix System V products.

Xenix System V is available in three modules: the operating system, $495, the development system, $495, and the text processing system, $295. All three modules may be purchased bundled together for $995. Contact The Santa Cruz Operation, P.O. Box 1900, 500 Chestnut St., Santa Cruz, Calif. 95061.

HP's Vectra personal computer

PALO ALTO, Calif. — **Hewlett-Packard Co.** has announced the Vectra Personal Computer, a modular desktop unit offering IBM Personal Computer AT compatibility.

Based on the Intel Corp. 80286, 16-bit microprocessor, the Vectra Personal Computer features a modular design that is 30% smaller than the IBM Personal Computer AT.

In addition to being able to run the same applications and use the same accessory cards as the IBM Personal Computer AT, the Vectra Personal Computer operates at 8 MHz, allowing program execution up to 30% faster than the IBM Personal Computer AT, according to the vendor.

The Vectra also offers high-resolution monochrome or color displays, providing a full-display resolution of 640 by 400 pixels.

In addition to HP Touch, the optional HP touchscreen facility, the Vectra Personal Computer also supports a wide range of input devices through the HP Human Interface Loop, including a mouse, graphics tablet and bar-code readers.

The Vectra will run many of Hewlett-Packard Co.'s proprietary software programs including Executive Card Manager, Executive Spreadsheet and the new Advancewrite word processing program.

Vectra's entry-level system, priced at $3,199, has 256K bytes of random-access memory (RAM) and one 360K-byte 5¼-in. disk drive.

For more information, contact Hewlett-Packard Co., 3000 Hanover St., Palo Alto, Calif. 94304.

MINNEAPOLIS — Lanmaster, a modular networking system designed to link together personal computers while allowing users of different local-area networks to share files and other resources, was recently announced by **Lee Data Corp.**

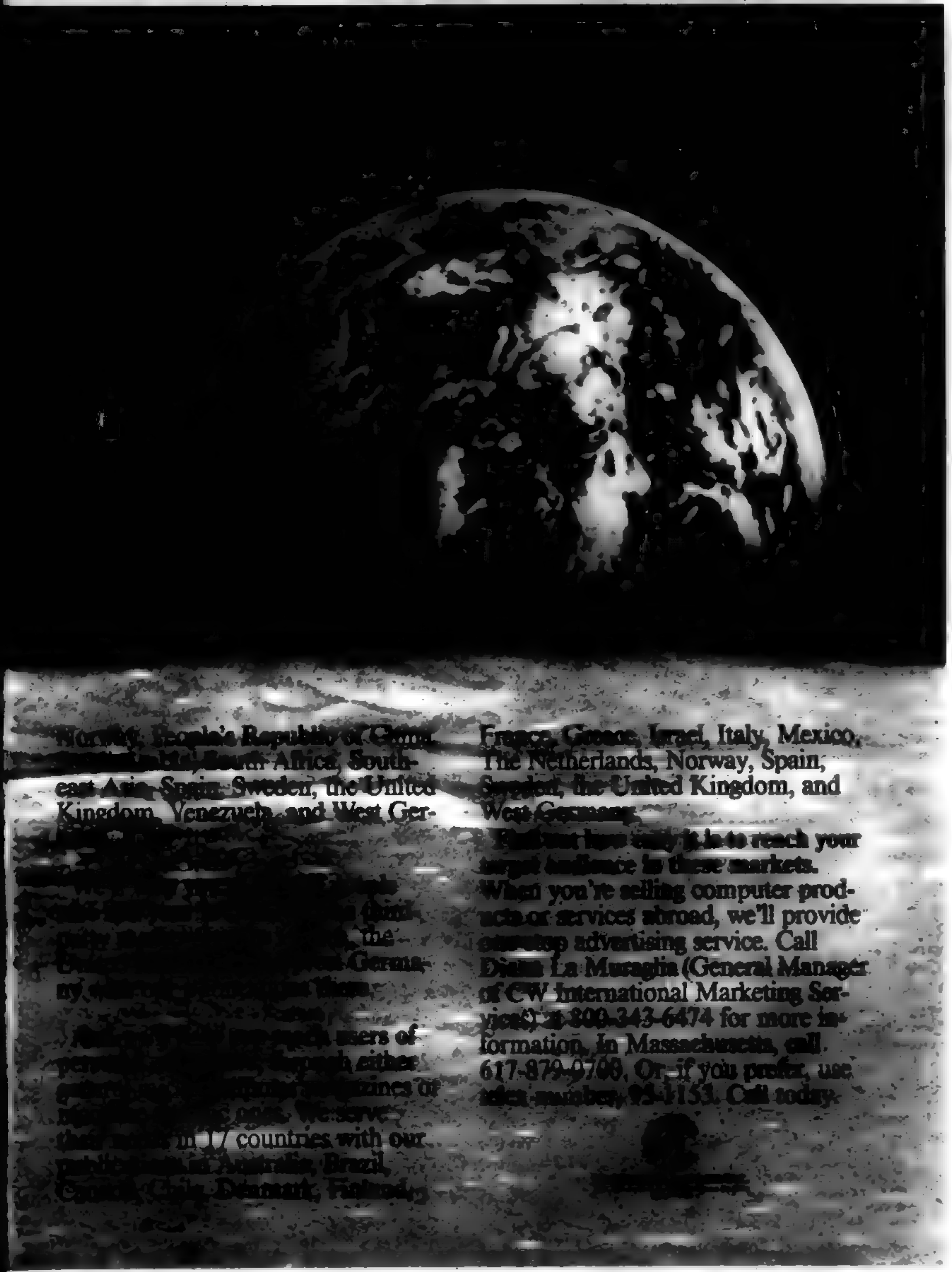
According to the vendor, Lanmaster also provides asynchronous dial-in capabilities to remote personal computers, allowing single users in remote locations to access the entire system. In addition, the system provides access to IBM and non-IBM mainframe computers by direct local connection or through public data networks.

Users may choose from a menu of services including file access, printer use, tape backup, time and date and electronic mail. Lanmaster also provides a system administration service to permit or restrict access to data file, networks or mainframes.

The basic Model 824 sells for $13,900 and consists of 1M byte of random-access memory (RAM), a 43M-byte fixed disk, two serial and two parallel ports, network control software, battery backup and 45M- to 60M-byte cartridge tape backup. Model 827, with a 70M-byte hard disk, is available for $15,600. Unit shipments will begin in November.

For more information, contact Lee Data Corp., 7075 Flying Cloud Drive, Minneapolis, Minn. 55344.

Lee Data Corp.'s Lanmaster



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November 18-20, Boston — **Optimizing Software Productivity and Quality.** Also, February 19-21, Los Angeles. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

November 25, New York — **Business Intelligence Information.** Also, December 6, Boston. Contact: Seminar Office, Worcester Polytechnic Institute, Worcester, Mass. 01609.

December 2-4, San Francisco — **Protocols for Message Handling Systems.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

December 2-4, Washington, D.C. — **Network Protocols and Standards.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

December 2-4, New York — **Networking Personal Computers.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

December 4-5, Los Angeles — **Office Automation Design and Management.** Also, December 11-12, Philadelphia; February 5-6, Miami; and March 19-20, San Francisco. Contact: Thomas Wilds Associates, Inc., P.O. Box 11120, Greenwich, Conn. 06830.

December 4-6, Washington, D.C. — **Introduction to Data Communications.** Also, December 11-13, New York; December 11-13, Fort Lauderdale, Fla.; and December 16-18, Los Angeles. Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

December 9-10, New York — **Managers' Update.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

December 9-11, San Francisco — **PCs: A Corporate Information Strategy.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

December 9-11, Chicago — **Long-Range Planning and Strategic Facility Management.** Also, January 13-15, Dallas. Contact: Facility Management Institute, 3971 S. Research Park Drive, Ann Arbor, Mich. 48104.

December 10, New York — **The Software Revolution — Large Systems Development.** Also, December 11, Washington, D.C. Contact: International Data Corp., 5 Speen St., Framingham, Mass. 01701.

December 10-12, Philadelphia — **Advanced Program to the 1985 Videodisc, Optical Disk and CD-ROM Conference and Exposition.** Contact: Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

December 11-13, Washington, D.C. — **T1 Networking.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

January 15, New York — **Executive Strategies for the Information Age.** Also, March 26, Dallas. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

January 27-30, Washington, D.C. — **The Eighth Annual Communication Networks Conference and Exposition.** Contact: Communication Networks, Box 880, Framingham, Mass. 01701.

December 5-6, Boston — **Local-Area Networks.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

December 5-6, San Francisco — **Integrating Voice and Data in the PBX.** Also, December 12-13, New York. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

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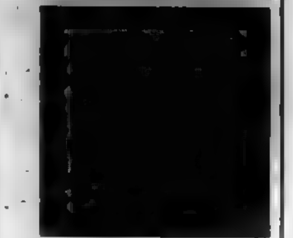

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Jobs for programmers and systems analysts are expected to boom. **Page 2.**

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IBM last week announced a Cobol restructuring program based on artificial intelligence techniques. **Page 10.**

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Europeans lag 1¼ years behind U.S. vendors in developing MAP products. **Page 19.**

■

Sperry moved to distance itself from the IRS' tax-return processing problems. **Page 2.**

■

Representatives from IBM and independent DBMS vendors swapped barbs on relational techniques. **Page 22.**

■

AT&T Unix versions of Samna Corp.'s Samna Word III and Samna+ were unveiled. **Page 83.**

Management Science America has been quietly trimming its work force, a company officer confirmed last week. Dennis Vohs, executive vice-president, said the software company has cut less than 5% of its 1,900 work force since September, mainly in administrative areas, but did not call it a layoff.

Vohs said the company in the past year has boosted employment in other areas. He also said some unannounced product plans "have been put off for a year or two." Damian Rinaldi, director of Framingham, Mass.-based International Data Corp.'s software and services program, said, "It may be a move to improve profitability in the fourth quarter, which has taken on added significance this year."

■

Data General's leap ahead of DEC (see story this page) may not last long. A DEC announcement has been scheduled for Dec. 4, at which time it is likely a new top-of-the-line model will be unveiled, possibly in conjunction with the expected Microvax III and a personal computer product.

See **NEWS** page 8

Ameritech buys ADR's software lead

By Clinton Wilder

Mainframe software developer Applied Data Research, Inc. last week confounded competitors and intrigued customers with an agreement to become a wholly owned subsidiary of Ameritech, a Chicago-based Bell regional holding company.

ADR customers contacted by *Computerworld* said they believe Ameritech, which posted revenue of $8.34 billion and profits of nearly $1 billion last year, recognized ADR as a technological leader (see story page 5). Most saw potential benefits from the alliance.

Ameritech, one of seven regional holding companies spun off from the former Bell system, will pay $215 million in cash to acquire ADR in a transaction that is expected to be approved by shareholders in

See **AMERITECH** page 4

Eclipse MV additions leapfrog DEC

By James Connolly

Customers and analysts echoed one term — leapfrogging — after Data General Corp. introduced high-end and low-end additions to its 32-bit Eclipse MV line last week.

The consensus among those observers was that DG's MV/20000 superminicomputers and MV/2000DC departmental system had outdone Digital Equipment Corp. products in pricing and performance, just as DEC had previously bettered DG with its VAX 8600 and Microvax II machines.

"In the game of DG and DEC leapfrogging each other, DG is now ahead. They've done a good job of packaging products that extend their product line," according to Gwen Peterson, an analyst with Dataquest, Inc., a San Jose, Calif., market re-

See **DG** page 6

Comdex spotlight shifts to issues

Networking, peripheral products top rollouts

By Eric Bender

LAS VEGAS — Reflecting the tough times for computer resellers, Comdex/Fall '85 seemed a bit subdued for a giant trade show held in a gambling city.

Although the annual gathering did produce a significant crop of new microcomputer products and sparked debate on the never-ending tangles among distribution channels, it featured few surprises. And even though final attendance figures were unavailable at press time, many attendees

See **NET** page 12

Software distributors fear losing corporate buyer

By Maura McEnaney

LAS VEGAS — Comdex/Fall '85 brought forth a myriad of software products. But for the resellers in attendance last week, the strident pitch of the software vendors was overshadowed by concern about the corporate market for software, now in the midst of some dramatic changes.

A Future Computing, Inc. survey of companies with more than 1,000 employees found that in 1984, 38% of the respon-

See **DISTRIBUTORS** page 14

CW EXCLUSIVE

Legal hang-up; State blocks school CATV bypass

By John Dix

ALBUQUERQUE, N.M. — The University of New Mexico learned that it can take more time and effort to deal with the legal issues of using CATV to bypass telephone company data services than it actually takes to upgrade a CATV network to carry data.

The school learned that lesson the hard way, but luckily under the moniker of research. The university was exploring medium-distance, high-bandwidth link alternatives.

The New Mexico experience was plagued by regulatory issues. But telecommunications analysts offered technical reasons for a bearish outlook on CATV as a way to sidestep regulated telephone company services. "CATV won't be a big factor in bypass or in any sort of data or business communications," according to Mark Winther, director of new communications services at Link Resources Corp., a market research firm in New York.

"CATV is a video business, and video transmission is very different from data," Winther said. Besides the fact that most CATV systems were designed to support only one-way communication, he said, the systems are "typically very leaky and unreliable relative to data communications needs."

For all of that, CATV systems do represent a potential bypass medium for hearty users. "It is happening in a few areas," Winther conceded. "Users who can't get what they need from the phone company sometimes look to the cable company in their areas."

The university was driven by research purposes, however, not by lack of telephone company services. The technology performed to expectations, but the bypass was short-circuited by the local telephone company.

In October 1983, the development

See **STATE** page 9

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NEWSPAPER

Government predicts soaring demand for DP workers

By Mitch Betts

WASHINGTON, D.C. — The U.S. government's latest employment projections portray a dramatic and rapid growth in the number of jobs for computer programmers and systems analysts. The U.S. Bureau of Labor Statistics predicted a roughly 70% increase in these occupations by 1995.

The bureau's employment projections, released last week, illustrated the transformation of the U.S. economy from heavy industry to service-oriented businesses, but analysts with the bureau said the rate of growth in clerical jobs will slow down, in part because of office automation.

In an industry breakdown, the Bureau of Labor Statistics said that employment in the medical services, business services and computer industries will grow the fastest through 1995. Employment in the computer industry will grow at a predicted average annual rate of 3.7%.

For computer programmers, the bureau projected a 71.7% increase from 1984 to 1995, increasing the population of programmers from 341,000 to 586,000. Likewise, the Bureau of Labor Statistics projected a 68.7% increase in DP systems analysts, from 308,000 to 520,000.

According to a separate bureau study in March, computer programmers are paid an average salary of $20,318 at the trainee level and up to an average of $41,288 for senior team leaders or specialists. Average salaries for computer systems analysts range from $28,197 at the low level to $68,809 for senior managers, the report said.

Other fast-growing occupations in this decade will be DP equipment repairers, electrical and electronics engineers and technicians and computer and peripherals operators, according to the Bureau of Labor Statistics report "Employment Projections for 1995."

In fact, of the 10 fastest growing occupations, seven are in the computer and electronics fields. The others are paralegals, medical assistants and travel agents.

Comparing the occupations with those having the largest numerical job growth, computer programmers ranked 12th and systems analysts ranked 16th, well below the numerical growth for cashiers, nurses, janitors and truck drivers.

The Bureau of Labor Statistics bases its labor market projections on assumptions about the U.S. population and economy. The figures cited here and in the bureau's summary tables are based on a scenario of moderate economic growth, with the average annual gain in real gross national product at 2.9%.

Under all three economic scenarios — low, moderate and high growth — the Bureau of Labor Statistics expects that about nine out of 10 new jobs between 1984 and 1995 will be in service-oriented industries.

Fastest growing occupations 1984-1995

	Occupation	Increase (%)
	Paralegals	97.5
✓	Computer programmers	71.7
✓	Computer systems analysts	68.7
	Medical assistants	62.0
✓	DP equipment repairers	56.2
✓	Electrical and electronic engineers	52.8
✓	Electrical and electronic technicians	50.7
✓	Computer operators (except peripheral equipment)	46.1
✓	Peripheral DP equipment operators	45.0
	Travel agents	43.9

Source: U.S. Bureau of Labor Statistics

Computer programming is forecast to be the fastest growing DP occupation.

Sperry defends hardware

Claims software to blame for IRS fiasco

By Mitch Betts

WASHINGTON, D.C. — Sperry Corp. officials, commenting for the first time about major tax-return processing problems at the Internal Revenue Service, sought last week to disassociate the firm's computer hardware from the widely publicized calamity.

John F. Horton, president of Sperry's Federal Systems Group, strongly denied a report in the *Philadelphia Inquirer* that implicated Sperry in the IRS problems, and he blamed the processing delays on software.

The controversy concerns the $103 million systems modernization program at IRS service centers, which included the replacement of antiquated CPUs with Sperry 1184 multiprocessors and other hardware and the conversion of 1,500 programs from assembly to Cobol.

Problems with some of the new hardware and software caused the IRS to fall far behind in its processing of 1984 tax returns and refunds earlier this year [CW, April 15].

In a *Computerworld* interview at that time, Thomas Laycock, assistant IRS commissioner for computer services, placed blame on faulty tape drives, balky operating software, new Cobol applications programs that ran too slowly and were full of bugs and a lack of system testing.

The *Philadelphia Inquirer* last week said that a secret report by the U.S. House of Representatives Appropriations Committee investigators had concluded that the Sperry system "suffered massive breakdowns" and that the IRS should not have awarded Sperry the contract because its hardware failed several prepurchase tests.

Sperry's Horton said the news article was inaccurate and misleading. "To set the record straight," he said in a statement, "there is a major misunderstanding about the difference between hardware and applications software in a computer environment.

"Beyond any shadow of doubt, the hardware we supplied to the IRS performed within the requirements of the contract . . . [and] Sperry's computers have been operational better than 98% of the time during the entire tax processing season," he said.

"Problems with the overall IRS system did occur because of operations and the applications software developed by the [IRS] itself, and these problems had nothing to do with the integrity of our hardware," Horton said.

He stressed that Sperry computers did not experience any massive breakdown and were not associated with lost tax records or other reported problems.

The newspaper also reported that the agency's capacity enlargement program will replace the "ailing" Sperry computers in 1989, at an estimated cost of $185.5 million. Horton said that rather than replacing the Sperry computers, "it makes far more sense and would cost far less to complement the existing Sperry system so it can better handle any increased volume."

At a U.S. Senate subcommittee hearing last week, IRS Commissioner Roscoe L. Egger Jr. said the IRS has taken several technical and managerial steps to prevent a recurrence of processing problems in 1986, including steps to assure adequate processing capacity.

Egger said the number of CPUs will be increased by 40%, peripheral equipment will be added, and installation, testing and training will be completed before 1986 filing.

News needed now

Hard as we try to give our readers the most complete information available, some good news and feature stories never reach us.

Are you involved in an unusual application of DP technology in your company? Have you implemented successful cost-cutting strategies? Is something in your DP shop not working as designed? Know any unsung heroes? Heard any hot news about vendors? Are you aware of technology or management trends the trade press is overlooking?

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We can't be everywhere — but our readers are.

CORRECTIONS

A co-originator of Burroughs Corp. Linc II information systems development tool [CW, Nov. 11] was misnamed. Gil Simpson should have been named along with Peter Hoskins.

The story "IBM offers CICS teleprocessing monitor for VM/CMS" [CW, Oct. 21] did not include pricing for the microcomputer portion of the CICS/CMS software. That portion has a one-time charge of $900 or a monthly charge of $50.

The operating system that Burroughs is having trouble with is called MCP Release 1 [CW, Nov. 11]. The disk storage program is called Qwik Disk.

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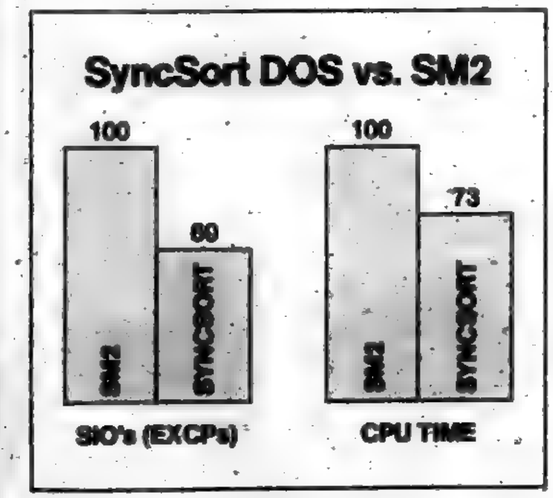

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Ameritech purchases ADR

From page 1

mid-December. The offer of $32 per share was $10 above the trading price of ADR stock the day prior to the announcement. It represents the largest amount paid for a software company and ranks only behind General Motors Corp.'s $2.5 billion acquisition of Electronic Data Systems Corp. within the broader software and services industry.

ADR among the elite

Celebrating its 25th anniversary last year with revenue of $128 million, ADR is among the elite of independent suppliers of IBM mainframe software, competing against Cullinet Software, Inc.; Management Science America, Inc.; Software AG; and others. Industry analysts had been expecting some consolidation among the independents due to the increasing competition from IBM's own software products, but most expected ADR to survive intact.

The announcement surprised even some ADR executives. "You may have found out before I did," one company executive said, adding that he did not learn of the deal until several hours after it was announced.

> *'For the first time, we feel pretty bullish about going up against IBM.'*
>
> — **John R. Bennett**
> **ADR chairman and CEO**

Some ADR competitors expressed a perhaps wishful sentiment that ADR stands to gain little from the relationship and has much to lose if it does not go smoothly (see story page 5). The harshest view was offered by Cullinet President John Cullinane, who said that Ameritech "will probably use ADR's technology for its own interests; that will make ADR's position of less significance than it is now."

ADR Chairman and Chief Executive Officer John R. Bennett told CW there will be no immediate changes in the company's top management or in product lines. But the deal provides ADR, which has posted a loss of $2.3 million in the first nine months of this year, with a cash-rich parent to fund the battle against the other independents and IBM.

"For the first time, we feel pretty bullish about going up against IBM," Bennett said. "We can continue our research and development investments in software without so much concern about quarter-to-quarter results."

Ameritech is the first Bell holding company to link up with a software house. The firm signaled its diversification intentions earlier this year by obtaining a Federal Communications Commission waiver from the restrictions on former Bell units to establish a software subsidiary.

In the independent software industry, ADR's Datacom/DB relational data base management system and Ideal fourth-generation language products have been very competitive and highly regarded. The company ranks second, behind Cullinet, among independent vendors of data base products.

"ADR seems to be a market leader in the products they have and the methodology they're espousing," said ADR customer Michael C. Nekechuk, data administrator with the Canadian Broadcasting Corp. in Ottawa. "I doubt if Ameritech would want to stifle it. I don't see any immediate problem."

May result in AT&T Unix versions

Another ADR user, Gary Mortenson, senior data administrator and systems planner with McGraw-Hill, Inc. in New York, speculated the deal "will probably result in Unix versions for ADR's product line.".

ADR President Martin Goetz said there has been no discussion with Ameritech about a communications product line. "Telephone communications is a slow-growth area, and Ameritech, in its diversification program, had targeted systems software as a high-growth, high-technology area," he said.

William L. Weiss, chairman and chief executive officer of Ameritech, said ADR will operate on a decentralized basis, as other subsidiaries do. He cited the synergies of the two companies and said communications and information processing are rapidly converging.

Analysts had varying views of what impact the acquisition may have on either the mainframe software or telecommunications industries.

'Who's going to be next'

The announcement "is causing lots of speculation as to who's going to be next," noted Terence Quinn, an analyst with Dean Witter Reynolds, Inc. in New York. "I don't think there's going to be a next one. That was a unique situation with ADR. It was looking to be acquired. "

Kenneth Burke, an analyst with Alex Brown & Sons, Inc. in Baltimore, unlike Ameritech's Weiss, saw little synergy between the two companies and said it was a diversification for the communications company. He said little short-term impact can be expected at ADR. But, he added, "What will happen is we'll end up with a few big players. I think there will be more acquisition activity over the next three or four years."

Telecommunications industry analyst Kenneth Leon, with L. F. Rothschild, Unterberg and Towbin in New York, said ADR's autonomy is assured for the near term because of Ameritech's regulated status. "If [the Second Computer Inquiry] is lifted, Ameritech will have a lot more flexibility in incorporating ADR into its own management," he said. "For now, [Ameritech management] will observe and learn."

Stephen Payne, president of PA Computers and Telecommunications, a consulting firm based in Princeton, N.J., said Ameritech's interest probably lies not in ADR's products but in its marketing presence. Ameritech has, he said, "bought a distribution facility for software that they have developed in-house."

Computerworld *staff members Charles Babcock and Rosemary Hamilton contributed to this report.*

AT A GLANCE

[illegible]

Operating Companies: Illinois Bell Telephone Co., Indiana Bell Telephone Co., Michigan Bell Telephone Co., Ohio Bell Telephone Co., Wisconsin Bell Telephone Co.

Subsidiaries: Ameritech Mobile Communications, Inc. (cellular); Ameritech Communications, Inc. (CPE*); Ameritech Credit Corp.; Ameritech Development Corp. (venture capital).

Number of Employees: 77,700

1984 Revenue: $8.34 billion

1984 Earnings: $990.6 million ($10.17 per share)

* Customer premises equipment. Each regional holding company has its own CPE subsidiary.

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Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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ADR deal: Rivals downplay importance, users look to future

The majority of the big players in the mainframe software business consider the announced acquisition of Applied Data Research, Inc. (ADR) by Ameritech of little consequence.

Top executives at companies competing with ADR told *Computerworld* that they expect the new partnership to have a minimal impact on their marketplace. Second, they dismissed the idea that last week's event will spark a trend of software mergers.

"My own feeling is the combination is a little bit regrettable," said Stuart Miller, president and chief executive of Software AG in Reston, Va. "If you ask me what Ameritech will bring to ADR or what's the benefit, I can't come up with an answer."

Other top software executives said the acquisition could eventually increase their market shares. "It may diminish ADR's presence in the marketplace," said John Cullinane, president of Cullinet Software, Inc. in Westwood, Mass., "which is just fine with us."

The executives doubted that a regional telephone company such as Ameritech has much to add to ADR, which is noted most for its relational data base management and fourth-generation language products. There is reason to believe, the executives said, that Ameritech will actually pull ADR away from its primary business as it pursues its own interests — communications.

"Ameritech doesn't bring products or technology to the partnership that could affect us," said Dennis Yablonsky, president and chief operating officer of Cincom Systems, Inc. in Cincinnati.

Not one of those questioned said he believes the ADR acquisition signals a software industry merger trend. Dennis Vohs, executive vice-president of Management Science America, Inc., said he had not seen enough similar activity to declare it a trend. He did note, however, that several companies are trying to get into the software industry and the best way to do it is through an acquisition such as this one.

Some of the executives interviewed made it clear that their respective companies are not going to follow in ADR's footsteps. Cullinane said his company voted in so-called shark-repellent provisions last year and prefers to "be in charge of our own destiny." Miller at Software AG said that, in a merger, "you lose the essence of an independent software company — the spark and the creativity."

One vendor, Computer Corporation of America, spoke of mergers in a more positive tone. It was acquired in 1984 by the Toronto-based financial services company Crownx, Inc. The issue of vendor stability is important to the user, according to John Donnelly, vice-president of marketing, and gaining a wealthy parent can make the user feel more secure. As far as creativity goes, "the entrepreneurial spirit is still here," Donnelly said.

The competitors do not believe Ameritech's deep pockets will make ADR a stronger threat. "Money thrown at a software company historically hasn't had much of an impact," Cullinane said. "If that were the case, IBM would be the only software vendor."

— **Rosemary Hamilton**

■

Users of Applied Data Research, Inc. (ADR) products expect little impact from the company's pending acquisition by Ameritech but do see potential benefits from the immense financial resources commanded by the regional holding company.

"From a user's point of view, this move gives ADR enhanced funding," according to Gary Mortenson, senior data administrator and systems planner with McGraw-Hill, Inc. in New York. "On the other side, the question is whether this will add bureaucracy to a company that in the past has been quite responsive. If it does, that would be a drawback." Mortenson uses ADR's Datacom/DB and Ideal products.

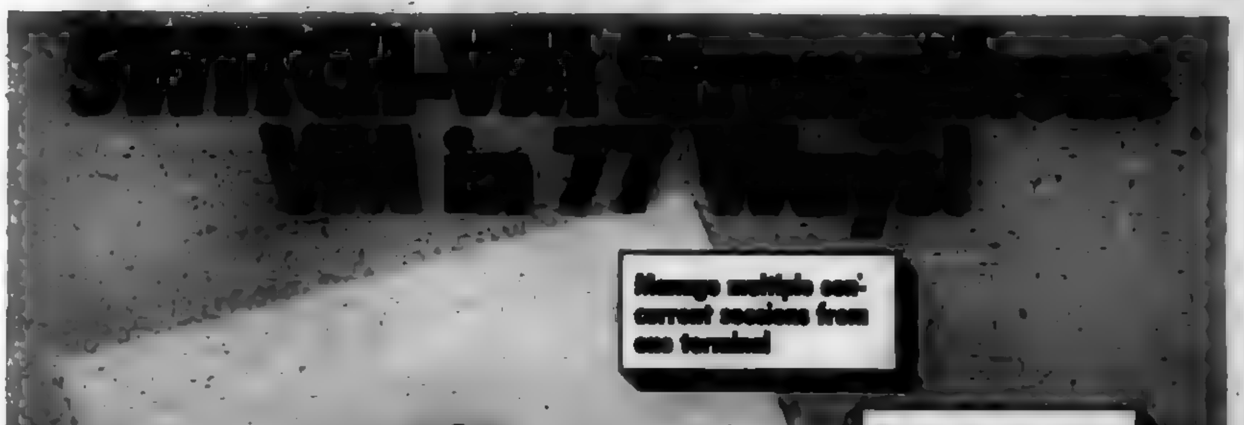
"It will give ADR more cash to work with," according to Israel E. Gotay, data base administrator for the U.S. Federal Energy Commission.

Other users of ADR products speculated about the telephone company's motivation behind the deal. Charles D. Moss, director of information systems with PPG Industries, Inc.'s Glass Group in Pittsburgh, said, "It will be interesting to see what Ameritech's strategy is behind this." Moss said he had been contacted by ADR but wants to have further discussions with company officials.

Patrick DiPronio, MIS director for Service Systems. Corp., Clarence, N.Y., said he thought Ameritech's interest was likely based on the success of ADR's data base and fourth-generation language products. "ADR is gaining in the data base field, and it has an excellent product in Ideal."

An ADR user at one of the country's largest firms saw the deal as a life belt for the software company. Asking not to be identified, he said that the alliance "will eliminate any fears that ADR might go under due to slumping revenues in a bad year." He speculated that ADR might now move into communications products.

— **Charles Babcock**



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DG additions leapfrog DEC

From page 1

search firm.

DG's announcement focused on three models in the Eclipse MV/20000 line, with performance claims of 5.5 million instructions per second (MIPS) for uniprocessors and 10 MIPS for dual processors. At the low end, DG released the 1-MIPS MV/2000DC.

DG officials claimed the MV/20000 outperforms DEC's VAX 8600 and IBM's 4381 for less money. They pitted the MV/2000DC against IBM's System/36 and DEC's Microvax II and the anticipated Microvax III.

Data General Corp. 32-bit products

Characteristic / System	MV/2000DC	MV/4000DC	MV/4000	MV/8000 Model 2	MV/10000	MV/20000 Model 1	MV/20000 Model 2
MIPS¹	1	0.6	0.6	1.2	2.5	5.5	10
Memory Size in Bytes (Minimum-Maximum)	2M-5M	1M-2M	1M-8M	1M-8M	1M-16M	4M-16M	4M-64M
Purchase Price² (Memory Size)	$17,500 (2M)	$38,200 (2M)	$63,400 (1M)	$125,300 (1M)	$137,100 (4M)	$234,000 (4M)	$337,000 (4M)
Machine Cycle Time (Nsec)	160	200	200	220	140	85	85
Channels	2	2	2	2	3	3	3
Cache (Buffer) Size	None	None	None	16K	16K	20K	20K³
Bus Architecture	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte of Main Memory	$3,000	$4,250	$4,250	$4,250	$4,250	$6,000	$6,000

1. Million instructions per second.
2. For processor with disk and tape units, system software and console.
3. Cache per CPU.

CW Chart

The new systems will target areas where DG has been strong, such as office automation, design and industrial control.

The three models in the MV/20000 family include the MV/20000 Model 1, which is a uniprocessor with 4M to 16M bytes of main memory that provides 5.5-MIPS performance at prices starting at $234,000 for a 4M-byte system. The second model is the MV/20000C, a rack-mountable version of the MV/20000 Model 1 that is intended for sale to OEM customers and end-user organizations that do their own systems integration. A 4M-byte MV/20000C costs $200,000.

At the high end is the MV/20000 Model 2, DG's first tightly coupled dual processor. The 10-MIPS system costs $337,000 with 4M bytes of memory, which can be expanded to 64M bytes. Floating-point processors are optional on the Model 1 and Model 2 and standard on the MV/20000C.

At the low end of the MV line, DG added the MV/2000DC pedestal-type departmental computer. The MV/2000DC provides about 1 MIPS of performance, includes up to 5M bytes of memory and costs $17,500 for a 2M-byte version. Designed for operation by office workers, it runs the same AOS/VS system software as the rest of the MV family and includes a 38M-byte to 120M-byte hard disk.

DG also announced the following:

- Technical Electronic Office (TEO), an integrated software package with the functions of DG's Comprehensive Electronic Office (CEO), but with graphics, windowing and artificial intelligence support through DG/Standard Applications and Graphics Environment for engineers and other technical users.
- AOS/DVS, which was designed to let networked DG computers — including Eclipse MV systems and Series 7000 workstations — share resources in a manner transparent to users.
- The DS7500 and DS7700 engineering workstations, which were designed to run AOS/DVS and TEO.
- Price cuts of 18% for the previous high-end system, the MV/10000, and up to 20% for extra memory and disk storage for the Eclipse MV line.
- DG/Data Dictionary, a data management software package designed to track resources and data throughout Eclipse MV systems and priced from $1,000 to $3,000.
- Release 7 of AOS/VS, used by all MV systems but enhanced for the dual processor.

DG said the systems will be targeted to areas where DG has been strong, such as office automation, design and industrial control. The systems feature higher data availability, which DG said means quicker recovery from malfunctions and less intrusive data backup procedures. The DG announcement was well received by analysts and customers who placed first-day orders for the new systems.

Richard Mikita, an analyst with the Framingham, Mass., research firm International Data Corp., said, "Overall, it's really impressive. They came in with a better price than I had guessed. As a group the products are a really solid offering."

Ronald Paxton, manager of office automation consulting for Coopers & Lybrand of New York, noted, "What DG has going for them is a hierarchical approach, from personal computers to departmental computers to corporate computing. They have some pretty strong products and a common system architecture, and they provide a good migration path."

The MV/20000 products use Motorola, Inc. MCA2800 emitter-coupled logic and transistor-transistor logic gate arrays and four-stage pipelining for an 85-nsec cycle time. DG officials said the basic Model 1 includes only a CPU board and a system board. They said that a comparable VAX 8600 could require 11 boards. An upgrade from a Model 1 to a Model 2 involves adding a CPU board and a system board to the meter-high cabinet used in the Model 1.

Of the MV/2000DC, DG officials said it uses a single 15- by 15-in. board, where a Microvax II might need six boards.

DEC officials declined to comment on DG performance and configurability claims.

DG said that an MV/20000 handles a maximum of 1,008 lines and the MV/2000DC up to 24 lines. However, they said that with a typical mix of office applications, the Model 1 can provide optimum CEO support for 140 to 175 users; the Model 2, 210 to 260 users; and the MV/2000DC, 20 users. DG claimed that with a comparable mix an IBM 4381 Group 3 supports 175 users; a Wang Laboratories, Inc. VS 300, 135 to 140 users; and a VAX 8600, 155 to 160 users. DG also said the cost per user for the MV/20000 is $500 to $1,000 below those competitors.

DG claimed price-per-user advantages of up to 25% for the MV/2000DC over the Wang VS 15 and VS 65, the Microvax II and the IBM System/36.

However, George Colony, president of Forrester Research, Inc. of Cambridge, Mass., said the advantages for DG over its competitors are closer to 10% for the MV/2000DC and 15% to 20% for the MV/20000.

Several observers questioned DG's claims of 10-MIPS performance on the MV/20000 Model 2. One prospective customer said the more realistic performance rating is 7 MIPS. Even if the 10-MIPS figure is accurate, some observers questioned the need for a 10-MIPS office machine.

But one area where that power could be useful is in integrating technical applications with office applications. Key elements in that integration of information systems and technical applications are TEO, which provides office automation tools for the DS/7500 and DS/7700 workstations, and AOS/DVS, which is available for those workstations and MV systems running engineering applications. The engineering workstations are available in single-user or multiuser, monochrome and color versions.

The DS/7500 monochrome version with 2M bytes of main memory and a 38M-byte disk costs $18,600. The DS/7700 monochrome version with 2M bytes of main memory and a 70M-byte disk costs $29,000.

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MCI settles antitrust suits against AT&T, six regionals

By Bryan Wilkins

WASHINGTON, D.C. — MCI Communications Corp. announced last week that it reached an out-of-court settlement in the antitrust suits it had filed against AT&T and six regional holding companies. The settlement ended a decade-long antitrust battle and was seen as an attempt by MCI to gain market share by working with its traditional adversaries.

Terms were not disclosed, but; sources said, the cash value to MCI approached $115 million.

MCI said the settlement terms also included stipulations that the country's second largest long-distance carrier (behind AT&T) will have full access to all network products and services of the six regional holding companies as well as to all products and services of AT&T.

The provisions of the out-of-court settlement, according to MCI, were similar to an earlier agreement it reached with the seventh regional holding company, U.S. West, earlier this year. These included a commitment by U.S. West to use MCI's long-distance services, timely hookups to local exchange facilities as they convert to equal access and access to planning decisions being made by the regional companies where network capacity is concerned.

MCI said it will report the value of the cash settlement as it is received.

The settlement involves two lawsuits. The first suit, filed in 1974, was tried for the second time earlier this year and resulted in a jury award of $113 million. The second suit was brought by MCI in 1979 and alleged that the independent telephone companies, AT&T and what were to become the seven regional holding companies conspired to monopolize the long-distance business by denying MCI connections at local exchanges.

Damages sought exceeded $1 billion

The second suit was in the process of pretrial discovery when the settlement was made. MCI Chairman and Chief Executive Officer William McGowan had estimated that the damages sought by MCI exceeded $1 billion. The suit's charges covered the period from 1975 though 1979, before the breakup of AT&T.

The lawsuit against the independent telephone companies and the United States Telephone Association is still pending.

MCI has made it plain that it is seeking to establish friendlier relationships with the seven regional holding companies, which are barred by the terms of the AT&T divestiture from the long-distance business. MCI's goal is to grab greater share of the long-distance market from AT&T Communications, the dominant provider of service with an estimated 85% to 95% of the market. MCI's market share is estimated to be between 5% and 7%, according to the firm.

Firm buys five MV/20000s

One of the largest first-day orders for the systems announced by Data General Corp. last week was placed by Beneficial Corp. The diversified consumer finance corporation ordered five MV/20000 Model 1s and 200 MV/2000DCs.

"We are using five 10000s now and will be replacing those with the 20000s," reported J. Edward Kerwan, president of Beneficial's data processing division. "We hope the better throughput will allow our system to operate faster and hope it will allow us to tie in CEO [DG's Comprehensive Electronic Office] to an information center concept, so we can get information in and out of our IBM environment."

Kerwan said that in addition to the five MV/20000s to be located in Peapack, N.J., where they will support the CEO package installed in April 1984, Beneficial will replace IBM dumb terminals in branch offices with MV/2000DCs. He said Beneficial eventually will install 1,000 MV/2000DCs in branch offices, where the machines will handle real-time processing through IBM Systems Network Architecture connections to IBM mainframes. While the MV/20000s will handle office automation duties in central locations, the MV/2000DCs will handle customer account transactions.

Another first-day customer, American Medical International of Beverly Hills, Calif., ordered an MV/20000 Model 2 for its own use and plans to purchase additional MV/20000s to package as turnkey systems for hospitals. "It's a good machine and figures to be very important to the health care community that we serve. We like the power, price and performance, the high availability features and the small footprint in relation to the overall performance and power," reported Dennis Peck, vice-president of sales for American Medical International.

Peck also said he was pleased with the delivery schedule for the DG machines — 90 days for the MV/20000 Model 1 and MV/2000DC and 120 days for the MV/20000 Model 2.

— James Connolly

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IBM, independents trade views on DBMS

Relational merits spark executive-level debate

By John Gallant

STAMFORD, Conn. — Long-simmering issues surrounding the technology of data base management systems came to a boil last week during a Gartner Group, Inc.-sponsored forum in which representatives from IBM and independent DBMS vendors traded opinions.

The verbal sparring began when panelist Edward Forman, senior vice-president of technology and advanced markets for Software AG, questioned IBM's commitment to relational DBMS technology.

The panel, chaired by Scott Smith, vice-president of Gartner Securities Corp., also included Joseph Farrelly, vice-president and director of research and development for Applied Data Research, Inc.; David Tory, senior vice-president of planning for Computer Associates International, Inc.; and David Litwack, vice-president of product development for Cullinet Software, Inc.

"IBM touted IMS as its primary DBMS for years," Forman said. "Then it flip-flopped into relational and began touting DB2. I wish there was someone on this panel from IBM who could clarify IBM's commitment to relational."

No sooner had Forman finished speaking when Robert Berland, director of strategic planning for IBM's Information Services organization, rose from his seat and strode to the podium — much to the delight of the audience in the ballroom of the Hotel Stamford Plaza.

Facing his competitors, Berland said, "The issue comes down to performance. We have to provide performance and data integrity for the largest companies in the U.S. There is nothing stopping relational technology from improving. But I challenge any of the relational systems to match the performance of IMS in the largest production applications.

"At this point," Berland continued, "relational cannot compete with the performance of IMS on a dyadic processor for a major company pushing state-of-the-art technology to the limit. Maybe relational will move there, but not for a long, long time."

In defense of DB2

Berland next seized the opportunity to respond to Gartner Group analysts who had earlier given DB2 a poor performance rating by saying that user experience with DB2 indicated it could process only about 5 or 6 transactions per second when large data bases were involved.

"DB2 can handle much higher volumes than anything I have heard here in the past two days," Berland said.

Cullinet's Litwack asked Berland why IBM had decided on a dual data base strategy rather than enhancing the older IMS with relational capabilities.

"Relational is not going to replace everything," Berland replied. "The ease-of-use issue disguises that fact. I am not certain that even when you push relational to the state of the art that its performance would match that of a networked system."

Smith, who had earlier faulted IBM for not providing a fourth-generation language and an integrated data dictionary, asked Berland about IBM's plans for such productivity tools.

"Believe me," Berland said, "we want them just as badly as you do. It is not that we don't know what we ought to do. You people have made that clear. The fact is that we do not have the programming resources needed to do a lot of these things. We have been trying to keep up with years of hardware advances, things like the 3090, dyadic processing, the extended architecture. The software people at IBM really have to scramble to keep up with hardware."

After the session ended, IBM's Berland spoke to a group of attendees who had gathered around him. "We have always focused on performance and data integrity. Believe me, productivity has been a major, constant concern. But every day I have to decide whether to kill my father or kill my mother."

TOP OF THE NEWS

NEWS from page 1

Growth in the mainframe software industry is expected to be only 23% for 1985 — a drastic decline from the 40% growth the industry enjoyed in 1984 — analysts said during the Gartner Group's Software Management Strategies conference last week. Independent vendors, though, will experience only 15% growth.

■

Management Science America said last week it has begun shipping its Expert Query system. Part of MSA's Information Expert applications integration environment, Expert Query supports ad hoc queries against application data bases. The query tool is available for MSA's general ledger, accounts payable and receivable, order processing, budget control and payroll/personnel systems at $10,000 per application. MSA unveiled Information Expert and the query facility in September 1984.

■

U.S. Sen. Robert Byrd (D-W. Va.) and the University of West Virginia are working to develop a "Software Valley" in West Virginia, focusing on Ada software development. They already have established a nonprofit venture called Software Valley Corp. to lure Ada software developers to the state and will announce more plans at a meeting today.

Only one

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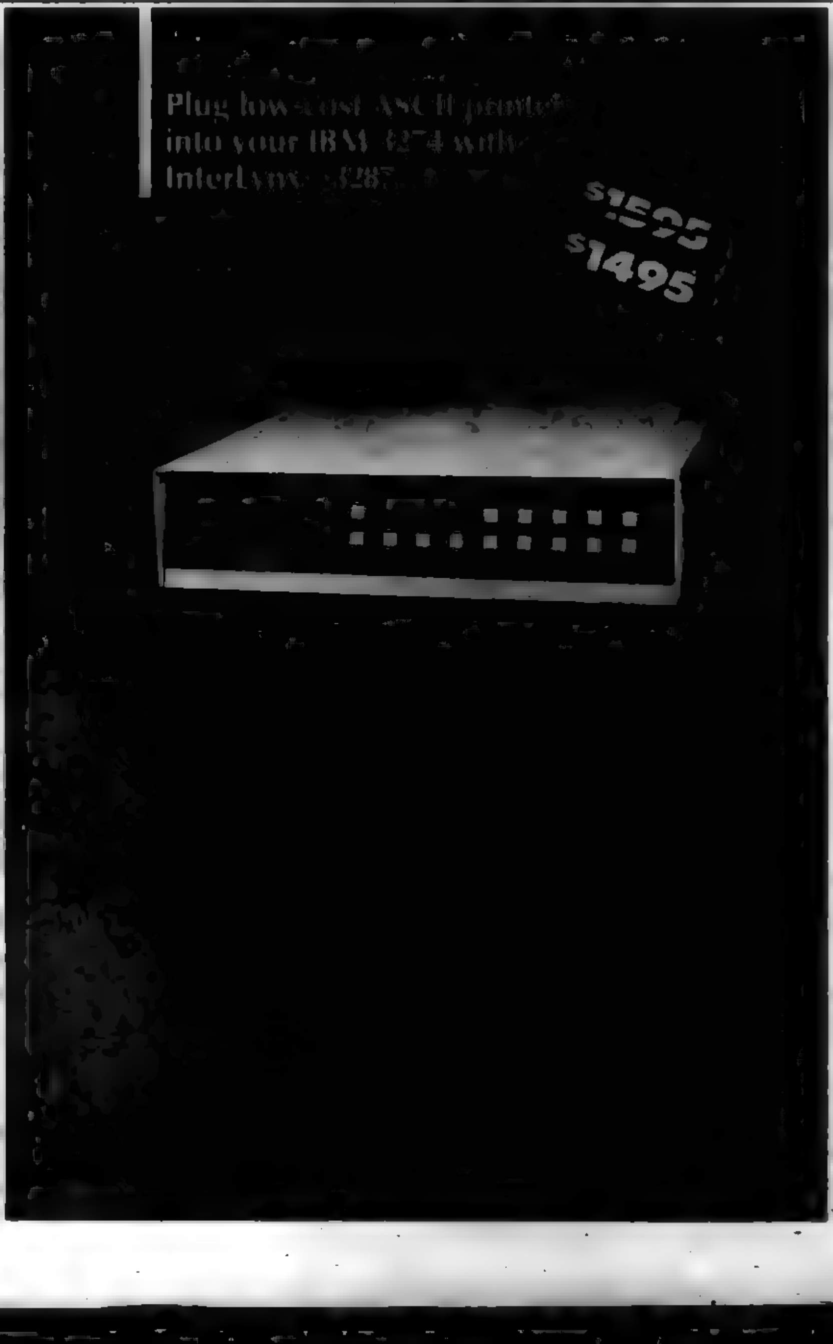

State blocks CATV bypass

From page 1

group of the school's computing center began a joint research project with the Southwest engineering division of Digital Equipment Corp. The goal was to set up a medium-distance, high-bandwidth link between the computing center and the DEC plant in Albuquerque, according to Gary Boyles, associate director of the center.

Albuquerque Cable TV was accessible to both locations, and its broadband coaxial network offered the bandwidth required, making it a logical choice for the experiment, Boyles said. After a little talking, the cable company agreed to go along with the idea.

DEC assumed the cost of the broadband products needed to update the CATV plan for two-way data communications. This included a $2,000 channel translator from Bridge Communications, Inc.; 44 $300 reverse amplifiers; and two $1,400 Bridge broadband modems — for a total of $18,000.

Most CATV entertainment networks are not built with two-way communications in mind, although that has been a franchise requirement in some recent systems. To achieve two-way communications on the Albuquerque net, reverse amplifiers were installed on the cable every 2,200 feet, and the channel translator was installed at the cable company's headquarters.

A signal generated at the university is put onto the net with a broadband modem tuned to the frequency of the channel that the cable company put aside for data transmission. It travels upstream to the cable company's head end, where television programming is originated, and is turned around by the channel translator and routed downstream to DEC.

First successful transmission

The first successful transmission of data from DEC to the university was in February 1984. Installation of the equipment was relatively straightforward, but, Boyles said, tuning the amplifiers and head end to support the desired 56K bit/sec. link took the CATV company many uncounted man-hours.

"Once the cable plant and [broadband] modems were adjusted, the network worked well," Boyles noted. Although it was relatively expensive to ready the cable net for data communications, the project showed that CATV has a suitable signal environment for reliable data transmission, a primary project objective, Boyles said.

The link was used daily for file transfers and electronic mail until mid-1984, when an unforeseen obstacle cropped up. At the behest of Mountain Bell, the New Mexico State Corporation Commission investigated the university's use of the CATV system. The telephone company alleged, in essence, "that Albuquerque Cable TV was providing public utility telephone service . . . the same service Mountain Bell could provide," Boyles said.

The state ruled against the cable company and ordered it to cease and desist from offering or providing such services.

> **”**
>
> ***Although it was relatively expensive to ready the cable network for data communications, the project showed that CATV has a suitable signal environment for data transmission.***

The issue of using CATV systems for bypass was brought to the Federal Communications Commission by Cox Cable Omaha, which lost a similar decision in 1983 when the Nebraska Public Service Commission ordered it to stop offering data services. The FCC ruled in favor of Cox Cable this past summer, saying that "state regulatory agencies cannot require regulation that would prohibit market entry," according to Anna-K Menzies, coeditor of "Telephone Bypass News," a monthly newsletter published by Telestrategies Publishing, Inc. in McLean, Va.

"It is a little unclear what the FCC meant by that," Menzies said. "The commission dealt with Cox only, so we don't know how the precedent will affect other cable companies."

For its part, Boyles said, the university will install and test a 1M bit/sec. multidrop link over CATV if the legal issues are resolved in its favor by the FCC and the state agency.

Although intended primarily for research, there may already be a practical application for the lessons learned in Albuquerque. "New Mexico has been planning a high-speed, statewide network along the Rio Grande corridor via a private nonprofit corporation called New Mexico Technet, Inc.," Boyles said. "The network is intended to provide a high-speed data communications facility to government, educational institutions and private industry."

The backbone of that network — which will run from Los Alamos, N.M., down to Las Cruces, N.M. — will be fiber optic. "Covering the last mile from the fiber-optic backbone to a user site at relatively high speeds and low cost is still a problem," Boyles said, "a problem that could have a solution via CATV data communications."

Gives you 223 illustrations for self-training and reference

At last, the programmer's guide to TSO

If you're developing programs under OS/MVS and you're using IBM's Time-Sharing Option (TSO), then a book called *MVS TSO* is meant for you. It zeroes in on the tasks a programmer has to do most often, so you can master TSO in a hurry.

Here's what you'll learn, whether you're using native TSO or ISPF (a full-screen, menu-driven extension to TSO)

- how to create or change a data set or a library member
- how to allocate, display, print, rename, delete, move, or copy a data set
- how to compile, link-edit, and execute a program interactively
- how to debug a COBOL program interactively—that is, how to monitor the program's execution, look at the contents of data fields, watch the order in which subprograms execute, and so on
- how to start and control background processing for batch jobs (a background job doesn't run in your time-sharing region, so your terminal's not tied up as the job executes)
- why you have to use native TSO commands for some functions even if ISPF is available on your system

In short, you'll learn everything you need to know to use TSO commands or ISPF for program development.

For experienced TSO users: How to use command procedures

MVS TSO will also teach you how to use command procedures, or CLISTs. A CLIST is a series of TSO commands and statements that are executed in sequence (it's roughly equivalent to a JCL procedure). In this book, then, you'll find out:

- how to create and execute a simple CLIST for a specific job
- how to create and execute a generalized CLIST that can be used in a number of situations
- how to write a complex procedure that uses facilities much like those of a high-level language
- how to write a procedure for terminal I/O or file handling
- when and why you should write a program in a high-level language instead of using a CLIST

2 reasons why this book works

1. TSO is easier to master if you have plenty of practical examples to follow. That's why *MVS TSO* is loaded with illustrations. For example, you'll find:

- before-and-after screen images that show you what values to enter into a screen and what the result will be
- TSO command formats that clearly explain each operand
- sample CLISTs
- schematic drawings that show how TSO works and how it relates to MVS

These illustrations not only help you understand TSO in the first place. They also serve as handy references when you're working at your terminal.

What's more, they teach you the basic patterns of TSO commands and ISPF options. So you won't have any trouble looking up new features in the IBM manuals or other references when... and if...you need them.

2. This book is organized in a way we've found works well. After chapter 1 (an introduction to MVS and TSO), the book is divided into 3 parts: one each on ISPF, TSO commands, and CLIST. So if ISPF isn't available at your installation, you can skip that part and concentrate on native TSO. If you already have TSO experience, you can go directly to the part on CLIST.

In other words, you can study the parts you want to, when you want to.

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Why take the time to write a program in a high-level language when you can use a utility program instead? *OS Utilities* teaches you to use 13 time-saving utilities, including IEBGENER, IEBPTPCH, IEBISAM, IEBUPDTE, IEFBR14, Sort/Merge, and AMS.

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IBM unveils tool to restructure VM, MVS Cobol code

Language systems now easier to modify

By Charles Babcock and John Gallant

RYE BROOK, N.Y. — IBM last week introduced a VM- and MVS-based Cobol restructuring program, touted to be based on artificial intelligence techniques, that was met with interest — if not enthusiasm — by users and analysts.

The Cobol Structuring Facility (Cobol/SF) was designed to transform existing Cobol language systems into easier to understand structured programs to ease maintenance and modification.

IBM, which has been faulted by critics for failing to keep abreast of innovations in key areas of productivity software technology, is likely to have a powerful impact on the fledgling field of code restructuring.

User need spawns packages, services

The emergence of restructuring packages and services was spawned by an intense user need to reduce the growing software maintenance work load — a work load caused in large measure by the need to upgrade and patch older, poorly written applications constantly.

According to Nicholas Zvegintzov, publisher of "Software Maintenance News," IBM will be facing only a handful of competitors. They include Peat, Marwick, Mitchell & Co. with its Structured Retrofit service, Group Operations, Inc.'s Superstructure package and Language Technology, Inc. with its Recoder system.

"Half the code in the universe is Cobol, and all of it can stand to be restructured," Zvegintzov said. "It's a tool many people should have."

According to William Engel, president of Salem, Mass.-based Language Technology, "IBM's entry is a validation that will help establish Cobol restructuring as a valid productivity tool."

> *'Half the code in the universe is Cobol, and all of it can stand to be restructured.'*
>
> — Nicholas Zvegintzov
> 'Software Maintenance News'

An IBM spokeswoman said Cobol/SF analyzes complex programs, structures them into a top-down hierarchy of components and identifies code segments that may reused for new program development. The system restructures programs automatically and generates reports that guide users in performing additional restructuring.

Structured programs produced by the facility are expressed in IBM's VS Cobol II. The spokeswoman said restructured programs are single-entry/single-exit programs that contain no functions like GOTO and ALTER, which are discouraged by structured programming proponents.

Useful for reducing maintenance

Cobol/SF's analysis mode allows a user to analyze an unstructured program for unreachable code or endless loops without actually restructuring the entire program. She said the product is useful for reducing software maintenance, facilitating program reengineering and for enforcing structured programming standards during new development projects.

The spokeswoman said the artificial intelligence techniques embodied in Cobol/SF are those used to organize an unstructured program into a hierarchy of components similar to those a software engineer would use. Cobol/SF is scheduled for shipment in January at a one-time charge of $125,000 or at a monthly license charge of $12,500.

Bernard Kaplan, vice-president of data processing for the New York investment counseling firm Scudder, Stevens & Clark, said the product would be useful to extend the life of older systems, particularly in an environment with high turnover and a lack of documentation. "But it would not be a cost-effective system for us," he said.

"We have been writing structured code for the past few years and have only one older system that is difficult to maintain," Kaplan continued. "We would not buy the product for one system."

'Large shops with gigantic programs'

That view was echoed by Robert Ofenloch, DP director for the Savings Bank Life Insurance Fund in New York. "I can see a need for it in large shops with gigantic programs and a lot of turnover," Ofenloch said. "But we would not even look at it at that price. We run a small shop, and we just do not have the need for it."

Boris Beizer, a consultant and author on structured programming, said IBM and other market players are pandering to an overly anxious user community concerned about rising maintenance costs. "This is a very popular thing to do," he said. "People have high hopes for restructuring, although those hopes may be misplaced.

"People think they can zap their code through something like this and they will realize great maintenance benefits," Beizer said. "But these systems don't solve the fundamental problems of badly written code."

Beizer said the system may be useful as an analytical tool for users who are rewriting older applications. "If the code is very bad, the amount of automatic restructuring the system can do will not be great. If it does restructure the majority of the code, then the code was not that bad to begin with."

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Net, peripheral products roll out

From page 1

suggested that the show floor seemed less crowded than in previous years.

As a sign of changing times, Comdex/Fall's highest profile product had first grabbed the spotlight two years ago. Microsoft Corp. staged a self-styled bizarre event to herald the long-delayed shipment of its Windows operating environment in a $99 retail package. The presentation closed with Chairman William Gates leading a chorus of *To Dream the Impossible Dream* and driving a golf cart overloaded with Windows packages through the jam-packed crowd.

A note of caution was sounded, however, as it was elsewhere in the show. Windows was launched with a conspicuously short list of enthusiastic endorsements from application vendors.

"You want to be able to work in that environment, but rewriting the software to take advantage of it is another matter," commented Fred Gibbons, president of Software Publishing Corp. If IBM came out with a graphics interface standard, "we'd follow it in a minute," he added.

"All we want is a graphics environment that works and is endorsed by IBM," said Camilo Wilson, founder of Lifetree Software, Inc. of Monterey, Calif. "So we play with GEM and Windows and wait for IBM." GEM is Digital Research, Inc.'s Graphics Environment Manager.

Many vendors did choose Comdex/Fall to jump on another bandwagon — personal computer local-area networks. Among new multiuser applications for IBM PC-DOS 3.1 networks were Ashton-Tate's Dbase III Plus [CW, Nov. 18] and a Smart Networking version from Innovative Software, Inc. of Lenexa, Kan.

The Innovative offering will provide data base management, spreadsheet and word processing functions.

> ”
>
> *The Microsoft Corp. presentation closed with Chairman William Gates leading a chorus of* To Dream the Impossible Dream.

"You can share data between various applications among a number of people on a net," Innovative Marketing Vice-President Ron Ferguson said. Available in first quarter 1986, the package will cost $1,795 for a three-workstation net with additional access software priced at $595 per user.

In another communications-oriented debut, leading personal computer modem supplier Hayes Microcomputer Products, Inc. unveiled a 2,400 bit/sec. internal modem for the IBM Personal Computer line and compatible systems. The Smartmodemb, which supports both asynchronous and synchronous data transmission through a single standard communications port, will cost $739.

On the hardware side, more machines compatible with the IBM Personal Computer AT made an appearance. They were led by Tandy Corp.'s Model 3000, the aggressive pricing of which drew considerable interest.

A basic system with 512K bytes of memory and a 1.2M-byte floppy disk drive will be available for $2,599, and a model with a 20M-byte internal hard disk drive will sell for $3,599.

Printer vendors out in force

As always, printer manufacturers were out in force at Comdex/Fall. This year's show saw a tremendous surge of nonimpact printers, which are expected both to displace medium-speed impact printers and to aid the fast-emerging application of desktop publishing. Among these, QMS, Inc. of Mobile, Ala., dropped through the $2,000 price barrier for laser printers, with a model carrying a $1,995 price tag.

Comdex/Fall demonstrated many advances in magnetic disk drives, one example being Eastman Kodak Co.'s 6.6M-byte minifloppy drives.

A host of optical storage devices also debuted, including a Compact Disc Read-Only Memory reader from Tecmar, Inc. of Solon, Ohio. Tecmar's new compact disc Massfile device, which works with the IBM Personal Computer and Digital Equipment Corp. Rainbow, costs $1,695 plus $295 for the controller card.

Tandy 3000 said to rival IBM's AT

By James A. Martin

LAS VEGAS — Tandy Corp., located in Fort Worth, Texas, last week introduced the Tandy 3000 personal computer, said to be fully compatible with the IBM Personal Computer AT but to offer more expansion capability and a smaller footprint at a reduced cost.

The 3000 was first shown at Tandy's annual shareholder meeting two weeks ago and was formally introduced at last week's Comdex/Fall '85 show. The machine is based on the 16-bit Intel Corp. 80286 microprocessor chip, operates at 8 MHz and is said to be 33.3% faster than the AT.

A company spokesman said the 3000 will be marketed toward Tandy's major corporate accounts as well as small businesses and work-at-home executives who require IBM capability at a lower cost.

The 3000 is available in two configurations, both of which include 512K bytes of random-access memory (RAM), expandable to 640K bytes on the main board, and which support up to 12M bytes. The standard configuration includes one 1.2M-byte

See TANDY page 13

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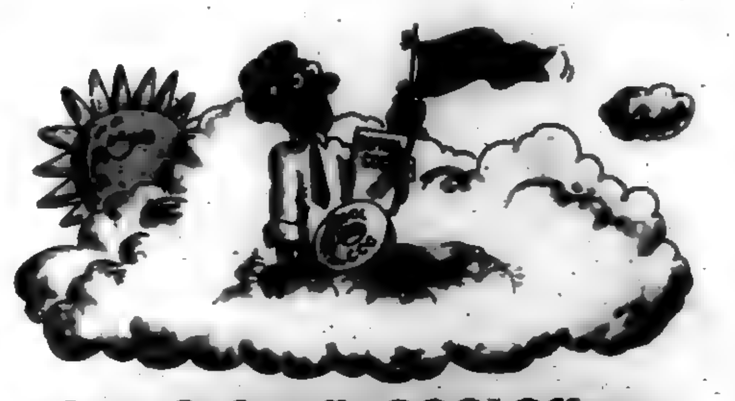

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Standards, multiuser software crucial to micro net market

By John Dix

LAS VEGAS — Networks of personal computers may soon rival the utility of minicomputers thanks in large part to standards set by IBM, net vendors at Comdex/Fall '85 claimed last week.

Two things, however, stand in the way: lack of network acceptance and lack of multiuser software. Both are changing.

IBM's recently introduced Token-Ring network will help educate and focus the market for micro nets, according to William A. Lanfri, director of marketing for Corvus Systems, Inc., a net vendor in San Jose, Calif.

The Token-Ring "is a real boon because it adds a standard to the market," agreed Charles J. Hart, president and chief executive officer of Palo Alto, Calif.-based Nestar Systems, Inc.

Netbios' crucial role for networks

But perhaps more crucial to user acceptance is multiuser applications, the dearth of which has hindered network acceptance, Lanfri said. That shortage is expected to abate as the publication of IBM's Netbios bears fruit, according to vendors interviewed.

Netbios, published in the tradition of the IBM Personal Computer's open architecture, facilitates the job of software houses trying to develop multiuser applications for IBM networks. Applications written to this common set of network calls can be run on networks supporting Netbios, including nets from other vendors.

Companies like Corvus and Nestar are committed to supporting the applications interface in order to cash in on the software development work now in progress.

"Netbios itself is not that important, but getting the world to coalesce around a software interface standard is," Lanfri explained.

The ultimate goal of micro networks is to provide a "minicomputer on a string," Lanfri said. User education and commonly available multiuser software will help make that a reality. The weak link, however, is network operating system software that dictates how network resources are managed and shared.

IBM has not had the influence on network operating system software that it has had in other areas. While most companies support IBM PC-DOS 3.1, IBM's networking version of its PC-DOS operating system, few have adopted IBM's PC Network program, its network operating software.

Furthermore, there seems to be little industry enthusiasm about MS-Net, Microsoft Corp.'s network software, although some vendors are adopting portions of it.

Novell, Inc. of Orem, Utah, is perhaps the best known provider of network operating systems. The company has ported its Netware product to 25 different networks and jointly markets the software with other net manufacturers. Netware was the first operating system software to offer file serving, according to Jared Blaser, manager of marketing technical services. File serving, unlike disk serving, enables users to access mutual files while providing control to ensure data concurrency.

Corvus puts a lot of stock in operating system software, enough to purchase a company that specializes in the field. In May it bought Applied Intelligence, Inc., a network software development firm. Corvus' present Constellation net software, Lanfri said, is best for the sharing of disks and printers. Applied Intelligence will expand on this and enable the company to offer better file sharing capabilities.

Interestingly, interviewees downplayed the near-term significance of IBM's Advanced Program-to-Program Application (APPC) high-level program interface. APPC is part of IBM's System Network Architecture and provides for program-to-program interaction, particularly between micros and mainframes.

Lanfri speculated APPC will be typically implemented in network gateways, instead of in each micro. He also said APPC will not make a lot of sense for use with micros until they are truly multitasking.

Tandy 3000 said to rival IBM AT

From page 12

floppy disk drive for $2,599. The 3000 HD processor contains a 1.2M-byte floppy disk drive and a 20M-byte hard drive and costs $3,599.

The 3000, which is available now, features the Microsoft Corp. MS-DOS 3.1 operating system that supports Tandy's Vianet local-area network.

The Tandy 3000 Deluxe Graphics Adapter displays several modes, including 640- by 400-pixel two color and 640- by 200-pixel 16 color. The CM-1 color monitor costs $599 or $799 if purchased with the adapter before June 30. The VM-1 monochrome monitor is $199.95. Both monitors are optional.

The 3000 is said to measure 6¼ by 19 by 18 in. and offers a standard real-time clock with CMOS RAM and battery backup and a standard serial/parallel adapter using a half slot.

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Distributors fear losing customers

From page 1

dents purchased software directly from the publisher, 38% purchased it from computer specialty stores and 5% were buying their software from computer mail-order firms. Another 16% said they were buying from wholesalers and distributors.

Last year, $4.1 billion of personal computer software was sold in the U.S., according to San Jose, Calif.-based Dataquest, Inc. Of that, 69% was business software.

But the corporate buyers appear to be shifting away from retail outlets. Corporate buying habits have contributed to a drop in software as a percentage of retail sales, now at 9.9% vs. about 12% a year ago, according to Egil Juliussen, president of Future Computing.

"We see corporate America demanding that software come directly from the software vendor," Kathleen Lane, director of software services at Dataquest, told Comdex/Fall attendees. "If you talk to the Microcomputer Managers Association, they don't want the retail store involved at all."

> *'Current software distribution channels are inadequate to handle innovative software titles, especially from the smaller publishers.'*
>
> — **Egil Juliussen**
> **Future Computing**

Price undercutting

Retail stores today are also challenged by price undercutting from the low overhead of mail-order houses.

Mail-order houses — companies that deal strictly in phone sales — have become leading sellers of volume software at slashed prices. Also emerging are the corporate resellers — typically former mail-order houses that now incorporate software support and service into their businesses.

"Retailers and dealers can't keep the volume to give competitive pricing," said Dan Spiner of Management Information Software Co. in New York during a recent interview. "Corporate customers today are getting 30% off list price in some cases."

"The state of software distribution is pretty lousy as a rule," said Mort Rosenthal, chairman of Corporate Software, Inc., a Canton, Mass., distributor.

High-volume, low-priced software

MIS is capitalizing on the need for high-volume, low-priced software sales. Companies succeeding in that market include Rosenthal's Corporate Software, which expects $25 million in 1985 sales, and 800-Software of Berkeley, Calif., which expects $18 million in sales this year.

At the user level, corporations are still clamoring for site licensing agreements from vendors and demanding attention be paid to their specialized needs for purchasing and support.

These changes have helped create a bottleneck that is preventing customers from accessing new software titles, according to Juliussen.

"Current software distribution channels are inadequate to handle new and innovative software titles, especially from the smaller publishers," he said.

Although its origins stem from strictly mail-order business where volume takes priority, the corporate reseller is looking to discover new software titles.

Management Information Software employs a team of six evaluators who test new products and enhancements. Even with that team, bringing new products to market is often difficult, Spiner said. "There are some nice products that come out of the closet, but I can only afford to promote one or two products a month."

There are some, however, who maintain that the distribution bottleneck is only temporary and is not a result of the current channel structure.

"If a product has an inherent value, it will get to market, but it will take time," said Luther Nussbaum, vice-president of operations at Businessland, Inc. "There will be some software hits, but right now we have hit a lull," he said.

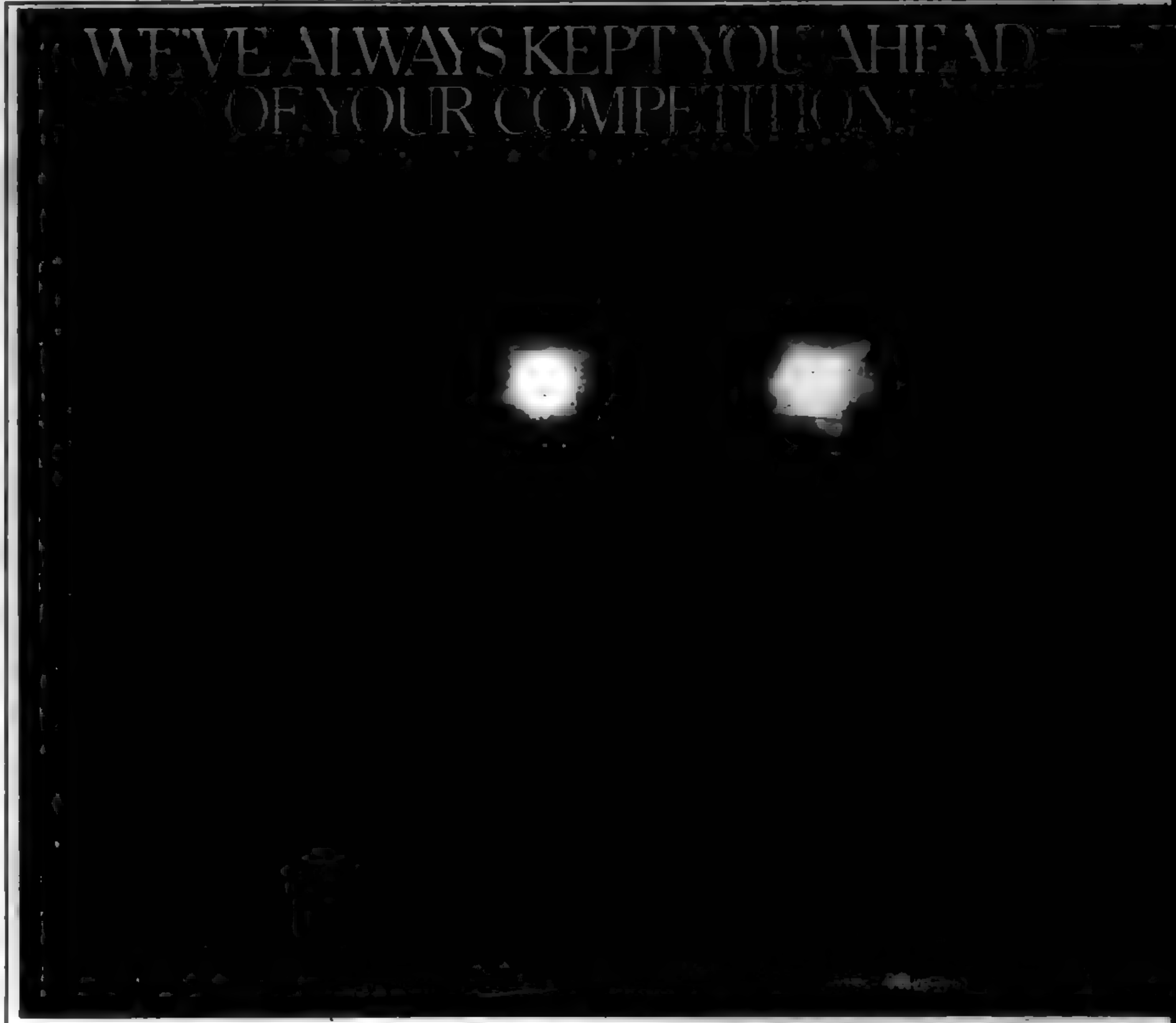
While Businessland continues to look for a few good products, Nussbaum said he believes the market will no longer accept the barrage of products it saw several years ago. "You don't get that kind of innovation in today's market," he said.

Chains such as Businessland will continue to sell software, but Future Computing's Juliussen said that there will be a resurgence of software-only stores.

Often failing in the past because of growth mismanagement and the imbalance between pricing strategy and product support, software stores in the future must maintain a large software selection, deal with the aftermarket customer base and produce small-ticket items, he said.

There may not be a clear solution to the software distribution bottleneck, but new technologies, including refined electronic distribution methods, could help loosen the flow, Juliussen said.

"Electronic distribution would be a major upheaval from current distribution markets," Juliussen noted.



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HP president advises vendors to return to business basics

Rapport with dealers, customers important

By Clinton Wilder

LAS VEGAS — Forging better relationships with dealers and resellers and making personal computers much easier to use will help bring microcomputer vendors out of the current industry slump, Hewlett-Packard Co. President and Chief Executive Officer John A. Young told attendees at Comdex/Fall '85 last week.

In his keynote address, Young called the microcomputer industry's challenge for future growth "a marathon, not a sprint" and further urged micro vendors to return to basic business fundamentals as they gird for long-term survival. He noted that 40% of U.S. capital spending is now for electronic equipment, making the computer industry more susceptible to lean economic times than ever before.

"The boom times of 1983 and 1984 fooled us all, and we lost our perspective on the marathon we're running," Young said.

"The easy personal computer sales have already been made. The electronics industry will grow as we meet customers' needs, not just sell equipment. And it does little good to make state-of-the-art products if, six months later, someone else can sell the same thing for half the price," he added.

Young emphasized that microcomputer vendors must improve their relationships with the value-added dealer/value-added reseller community, especially after sales are made.

"Perhaps we have devoted too much innovation to our products and not enough to our relationships," Young said. "Discounts, for example, should not be viewed as taking something away from the vendor because resellers are an integral part of the organization."

To overcome the user uncertainty that has partially caused the current microcomputer downturn, Young urged the development of true user-friendly systems that address real needs. He said that natural language interfaces and reliable networking technologies represent two of the greatest hopes for achieving that goal, particularly for sales to small organizations that comprise 95% of the businesses in the U.S.

In addition, Young stressed the importance of local-area networks, the most fertile ground for new product introductions at Comdex/Fall. Young maintained that only 4% of microcomputers currently operate within any kind of network, despite the fact that office workers spend an estimated two-thirds of their time communicating.

WORLD DIGEST

Computerworld News Service

TAIPEI, Taiwan — Two European electronics heavyweights, N.V. Phillips of the Netherlands and Siemens AG of West Germany, are scouting for Taiwanese electronics engineers in hopes of gaining the talent needed to compete against U.S. and Japanese semiconductor manufacturers better. Some 1,000 Taiwanese specialists reportedly answered a recent "help wanted" advertisement placed by the two firms.

LONDON — The skills shortage in the UK's computer industry is likely to worsen next year as DP managers try to expand recruitment, according to a survey by the National Computing Center. In 1986, the survey reported, the shortage of good staff, especially systems programmers, will continue; recruitment will become more difficult; and staff turnover rates will become worse.

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VIEWPOINT

EDITORIAL

Security alert

Security is a nuisance. None of us like the thought: Somehow the fact that we must lock up our homes and cars makes us recognize our vulnerability to threats we cannot control. None of us like the bother: It requires planning, the purchase of the right devices, extra steps in our daily routine.

Twenty years ago, many DP professionals dismissed security as no more than a nuisance. Few do today. The threat to an organization's data and, therefore, to its health, became clear as computer systems moved out of physical enclosures and became friendly enough to be used by people throughout the organization.

What may not be clear is the character and strength of the threat as well as the importance of legislation to control it. No longer are hackers — genius programmers or teenage whizzes — the most troublesome factor in the computer security equation.

According to a survey of state prosecutors' offices by the National Center for Computer Crime Data, today's typical computer criminal is a petty thief who knows only enough about computers to recognize that they offer one more method for pilfering cash. Also, far more typical is the disgruntled employee who commits fraud or simply creates mayhem within an organization's computer system. Now add organized crime, which inevitably will dip into the enormous potential for computer fraud, and the seriousness of the threat is clear.

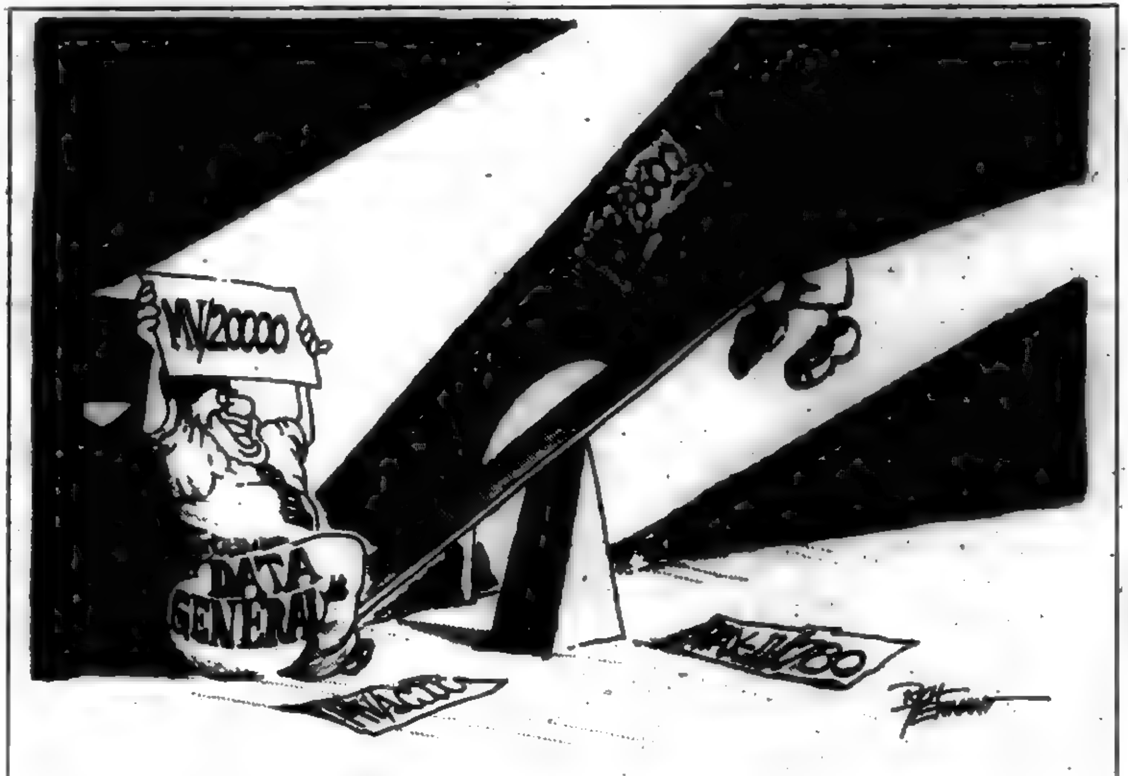
Given this growing gallery of computer criminals, what is being done to create legal protection for systems and their data? A majority of state legislatures have passed laws of varying effectiveness that cover intrastate computer crime. The Data Processing Management Association (DPMA) has been active here, first drafting model legislation, now planning to lobby for it.

But more critical by far is the interstate arena because so much of electronic technology simply ignores geographical boundaries. Here, only the U.S. Congress can act. As outlined in this issue's Special Report on security (see page 55), the U.S. House and the Senate are each debating two somewhat conflicting approaches. One, based on privacy law, views the breaching of a computer system as an invasion of privacy; the other, based on criminal law, views it as criminal trespass and burglary.

Unfortunately, these bills are competing for legislators' support, and that competition is hindering their progress. Computer crime usually contains elements of both criminal trespass and invasion of privacy; thus, the bills should be merged as quickly as possible so that debate can focus on creating the best legislation rather than on the best approach to legislation.

Unfortunately, too, the DPMA has not added its voice to this interstate debate, preferring to limit its lobbying to state legislatures. It has not participated in subcommittee hearings during 1985; it currently has no plans to testify in 1986. The DPMA, with its unique grasp of the issues, ought to be heard.

Computer crime is long past the stage of being a nuisance; it is a growing threat to the privacy and security both of organizations and of individuals. We should not allow either legislative bickering or the reluctance of professional groups like the DPMA to slow progress on a much-needed federal law.



LETTERS TO THE EDITOR

Today's fourth-generation debate reminiscent of 1960s' Cobol dispute

Although I found the article "Language Barrier: The fourth generation at work" [CW, Nov. 11] informative, I want to set the record straight on a quote attributed to me.

The article quoted me as saying, "A combination of principal fourth-generation language products can eliminate all Cobol in most shops today." I did not make this statement. What I did say is that a combination of principal fourth-generation language products can eliminate most Cobol in most shops today.

Fourth-generation languages can satisfactorily handle transaction-processing volumes of 5,000 per hour or less. Most of today's data processing shops do not handle loads exceeding 5,000 per hour.

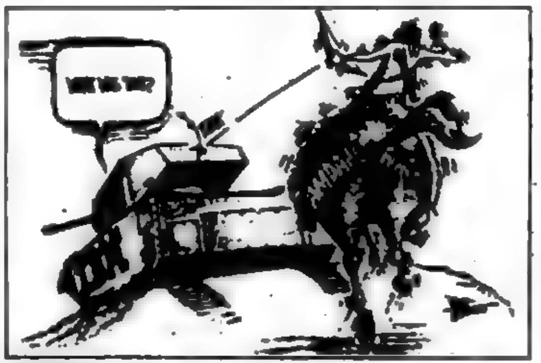
The reference to the use of Applied Data Research, Inc.'s (ADR) Ideal at the New Jersey Department of Motor Vehicles provides a case in point. ADR had recommended that the department's application be coded principally in Ideal with the use of Cobol for performance-sensitive segments. Instead, Ideal was used 100%. The application is now being reimplemented based on ADR's recommendation and is expected to perform adequately.

There is nothing new in the debate over whether end users should migrate their applications to fourth-generation languages. The same debate raged in the early 1960s with the advent of Fortran and Cobol. At the time, some considered both languages to be too inefficient to serve as general-purpose development languages.

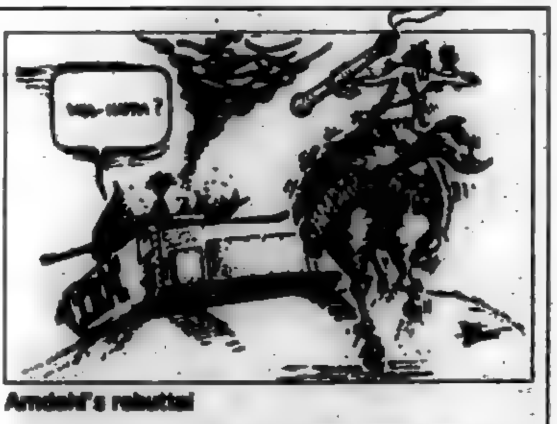
The advocates of this viewpoint were, of course, wrong. Yet, even as Cobol and Fortran became dominant, specific needs and demands for low-level assembler code remained.

Twenty years from now, people will look back on our debates over fourth-generation languages much as we now view the 1960s debates over Cobol. By the turn of the century, most applications will be built using fourth- and fifth-generation techniques. But even in the year 2000, some demand for low-level Cobol and Fortran encoding will still exist to solve performance-critical problems.

George Schussel
President
Digital Consulting Associates, Inc.
Andover, Mass.



Computerworld's cartoon



Amdahl's rebuttal

Amdahl Apache gets equal time in version of editorial cartoon

Quite frankly, many of us at Amdahl Corp. weren't too amused with the Amdahl Apache vs. IBM cartoon that appeared in *Computerworld* [CW, Oct. 28]. In rebuttal, we would like to submit our own version, which has been circulating companywide.

Take that, IBM . . .

Steve Chen
Amdahl
Sunnyvale, Calif.

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VIEWPOINT

A new definition of quality

QUALITY

By Wayne Smith

In a fall 1984 article in the *Sloan Management Review* titled, "What does 'Product Quality' Really Mean?" David A. Garvin of Harvard University attempted to synthesize a definition of product quality by drawing on a host of definitions from philosophy, economics, marketing and operations management.

From this multidisciplinary vantage point, he developed an eight-part framework that incorporated performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality.

Although Garvin focused on product quality as it relates to the manufacturing of hard goods, his points, like so many engineering and manufacturing concepts, are also applicable to the problems facing information services management.

In Garvin's multidisciplinary model, quality as it relates to the application development process is not simply a set of engineering factors but rather a combination of factors, some of which are innate and absolute, some are transitory, some measurable and some totally subjective.

For example, the first two dimensions, performance and features, measure the degree to which a product or an application system meets its primary and secondary business requirements. This is the most common quality orientation in information services.

Similarly, the fourth dimension, conformance, measures the degree to which a product meets some predefined set of standards; for example, in a software development effort, this dimension might be represented by adherence to data base standards or communications protocols. These three dimensions are primarily product-oriented; that is, they are attributes inherent and measurable in the product itself.

The dimensions of reliability and durability are a blend of product and process-oriented quality issues. They measure the tendency of the product to fail or suffer excessive maintenance costs. Another process-oriented dimension is serviceability that measures the overall responsiveness of the information services organization to problems, corrections and changes.

Finally, the last two dimensions, aesthetics — the degree to which the product attributes match the preferences of the targeted and untargeted users — and perceived quality — the degree to which the product meets the expectations of the users — are highly subjective and vary continuously over time and among various individuals.

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> *As professionals in information services, we live in a primarily quantitative culture.*

As professionals in information services, we live in a primarily quantitative culture. We strive for methods, techniques and processes of all kinds. We tend to see every problem as some kind of translation between the "problem space" and the "solution space." We quickly look for solutions in familiar architectures.

In other words, we subconsciously attempt to deal with only those dimensions of quality with which we are familiar, leaving the others to wander and vary unmanaged and, in some cases, to go unrecognised.

Ironically, because most information services managers are struggling with a poor-quality image as perceived by the rest of the organization, they tend to overlook those very quality dimensions — namely, aesthetics and perceived quality — which would yield the greatest leverage in this struggle.

From a strategic point of view, the message is clear: Information services management must recognize the eight dimensions of quality. Furthermore, managers must come to grips with the reality that although certain of these dimensions can be handled with traditional quantitative and engineering-oriented disciplines, there nevertheless exist some that are inherently subjective. And, moreover, these are equally important to the success of the overall quality program for an information services group.

Smith is vice-president, specializing in quality, at Applied Information Development, Inc. in Oak Brook, Ill.

Middle managers as barriers to change

By John P. Murray

A key factor in the eventual success of any attempt to develop a state-of-the-art information processing environment is the attitude of the department's middle management. Where those managers do not actively support necessary changes, the task becomes much more difficult. Where they withhold support and actively seek to forestall the process, they can render substantial harm to the effort.

DATA CENTER

One would think that middle managers would welcome any effort to move to a state-of-the-art position: The benefits not only to the organization but also to these individuals seem obvious.

Unfortunately, this is not always the case. Some will strongly resist these changes, primarily because of simple fear. Being comfortable with a given technology, particularly if that understanding creates a very solid position within the department for the individual, is one reason to fear and resist change.

The fear of not being able to learn new techniques and adopt new approaches, of not being able to keep pace with the coming changes can also be a factor. An important, yet perhaps not so obvious, fear is that as a result of change someone else will usurp power or authority now held by the particular manager.

An important aspect of the responsibility of these managers must be to support the goals of the department's senior managers. This support is required because these managers are closer to the rest of the people in the department, and their attitude toward the necessary changes will be a critical factor in the success or failure of the effort. Although strong senior-level management can carry the day in the end, the strain engendered as a result of the battle to do so can be considerable.

The senior manager must exercise care in distinguishing between valid objections and ploys to delay progress. Close questioning of the validity of the issues and challenging the various negative assumptions put forth by middle-level managers should be considered mandatory. The senior manager, as a part of this questioning process, should not only attempt to determine the appropriateness of these issues but also the real attitude of those doing the protesting.

In some situations it will become clear that a particularly recalcitrant manager is generating harm through continued resistance. If that manager has done a good job otherwise and is viewed as being able to make a strong contribution in the future, an effort should be mounted to bring about a change in attitude. If it becomes clear that there is little reason to expect change, it is in the best interest of all concerned to encourage that manager to seek new opportunities elsewhere.

The move to a state-of-the-art information processing environment requires considerable thought, planning and plain hard work. Given the magnitude of the effort, any and all unnecessary areas of obstruction must be, if not eliminated, at least controlled. The resistance of members of the middle management group is one of those areas. The senior manager of the installation should pay close attention to the probability of that resistance developing and, should it arise, move swiftly to put it down.

Murray is director of management and information services for American Breeders Service, a DeForest, Wis., division of W. R. Grace & Co., and is the author of Management Information Systems as a Corporate Resource.

Shortcomings of computer crime law

READER'S PLATFORM

By Sanford Sherizen

Believing in computer crime law may be hazardous to your corporation's health. From my view as a criminologist, computer crime legislation isn't going to help corporations very much. Those who think that they will not have to actively prevent computer crime are going to be surprised.

With more than two-thirds of the states and the federal government having computer crime laws, the rapid movement toward legislation is an impressive response to computer crime, particularly compared with how slowly the government responds to other pressing problems.

Yet, a rational criminal who determines risks and benefits is still going to choose computer crime. The odds continue to be on the criminal side because most computer crimes may never be detected. Few companies that detect these crimes are willing to press charges and, even in the unlikely chance that they are willing, prosecution may not occur. Who says crime doesn't pay?

Computer crime law, like most other law, is not the carefully crafted art form taught in civics classes. As yet, there doesn't even appear to be nationally accepted definitions of computers, computer crime or computer abuse.

The law continues to grapple with questions of the acceptability of computer-generated documents and other aspects of evidence. The problems caused by the lack of cooperation by the state government, federal government and private sector is exemplified by computer crimes that can easily cross several state lines, involving a number of private telecommunications systems and devices.

The lack of sufficient technical knowledge on the part of many prosecutors and judges can lead them to avoid computer crime law. Traditional fraud-type statutes continue to be used for computer crime even though cases may be lost because of inappropriate legal categories.

Although not toothless, the law has at least a bad-fitting pair of dentures. These problems will gradually lessen as computer crime laws are tested and refined. The legal system will become more attuned to the problem, and businesses may even be more willing to report cases. In the meanwhile, a good, reliable information security program is the best available means of controlling computer crime.

Sherizen is a Natick, Mass.-based information security expert who consults and leads seminars for corporations, banks and government.

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COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

AT&T tries different tack

AT&T Information Systems has assembled an impressive array of connection options for IBM 3270-type peripherals, some of which are embodied in the company's recently announced version of IBM's workhorse 3274 communications controller.

Manufacturers of 3270 plug-compatible equipment, such as Lee Data Corp., have offered alternatives to point-to-point coaxial cable links between terminals and controllers for some time. AT&T's 3270 devices do little more than those products, but AT&T adds value by incorporating support for its systems into its building wiring scheme and private branch exchanges (PBX).

The primary benefit of the AT&T 6500 Multifunction Communication Controller announced two weeks ago [CW, Nov. 18] is multiple-host support. The 3274-compatible box can be connected to three synchronous hosts or up to 16 asynchronous CPUs. Attached terminals, including models in the new AT&T 6500 line, can simultaneously access up to four different hosts through a windowing capability.

That in itself isn't unusual in the plug-compatible world. What is different is the range of ways that AT&T can connect 3270-type terminals to controllers. These include twisted-pair options, twisted pair with fiber-optic links, connections through AT&T PBXs and local network support.

AT&T's 6500 controller can support up to 32 terminals using unshielded twisted-pair wire instead of the usual coaxial cable. That wire may be part of an AT&T Premises Distribution System (PDS), although it doesn't have to be. PDS is a building wiring scheme similar

See AT&T page 22

Sytek rests on thin IBM ice

Feeling dependency on Big Blue for OEM contracts

By John Dix

Contracts to supply IBM with original equipment sing in the ears of small vendors like the Sirens to Odysseus. But young companies may be wise to heed the lesson of Homer's adventurer and brace against the temptation of, in this case, big and fast money. Big Blue can decimate vendors by withdrawing OEM contracts.

Sytek, Inc. is vulnerable. Half of the local network manufacturer's estimated $100 million revenue this year will come from a contract to supply IBM with the PC Network. The four-year contract, now in its second year, is in jeopardy, analysts said. IBM's recent introduction of the Token-Ring network has clouded the future of the baseband, coaxial-cable PC Network.

Dependency on IBM has put Sytek on tenterhooks. "Sure it has us worried," confessed Ken Biba, company cofounder and senior vice-president of marketing and planning. "But we've had plans in place since last year to change our revenue balance." Ideally, Biba would like to see 75% of the company's revenue come from end-user sales and the remainder from OEM business.

Biba said he hopes to achieve the revenue redistribution by increasing sales of Sytek's general-purpose local network and its version of the PC Network. If IBM pulled out of the contract, Sytek could suddenly find end-user sales providing all revenue — a situation that has frequently devastated microcomputer disk drive manufacturers. The most recent example of the latter phenomenon is Computer Memories, Inc., which soared to stardom on a lucrative IBM contract but now faces the loss of 75% of its revenue because IBM declined to renew the deal.

The fate of Sytek's IBM contract depends in large part on how IBM's introduction of the Token-Ring will effect PC Network sales.

See SYTEK page 22

MAP: Europe lags behind U.S.

By Edward Warner
Computerworld News Service

DETROIT (CWN) — European vendors are roughly a year and a half behind their U.S. counterparts in development of products that conform to General Motors Corp.'s Manufacturing Automation Protocol (MAP), vendors reported. Actual implementation of MAP in Europe is even further behind that of U.S. companies.

MAP is a network architecture intended for the integration of different types and makes of automated factory equipment, such as drill press controllers and minicomputer tracking systems.

Twenty-one companies participated in the MAP demonstration at the Autofact '85 Conference and Exposition on factory automation in Detroit. Only Siemens AG, the West German electronics giant, and ASEA AB, a Swedish robot maker, hailed from Europe, and neither had a commercial MAP-compatible product available.

Siemens engineer and executive Dittmar Janetzky said Siemens will not begin production of the very large-scale integration chips needed for its first commercial MAP product until next year. The ASEA robot used in the MAP display at Autofact, meanwhile, was run by a MAP-compatible controller from a U.S. vendor.

Europe's lag in the MAP arena is no handicap, according to Janetzky. MAP is needed in the U.S. because factories have automation equipment from a variety of vendors, but most European factories buy their automation gear from one source and have fewer data communications worries, Janetzky explained.

While European factory automation vendors may have few problems selling systems to European clients, many U.S. manufacturers seem poised to switch and to endorse MAP. GM, which sponsored MAP's development, has already an-

See MAP page 22

NEW THIS WEEK

- Insystec introduces a voice/data office automation system
- Codex introduces AT&T-compatible modems

For more on these and other new products, see pp. 83-98.

INSTANT ANALYSIS

"The Open Systems Interconnect architecture in no way ensures that there will be heterogenous networks that can work together. Implementations of OSI will be very different."

— Dale Kutnick
noted industry
network consultant

Rolm ups voice/data lines, quadruples memory of switch

By Paul Korzeniowski

SANTA CLARA, Calif. — Rolm Corp. nearly doubled the capacity of its low-end switch recently, a strategic move given that the rate of new switch installations falls yearly and system upgrades promise needed revenue.

The total number of combined voice and data lines supported on Rolm's VSCBX — a private branch exchange (PBX) designed for small to medium-size businesses — has been increased from 144 to 272, capacity enough for 208 voice lines and 64 data lines. If a customer desires, the device can support 304 voice-only lines. The main memory of the switch has been quadrupled from 256K bytes of random-access memory (RAM) to 1,024K bytes of RAM.

With the added memory, users are able to install Rolm's Integrated Call Management feature that was introduced earlier this year. This feature supplies four cost management functions: toll restriction, least-cost routing, call queuing and equal-access connectivity.

Toll restriction prevents employees from placing long-distance calls to predetermined area codes, office codes or other call designators. Least-cost routing automatically chooses the cheapest route for outside calls. Call queuing assembles low-priority callers in queues to wait for the least costly trunks. Route optimization enables the switch to access carriers other than AT&T without requiring the caller to enter extra access digits.

The VSCBX's optional call-detail recording tracks calling activity and logs what trunk groups were used for inbound and outbound calls. Calls of extraordinary length or time are highlighted to identify abusers.

Rolm's enhancement strategy may be mirrored by other vendors, according to International Data Corp. (IDC), a Framingham, Mass.-based market research firm. IDC has predicted that the rate of new PBX installations will increase at a rate of only 2.75% throughout the rest of the decade. Reasons for the slow growth include failure of manufacturers to deliver promised technologies to market, the inability of suppliers to differentiate their products and former Bell operating companies' effective repositioning of Centrex services as an alternative to the PBX, IDC reported.

Because promise for new installations looks so gloomy, vendors will rely on revenue from customers who upgrade their current PBXs. The number of line shipments will grow at an overall rate of 5.83% through 1990. By 1990, nine out of every 10 lines shipped will be replacement lines rather than new lines, according to IDC. Rolm claimed that approximately 6,000 VSCBXs have been sold since it was introduced in 1979.

While Rolm holds third place in the market for low-end PBXs — Rolm has a 16% share behind Mitel Corp. with 24% and Northern Telecom, Inc. with 18%, according to IDC — upping the maximum lines supported on the VSCBX will help it retain customers and attract others.

Prices for the VSCBX range from $500 to $1,000 per line. The cost to upgrade an existing VSCBX ranges from $1,000 to $3,000.

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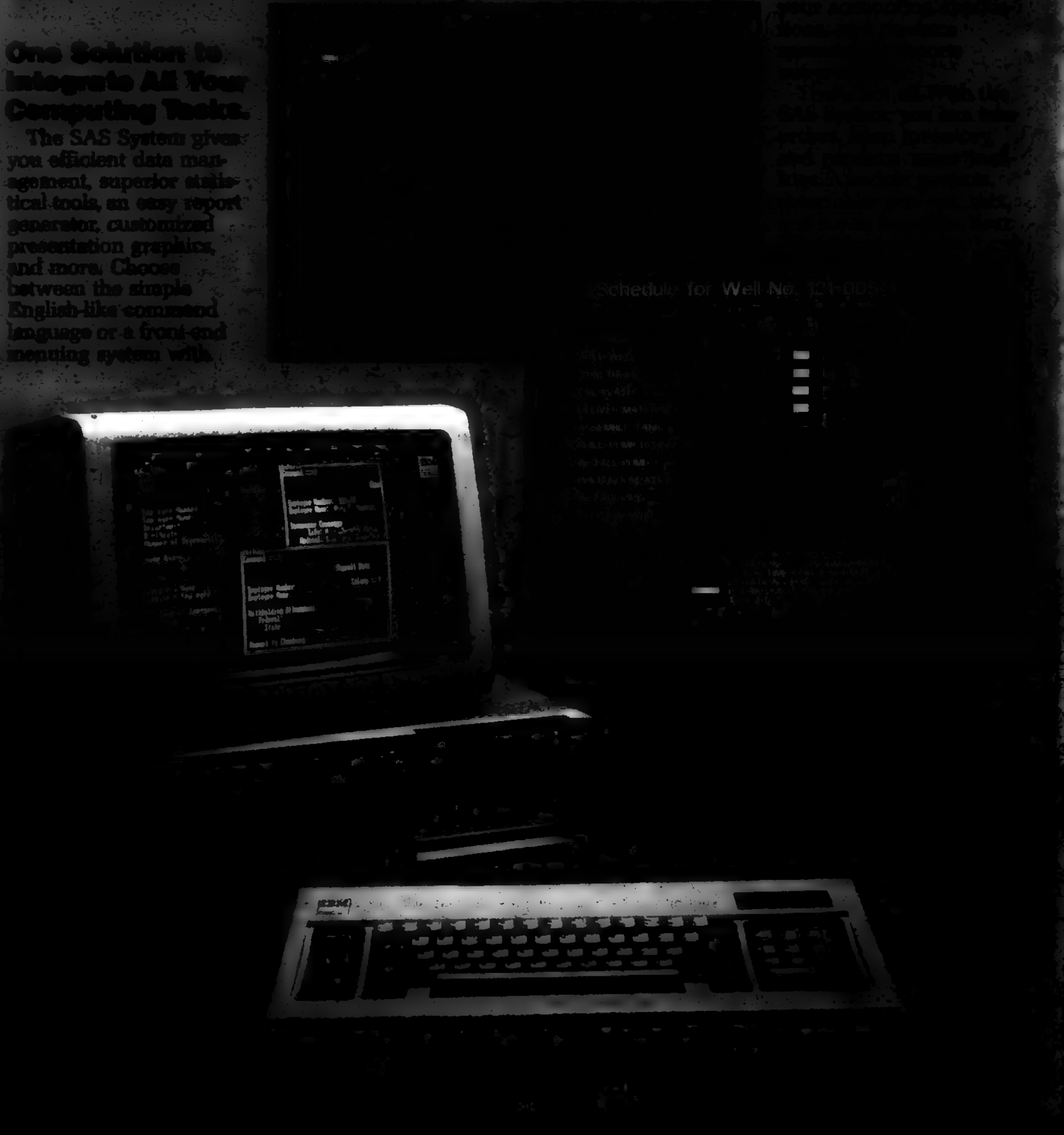

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Sytek rests on thin IBM ice

From page 19

To date, IBM has not been successful in selling the PC Network, according to Kim Myhre, director of communications research at International Data Corp. (IDC), a market research company in Framingham, Mass. He estimated that IBM has shipped 1,000 to 1,200 nets at most, representing roughly 10,000 Sytek interface cards. This is only 7% of the interface cards Biba said Sytek has shipped to IBM.

One factor possibly contributing to the low demand for the PC Network is that users have been waiting to evaluate the Token-Ring. If true, PC Network may be found adequate for many users' needs, and Sytek will be sitting in the catbird seat.

However, as with PC Network, the first release of the Token-Ring is intended for use with IBM Personal Computers. It is equally probable, then, that users faced with a micro network choice will take the Token-Ring because — unlike with the PC Network — IBM has committed itself to the Token-Ring's development.

A large unknown is how retailers will react. If they opt to stock the Token-Ring rather than the PC Network, sales of the Sytek product could plummet. "Retailers will stock what IBM tells them," predicted Eric Killorin, publisher of "PC Netline," a leading network industry newsletter.

IBM may push retailers to stock the net product that has the highest margins or encourage "retailers to stock both nets, possibly at the expense of other network companies," Killorin said. He said he believed that the Token-Ring net is a low-margin product at this point.

Many analysts said they see IBM pushing the Sytek product as a low-end network. In justification of that idea, IDC analyst Myhre noted that the PC Network does not conform to any Institute of Electrical and Electronics Engineers, Inc. (IEEE) standards, and IBM will not manufacture products for it. The Token-Ring, on the other hand, conforms to an IEEE standard and has IBM's full support.

The uncertainty surrounding the fate of the IBM PC Network can only further encourage Sytek to lessen its dependency on the industry giant. The company recently announced the System 6000, its own version of the IBM net. "The PC Network is the little brother of our product because IBM has artificially limited it to 72 nodes," Biba said. "We can build much larger [personal computer networks] over much wider areas."

The System 6000 complements the company's general-purpose broadband network that supports a broad array of computers and peripherals. "We think of ourselves as providers of general utility local-area networks, generally for large customers," Vice-President Biba said. "We think this is the single biggest growth segment of the marketplace."

"Sytek will continue to be a successful supplier to the general utility local network market segment," predicted Mark Stahlman, a security analyst with Sanford C. Bernstein and Co., an investment research firm in New York.

To strengthen the company further, Biba said, Sytek will diversify its product line by coming out with a token-ring network. It will also consider types of transmission media other than broadband coaxial cable.

Despite its reliance on IBM revenue today, two-thirds of Sytek's customers are repeat customers that are expanding their networks. This ensures Sytek a steady revenue stream isolated from IBM influence.

Asked whether IBM has approached Sytek about factory networks — which are broadband, like all Sytek products — Biba said the firm continues to have discussions with IBM about new products.

Regarding future relations with IBM, Killorin noted, "IBM is interested in just about all local network technologies and will be looking to companies that have a head start in that technology. That's why they aligned themselves with Sytek a year ago. But as Sytek outlives its usefulness, IBM will chew them up and spit them out. That is historically predictable."

MAP: Europe lags behind U.S.

From page 19

nounced its intention not to buy equipment that is incompatible with MAP. Other major manufacturers in the U.S. MAP users group are likely to follow suit soon.

The offering of MAP-compatible products by U.S. competitors has forced vendors like Siemens to pursue MAP compatibility to retain U.S. market share, Janetzky said.

Forces in Europe, meanwhile, are also pushing European vendors toward adoption of the MAP standard. This year, about 20 large European manufacturers formed a MAP users group. Vendors are able to join the group, but so far only four have done so, and only two are active, according to Janetzky, a member of the group's steering committee.

Another member of that group's steering committee said that, while European manufacturers are interested in MAP, European vendors are about a year and a half away from delivering MAP-compatible products.

If there is one reason for this lag, it may be the cost. According to U.S.-based Siemens-Allis Automation, Inc. President James Bardis, each vendor at GM's MAP display spent about $1 million in order to achieve MAP compatibility.

AT&T tries different tack

From page 19

to IBM's Cabling System that dictates how to wire a building to provide data outlets in each office.

Terminals can be located up to 400 ft away from a controller using wire installed for that purpose or twisted pair in PDS. Greater distances can be obtained by incorporating AT&T's Premises Lightwave System.

For example, multiple 3270 terminals could be connected to a wiring closet on one floor using twisted pair. Signals from these terminals could then be multiplexed over AT&T's lightwave system down to a controller in the processor room four floors away. Terminals can be located up to 2 km away from a controller using the fiber-optic link, which is greater than can be achieved with IBM's usual Type A coaxial cable or its Cabling System.

AT&T's PDS, like IBM's Cabling System, is configured much as wiring systems were for years to support standard telephone systems. In fact, PDS is essentially the same wiring scheme AT&T installs with its System 85 or System 75 PBXs. Customers can thus use the wire installed with their new AT&T PBXs as if it were a PDS as outlined above.

Customers can also use either PBX to support 3270s. AT&T sells 3270 Data Modules that enable terminals to be switched through a PBX to a controller. The modules come in three flavors. The 3270T is used to connect 3270s to a PBX and the 3270C is used to connect a PBX to a controller. Another terminal device, the 3270A, provides the same functions as the 3270T, but also enables the terminal to emulate a Digital Equipment Corp. VT100 and access asynchronous hosts.

Using a PBX to support 3270s also enables the terminal user to access multiple controllers or multiple hosts, with the PBX acting like a data switch. PBXs with DS-1 interfaces can use 1.54M bit/sec. digital T1 facilities to connect terminals to hosts across the country.

The Inter-Premises Trunk capability is also a feature available with AT&T's Information Systems Network (ISN), a local network. Last May, AT&T enhanced ISN to support IBM 3278, 3279, 3178 and 3179 displays, connecting the tubes to ISN nodes via twisted-pair wire. Terminal users can dial cluster controllers and maintain up two controller sessions.

In concert, AT&T's 3270 support provides more flexibility than IBM can offer, even though the mainframe maker now owns Rolm Corp., an AT&T PBX competitor. Interestingly, inroads AT&T made in 3270 support over twisted pair with its PDS are likely at the root of IBM's recent policy reversal regarding the Cabling System. Big Blue now says nonshielded twisted-pair wire is acceptable for 3270s in many applications.

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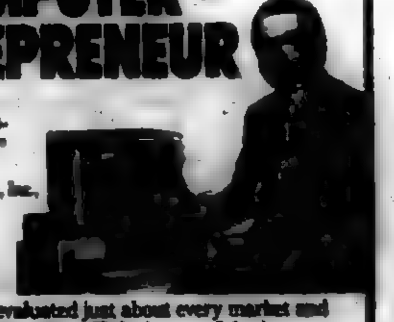

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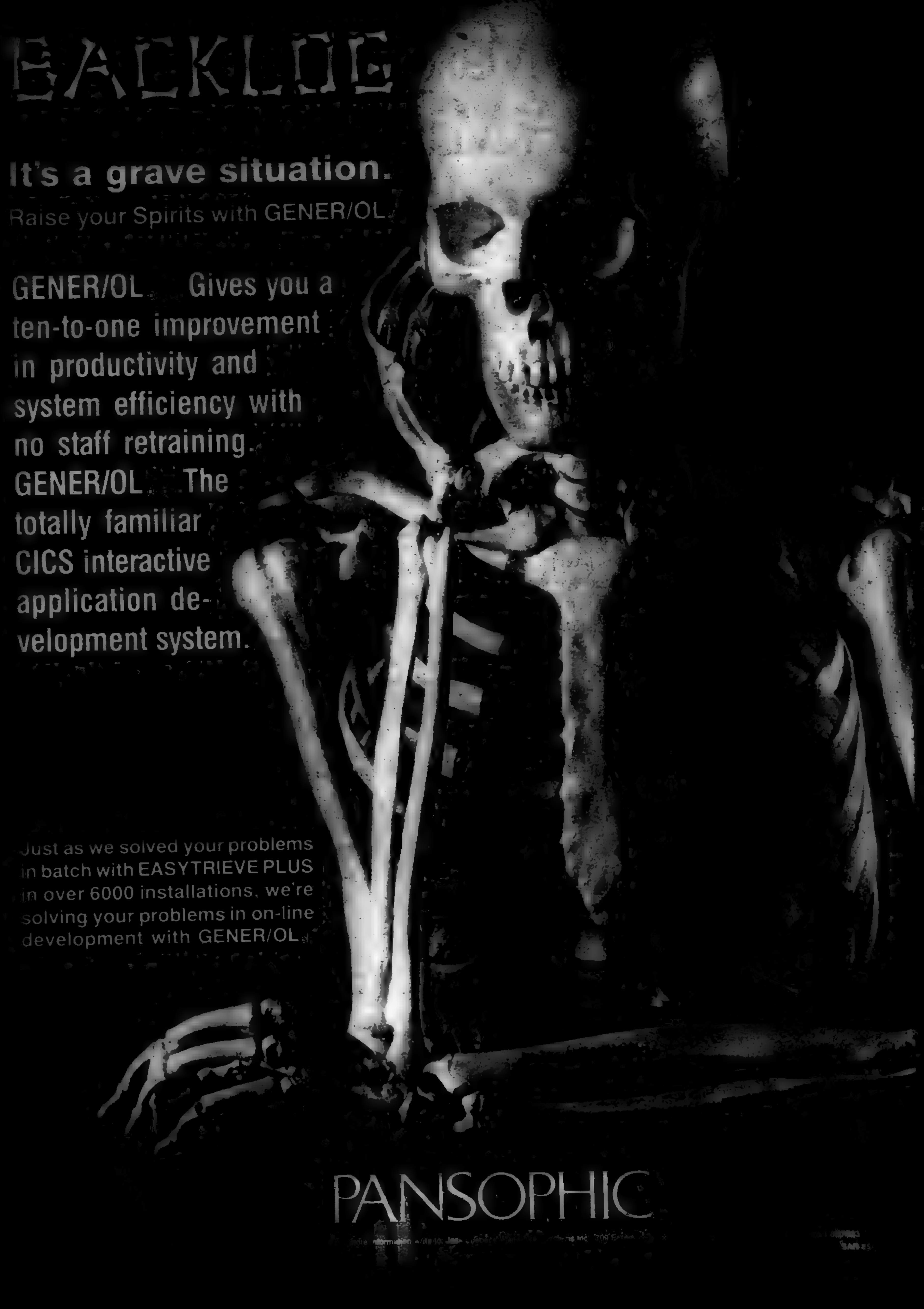

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SOFTALK
John Gallant
CW Senior Editor

IBM exploiting AT/370 ability

Last month, Thomas Foth lauded IBM for having introduced a version of its widely used CICS teleprocessing monitor for the VM/CMS environment.

Foth, a member of the senior technical staff at Adesse Corp., a Ridgefield, Conn.-based VM software house, said CICS/CMS, running under VM/PC on the IBM Personal Computer AT/370 and XT/370, held the potential to transform those machines into "dream workstations" for CICS applications development [CW, Oct. 21]. Foth tempered his enthusiasm by stating that IBM would have to improve the performance of the XT/370 and AT/370 to tap that potential.

Less than a month after Foth commented on the CICS/CMS unveiling, IBM significantly bolstered the power of one of those machines, the currently slow-selling AT/370. VM/PC Release 2, announced earlier this month [CW, Nov. 11], boosts AT/370 performance by as much as 60%, depending on the complexity of the application being processed. In addition, the enhanced operating system allows AT/370s to be linked through IBM's PC Network and includes several other modifications that, combined, serve to improve performance even further.

VM/PC now enables users to utilize add-on memory as a page cache. That means the most frequently used pages — portions of an application to be executed — can be stored in expanded memory rather than on the AT/370's disk. Foth said the reduced disk access required to run complex applications really improves performance.

"Any time the AT/370 had to do

See IBM page 29

Big Blue must push software

Analysts cite need to bolster its advanced technologies

By John Gallant

STAMFORD, Conn. — To get its hardware house back in order, IBM must become more aggressive in developing and marketing software.

That was the message that Gartner Group, Inc. analysts conveyed at the market research firm's Software Management Strategies conference last week. Gartner observers told visitors that IBM must, among other steps, bolster its relational technology and push the emerging LU6.2 communications and SQL relational data manipulation language standards to boost hardware sales and remain a driving force in the software industry.

"The mistake is in viewing IBM as a hardware company," said Scott Smith, vice-president of Gartner Securities Corp. and the financial analyst responsible for overseeing trends in the software and services industry. "Software drives hardware sales, and IBM, increasingly, is coming to realize that. Software development clearly drives hardware growth. So, IBM must get more aggressive. It cannot leave its future hardware sales to the independent software vendors."

IBM's increasingly aggressive software moves, said H. Michael Braude, vice-president and director of Gartner's Software Management Strategies Service, will likely be made in accordance with its perceived four-pronged software strategy. The first prong of that strategy is to provide software that fully exploits the capabilities of its hardware.

"IBM is not doing that," Braude said. "It has internal constraints, and it has had to set priorities."

As an example, Braude cited VM's lack of support for so-called four-way processing on IBM's largest systems, the 3090-class mainframes. Although IBM announced an Extended Architecture (XA) version of VM earlier this year, it will have to work to develop further features in that operating system.

See BIG page 26

IBM emulation systems bow

By Peggy Watt

SAN JOSE, Calif. — Micro-to-mainframe system vendor Forte Communications Co. last week released a string of new and upgraded products that improve upon the IBM communications family.

Among the releases is an upgrade of its 2-year-old file transfer program Fortenet, which operates at nearly twice its previous speed, and enhanced versions of Forte 3270 software, Fortegraph SSG and Forte/PJ.

"Our strategy now is to be in that LU6.2, DIA/DCA [Document Interface Architecture/Document Content Architecture] arena" embraced by IBM's micro-to-mainframe family, said George Moore, Forte marketing director. "We've seen a lot of changes in the marketplace," he said. "Buyers are looking for a single-vendor solution."

Forte's answer is to offer communications system products that do the same job as their IBM equivalents but provide more features.

The company will add Personal Services/PC support to its existing Forte/PJ and Fortegraph SSG software, enabling documents that do not meet the DIA/DCA standards still to have access to IBM's Distributed Office Support System.

"It's our intent to keep our customers consistent with the IBM world," Moore said.

Current customers will receive free upgrades, but the company expects more demand from new customers who will opt for the enhanced Forte product over the IBM coaxial product.

Fortegraph licenses are $2,590 including Forte/PJ or $1,595 alone and will be available in December, Moore said.

Forte's Fortenet II now includes pro-

See EMULATION page 27

INSIDE

Sequent Computer Systems and Verdix announce a parallel implementation of the Ada language for Sequent's Balance 8000 parallel processors/27

NEW THIS WEEK

- Samna ports Samna Word III and Samna+ to AT&T's Unix System V
- For more on these and other new products, see pp. 83-98.

INSTANT ANALYSIS

"I don't want to give the impression that we're going to rush out and spend all of their money, but I feel very comfortable that our customers will see positive results. . . . We're part of an $8 billion company, [and] that lends a lot of credibility."

— Applied Data Research Chairman and CEO John R. Bennett, commenting on the pending sale of his company

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's *SQL/DS* or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's *SQL/DS* and DB2. Programs written for *SQL/DS* or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either *SQL/DS* or DB2.

- **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

- **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and *SQL/DS* are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, *SQL/DS* and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

- **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS

Big Blue software push needed

From page 25

> ***'Police your software budgets like they were phone bills. Ask IBM for deals, and take an aggressive posture on software purchases.'***
>
> — H. Michael Braude
> Gartner Group

But IBM will not be alone in working to exploit hardware advances. Braude said independent vendors have been slow to capitalize on such features as the 31-bit addressing capabilities of XA systems. "Will the independents be able to retool their products to take advantage of new architectures?" he asked. "I think they must. They have to reinvest in their systems; that is the basis for future growth."

IBM's second goal is to facilitate customer growth. That growth primarily involves supporting applications development, which fuels processor and storage system purchases. Thus, IBM will be forced to address the productivity issue by boosting the performance of its DB2 relational data base management system (DBMS) and providing a fourth-generation language, data dictionary and productivity tools similar to those being offered by the independents like Applied Data Research, Inc. and Cullinet Software, Inc.

Braude said DB2 will likely become more performance oriented eventually, but 1986 could be a rough year for the relational system as users get firsthand experience with it and unearth problems.

Considering the impact of the computer industry slowdown on the software market, perhaps the most difficult of IBM's tasks will be to increase its software revenue at its hoped-for 45% compound annual growth rate. A recent Gartner Group survey indicated that users' software budgets will grow, at most, 35% this year.

So, Braude said, IBM will have to make up the shortfall with increases in software prices based on what he labeled "value pricing," that is, adding functions and cost to existing packages. The significant price increase witnessed this year by IBM IMS DBMS users for the system's Extended Recovery Facility, announced in February, is one of a growing number of examples of value pricing.

To respond to such pricing moves by IBM, Braude said, users will have to assert control over their software budgets and take the initiative in making deals with vendors. "Police your software budgets like they were phone bills," he said. "Ask IBM for deals, and take an aggressive posture on software purchases."

Finally, Braude said, IBM will continue to take steps to protect its software assets through extensions of the object-code-only policy, which restricts the distribution of source code materials. In order to implement that policy more widely, he said, IBM will have to bolster its support facilities.

"IBM has to deliver added value to justify its revenues," Braude said. "And it has to make its advanced technologies work, including DB2 and SQL. Its progress has been disappointing there so far. IBM must move into the high-end productivity tool business and organize itself to sell software."

SQL evolving into standard

Braude said SQL will evolve into an industry-standard data interface. He said users should not be looking at whether a data management system is relational in the strictest sense but whether it supports or will support SQL. "SQL is a key issue," he said. "It will handle the relational debate. Users should be looking at SQL as a strategy."

Braude described IBM's much-heralded LU6.2, which supports data sharing among applications transparent to machine environments, as a new infrastructure and "a network operating system." Other software vendors must move to embrace LU6.2, a step many of them will take in the near future, he predicted. But above all, IBM itself must come to realize the importance of LU6.2.

"If IBM really wanted to move LU6.2 along," Braude said, "it would provide LU6.2 development tools for building programs with LU6.2 support. But IBM is still looking at LU6.2 as a communications driver rather than an applications enabler."

IBM's unveiling of its Token-Ring local-area network, while disappointing on its own, was a statement of direction on IBM's part. "IBM made LU6.2 accessible on a Personal Computer," he said. "Software and hardware vendors have to understand the strategic importance of that."

Other software moves likely to come from IBM include the following:

- The introduction of common subsystems, such as CICS and VSAM, across operating systems. An example is the recent introduction of CICS/CMS.
- A push toward expert system management of large data centers. IBM is currently developing such a system known as the Yorktown Expert System.
- IBM will use its Cross Systems Product as a simulated data dictionary supporting a single definition of data for multiple environments.

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Emulation systems bow

From page 25

gram interface macros that can let host-based applications automatically begin file transfers to and from IBM Personal Computers and compatible microcomputers, Moore said.

"The [personal computer] need only be turned on," he said. The program transfers mainframe files over 3270 coaxial networks and also converts them to PC-DOS formats under the Foftenet utility PC Command. The mainframe's increased ability to manage data in a personal computer format also reinforces data base security, he added.

In its first form, Fortenet enabled files to be transferred without special PC-DOS programs or 3278 emulation-mode requirements.

The updated Fortenet transfers files at up to 7,000 char./sec. at a 75% CPU load, increased from a 3,000 to 6,000 char./sec. rate in the earlier version, Moore added.

"We consider ourselves evolving from emulation to information transfer," Moore said.

Fortenet replacement

Fortenet II, which will be ready for shipping in December, will replace the current version of Fortenet, he said. It has the same $1,000 licensing fee as the current version, including PC-Command, for use with the Forte/PJ 3270 emulator.

Program modules to write macros for a personal computer interface are an additional $2,000. Upgrades from the first version will be available for $500.

Forte also enhanced its existing IBM Personal Computer 3270-compatible software, out about eight months, to a new version that emulates the 3270-PC advanced workstation. It includes a High-Level Language Application Program Interface (HLLAPI), equivalent to the IBM 3270-PC HLLAPI, which allows applications developed on IBM 3270-PCs using IBM's HLLAPI to run under the Forte 3270 PC.

The upgraded version also supports the IBM 3270 122-key keyboard and its special-function keys and emulates Models 3, 4 and 5 for their specific additional capabilities. The new release also offers foreign language support for several languages, with more promised in February.

It also will be available in December as a free upgrade to current users and will be licensed at $495.

Moore said this "fills out the product" and promises Forte will solidify its capabilities with more, minor enhancements in the next year.

The company also recently introduced the Fortegraph APA, for interactive access to IBM's advanced All-Points-Addressable host graphics, also based on the Forte PJ 3270 emulator.

Sequent unit gains Ada use

BEAVERTON, Ore. — A parallel implementation of the Ada language for Sequent Computer Systems, Inc.'s Balance 8000 parallel processors was announced jointly by Sequent and the Verdix Corp. of Chantilly, Va.

The product will allow Sequent to participate in the growing market created by the U.S. Department of Defense's mandate that Ada be used to develop mission-critical software systems, according to Sequent spokesman Gary Raetz.

The Verdix Ada Development System (VADS) allows Ada developers to take advantage of the parallel architecture of the Balance system. Sequent will assist in marketing, sales and promotional efforts. The company will work closely with Verdix in the adaptation of VADS to the parallel environment of the Balance 8000.

VADS will be available in first-quarter 1986 in a version that is not optimized for parallel computers. This product will be followed in the second quarter of the year with an upgrade version optimized for parallel processing, Raetz said.

On a two-processor system, VADS costs $15,000. For four to eight processors, the price is $25,000; and for 10 to 12 processors, the system costs $40,000. No pricing structure has yet been determined for the parallel processing version.

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IBM exploits AT/370

From page 25

significant paging, it ran like a real dog," Foth said. "That was a problem for developers because compilers, like [IBM's] Cobol VS, were written for environments with strong paging abilities. Now, a good deal of paging will be done at memory speeds rather than at disk speeds. That dramatically improves performance for applications that page a lot, specifically things like compilers. You can finally run a compiler with some efficiency on an AT/370."

The announcement does not affect the XT/370, Foth said, because users cannot expand the machine's memory beyond the 640K-byte line and cannot create a page cache.

Foth said IBM's performance improvement figures were probably overly cautious. IBM used a maximum of 1.5M bytes of expanded memory for its benchmark tests. With greater added memory — users can add up to 16M bytes, Foth said — the AT/370's performance in processing complex applications with heavy paging requirements would be vastly improved.

"It's a really great use for that type of memory," he said. "For a lot of compiles you would never have to page to the disk. When you are not paging to disk, performance is great."

Just as significant, Foth said, is the added ability of AT/370s to participate in the PC Network. With some additional enhancements, a cluster of some 20 AT/370s could take the place of an IBM 4300 series mainframe for most applications development groups, he said.

"I can envision these programmers working at a bunch of AT/370s, sharing data, and only one of the machines would have to be hooked into the mainframe," Foth said. "There are certain tasks, like really large compiles, that would be more efficient on the mainframe. But the development and testing of most applications could be done on that network."

What's missing, Foth said, is the ability of AT/370s on the network to share mass data storage facilities and the absence of virtual machine-to-virtual machine communications capabilities.

Mainframe software exists that allows an application running in one so-called virtual machine within VM to share data with a program running in another virtual machine. He said IBM or another vendor will likely soon rectify those shortcomings.

"There were two big problems with the AT/370," Foth said. "The first was performance, the other was the need to allow developers at workstations to share code. IBM has essentially addressed one and a half of those problems. The AT/370 has become a very adequate workstation, and that is significant. It indicates that IBM is not going to let this product die."

What would really solidify the AT/370's role as a key workstation product for IBM — and probably significantly boost sales of the machine — is a faster microprocessor foundation.

Is IBM betting on the AT/370 to carry out its as-yet-unrevealed workstation strategy? That remains to be seen. But as Foth and other development gurus have attested, application developers and others concerned with programmer productivity should keep close tabs on AT/370 developments.

> ”
>
> *'There were two big problems with the AT/370. . . . IBM has essentially addressed one and a half of those problems.'*
>
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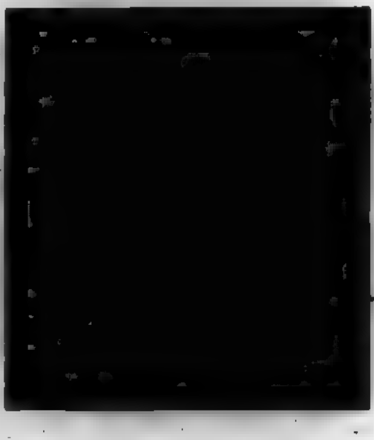

Ray Forester believes that the TI 707 is ideal for the salesman on the go. It's lightweight and rugged, takes up approximately one half of a briefcase, and is quiet even at peak operation. "It's exactly the productivity tool we needed for our division's field communications," he concluded.

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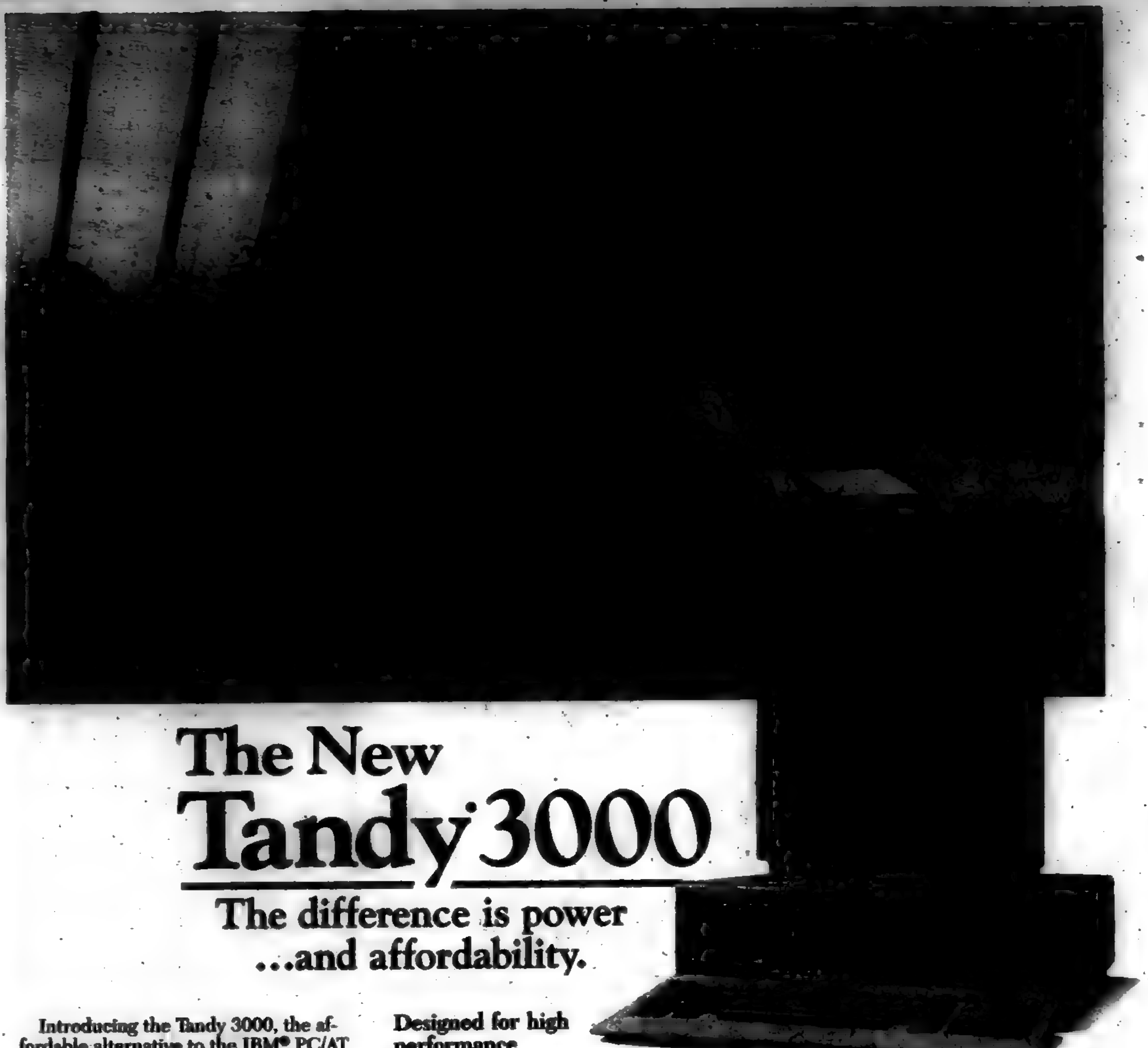

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MICROCOMPUTERS

SMALL TALK
Thomas Madron

Broadband vs. baseband

With a joint announcement by IBM and Texas Instruments, Inc. on Oct. 15, IBM's much-touted Token-Ring local-area network was finally unveiled, a little more than a year after IBM's broadband PC Network.

The Token-Ring network is based on a joint development program between IBM and TI, originally announced in 1982. The outcome of that development effort was the TMS380 adapter chip set, which meets the ANSI/IEEE Standard 802.5 specification as well as the European Computer Manufacturers Association 89 standard for token-ring, baseband local-area networks.

The Token-Ring's data rate will be about 4M bit/sec. This compares with the 2M bit/sec. rate for the PC Network and 10M bit/sec. for Ethernet systems. While these rates seem fast compared with terminal-oriented networks operating at 9.6K to 19.2K bit/sec., they still do not match channel speeds of 24M to 48M bit/sec. common on IBM mainframe systems. All the network data rates quoted are somewhat misleading since actual loading of the networks can affect performance and affect the throughput an end user sees.

While the new IBM net initially will connect IBM Personal Computers, the chip set, properly configured, will allow a wide range of information processing devices to be connected in a single network.

Like many other local nets now on

See BROADBAND page 40

Madron is manager of computer services at North Texas State University in Denton, Texas.

DRI unveils polished GEM

Two applications released with redesigned programs

By Peggy Watt

Apple Computer, Inc., which threatened Digital Research, Inc. with a lawsuit over Digital Research's Graphics Environment Manager (GEM) software, has indicated that the revised GEM software is sufficiently different from the Macintosh to pass legal muster. Earlier this month Digital Research released the revamped products.

The original GEM Desktop and accompanying GEM Paint and GEM Draw applications, which run on the IBM Personal Computer and compatibles, were not yanked immediately from computer store shelves but will be replaced in shipments scheduled to begin last week.

An out-of-court settlement was reached last month between Digital Research and Apple, which claimed Digital Research's programs too closely resembled the "look and feel" of its Macintosh interface, Macwrite and Macpaint programs.

Digital Research redesigned a few icons, thickened a few lines and boxes, switched the location of a few menus and commands and added a few enhancements that it had planned on plugging into the next releases anyway. The trash can icon disappeared in favor of the more standard "delete" option. "I guess Apple feels it has the monopoly on trash," a Digital Research designer quipped.

Accompanying the revamped programs are two new GEM applications, GEM Wordchart and GEM Graph.

Wordchart, intended to create charts and displays used in lectures and presentations, features a host of fonts, sizes and colors with such built-in formats as columns, outlines and automatically centered text. It will ship in December with a suggested retail price of $130.

The drawing-based Graph offers a menu

See GEM page 36

Compaq Loral bows

HOUSTON — Compaq Computer Corp. has unveiled a version of its Portable 286 system that meets the federal Tempest standards for suppression of electromagnetic radiation.

Designed for applications where security is a particular concern, the new Loral 3100T Compaq Portable 286 incorporates a removable 20M-byte hard disk drive.

Compatible with the IBM Personal Computer AT, the new machine will cost $11,999 and begin shipping in January.

Latest Sidekick goes on the road

By Peggy Watt

SCOTTS VALLEY, Calif. — Diehard users of Borland International's Sidekick productivity program now can take Sidekick-managed information on the road even if the personal computer is not traveling along.

On-line accessories collected with Sidekick, which runs on IBM Personal Computers, can be transformed to more mundane paper form, inserted in an accompanying binder and tucked into a briefcase with the new $69.95 Traveling Sidekick program.

Under a report writer section, Traveling Sidekick prints out data in Sidekick's address and appointment files in three different formats — phone list, address book and mailing labels — and sorts it by name, company or ZIP code.

Under the program's day timer section,

See SIDEKICK page 36

INSIDE

Paladin introduces its icon-driven Super Crunch spreadsheet package for the Apple Macintosh/32

NEW THIS WEEK

- The Software Clearing House offers Versanet
- Unisource Software ports RM/Cobol to personal computers
- For more on these and other new products, see pp. 83-98.

INSTANT ANALYSIS

"A microcomputer manager's association in California disbanded this year. They had met for several years, discussing microcomputers only, and felt that they had discussed all the issues — some several times."

— **Warren Kruse, president of Connect, an association for managers of end-user computing**

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Micros hooked to Sperrylink

BLUE BELL, Pa. — Sperry Corp. Information Systems Group has announced a software program that gives Sperry micros, IBM Personal Computers and compatible systems a link into the Sperrylink office information system.

"Basically what we've done is rewritten [Sperrylink] for the [Personal Computer]," said Howard Kearns, director of marketing support for the company's office information systems division. "Now we have a fully integrated product line."

Designed to run on microcomputers with 640K bytes of internal memory and a hard disk drive, the Sperrylink PC connects the micro to the company's Series 1100 mainframes or DCPS/20 departmental processing systems, Sperry said.

The menu-driven product includes word processing functions and on-line access features. It can also create personal files and a system directory and perform file searches.

In addition, standard Microsoft Corp. MS-DOS files can be converted to Sperrylink files or vice versa, the company said. MS-DOS-based spreadsheets, for instance, can be converted to the Sperrylink system and be incorporated into Sperrylink documents.

Sperrylink PC, which is priced at $400, will be available in January, Sperry said.

— Rosemary Hamilton

Paladin's Super Crunch Mac spreadsheet debuts

SANTA CLARA, Calif. — Paladin Software Corp.'s Super Crunch, a spreadsheet for Apple Computer, Inc.'s Macintosh, may well distinguish itself as the first spreadsheet that talks back, because it includes a speech-output feature designed as a proofreading aid.

But Paladin is counting on other features to gain this upgrade of its 6-month-old Crunch package a close second place to Microsoft Corp.'s Excel in the 512K-byte Macintosh spreadsheet market. Planning to deliver the $295 Super Crunch package by year's end, Paladin hopes to ride the coattails of the Microsoft product in legitimizing the Macintosh's position among power users.

The decision to buy Super Crunch rather than Excel or Lotus Development Corp.'s Jazz will rest not upon speed or power but rather upon a choice for a working style that makes ease of use a priority, Paladin President Ted Newlin said.

Like Crunch, the icon-driven Super Crunch aims to exploit the Macintosh's graphics-based interface to the fullest. To choose from among typical spreadsheet features, the user points at the icon with the mouse and clicks.

Selecting spreadsheet features via icons, users will make 50% fewer keystrokes per application than they would with Excel, according to Katie Osgood, product marketing manager.

Newlin said corporate buyers, particularly MIS managers, could benefit from Super Crunch's macros that can be customized for vertical applications.

At the same time, Super Crunch was designed to provide the new user with "accessible power," Newlin said. The program's more sophisticated options remain invisible until the user is ready for them, he added.

The Super Crunch upgrade makes Crunch a more versatile package, Paladin said. The original version had 21 icons along the icon bar; Super Crunch will provide a palette comprising 63 predefined and user-definable icons.

Other enhancements will include a three-dimensional work sheet with a depth of 250 work sheets; cross-tabbing in the data base; auditing features including the "Say It" speech-output proofing function; and enhanced graphics capabilities, including exploded pie charts.

Crunch packages now being sold are marked with stickers that indicate a free upgrade.

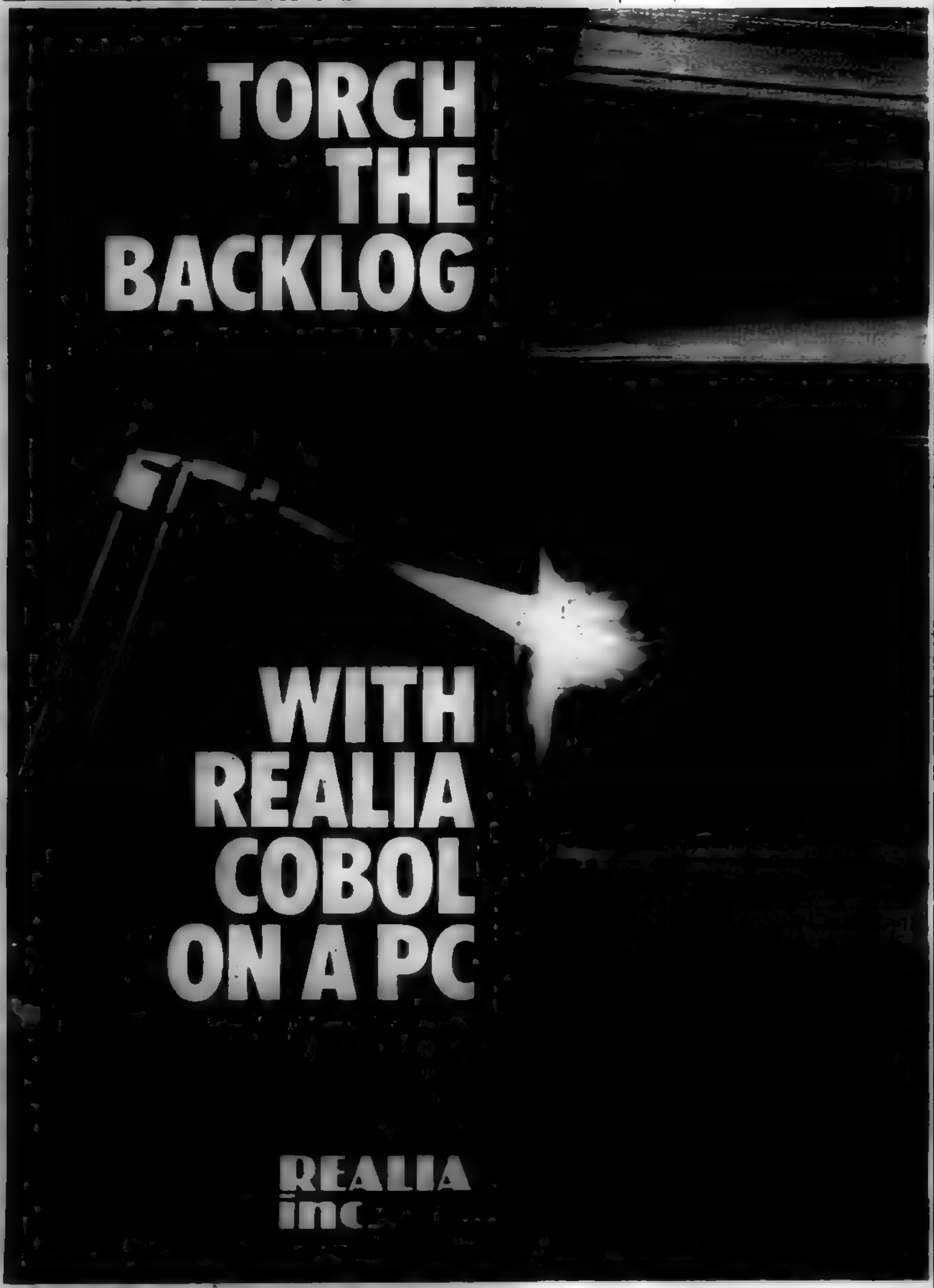
Chorus Data add-on board out

MERRIMACK, N.H. — Chorus Data Systems, Inc. has announced Compressit, an $995 add-on board for the IBM Personal Computer XT or AT said to reduce the disk space required to store bit-mapped images.

A continuous-tone gray-scale or color image will typically compress from 2:1 to 4:1, according to Chorus. Computer-generated graphics typically compress from 4:1 to 8:1, and black-and-white text or line drawings from a scanner may compress from 25:1 to 50:1.

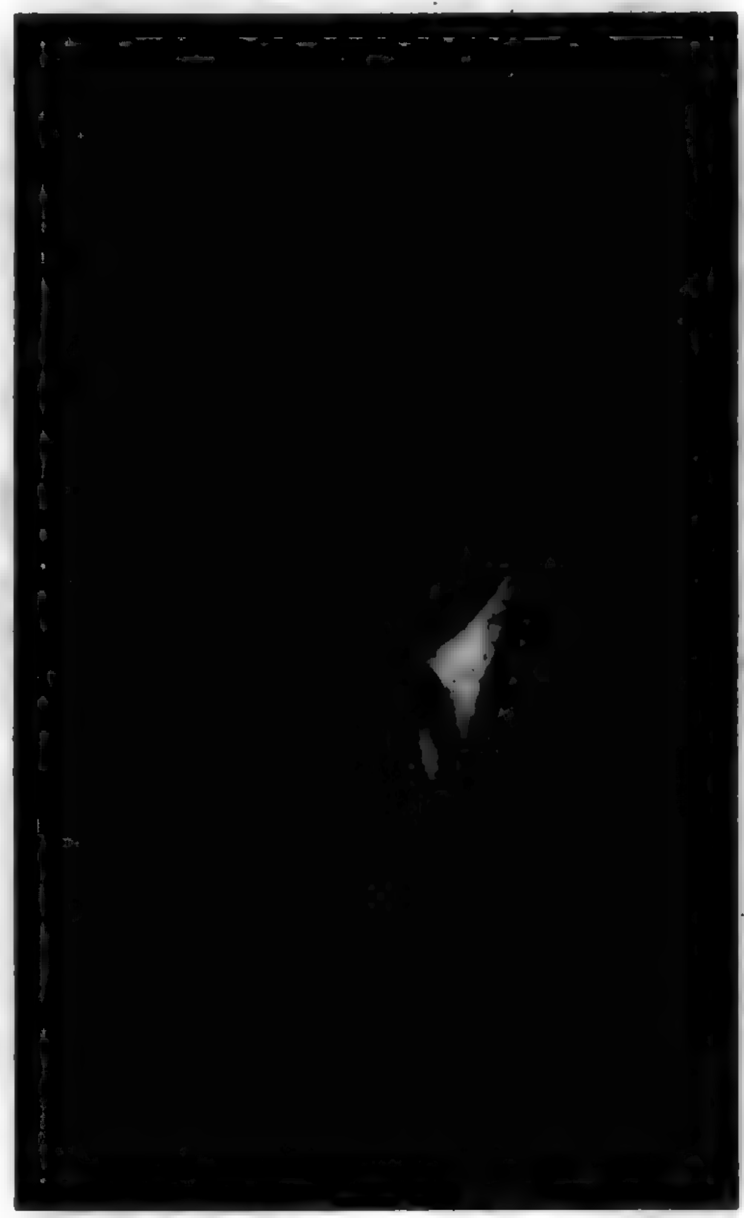
Compressit requires a single slot in the IBM Personal Computer expansion bus. It is said to execute its compression algorithms approximately 10 times faster than an assembler program could compress data on the XT and four times faster than data compression on the AT.

According to a spokesman, Compressit performance is achieved from the use of extended microcode addressing for the transistor-transistor logic microprocessor.



The time has come
for straight talk about
database management systems.

“The only reason to buy a database management system is to build better applications.”



Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEO's of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

J. J. Cullinane

John J. Cullinane
Chairman of the Board

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The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of on-line and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/1, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS

Cullinet

[illegible] Drive, Westwood, MA [illegible]

AST plunges into IBM Netbios-compatible network mart

Releases network, gateway, interface tool, security software

By Donna Raimondi

IRVINE, Calif. — Four products that support the IBM Netbios-compatible local-area network market were released last week by AST Research, Inc.

The 4½-year-old company believes that IBM networking will become the industry standard and is committed to providing Netbios compatibility in networks, said spokeswoman Karen Chillemi.

IBM's recently announced Token-Ring network will most likely become the backbone of networking, with other vendor's nets hooking into a companywide system, she predicted.

Network links 64 micros

The AST-Resource Sharing Network links up to 64 IBM Personal Computers, Personal Computer XTs or ATs with a data transmission speed of 5M bit/sec.

The network adapter, which costs $495 per node, includes RG-59 coaxial cable to link nodes; an on-board intelligent controller to off-load the host personal computer; and support for up to 1,500 ft of cable without the need to add signal repeaters, translators or access units.

A starter kit consists of two network adapter cards, cable and the software needed to link two Personal Computers and costs $1,195.

Gateway introduced

AST also released its IBM Systems Network Architecture/Bisynchronous Connection Gateway, a hardware and software package that allows communication between up to 32 IBM microcomputers and a host IBM mainframe.

The $1,795 gateway board is installed into one microcomputer on the network, transforming the micro into a master gateway that emulates an IBM 3274 or 3276 cluster control unit.

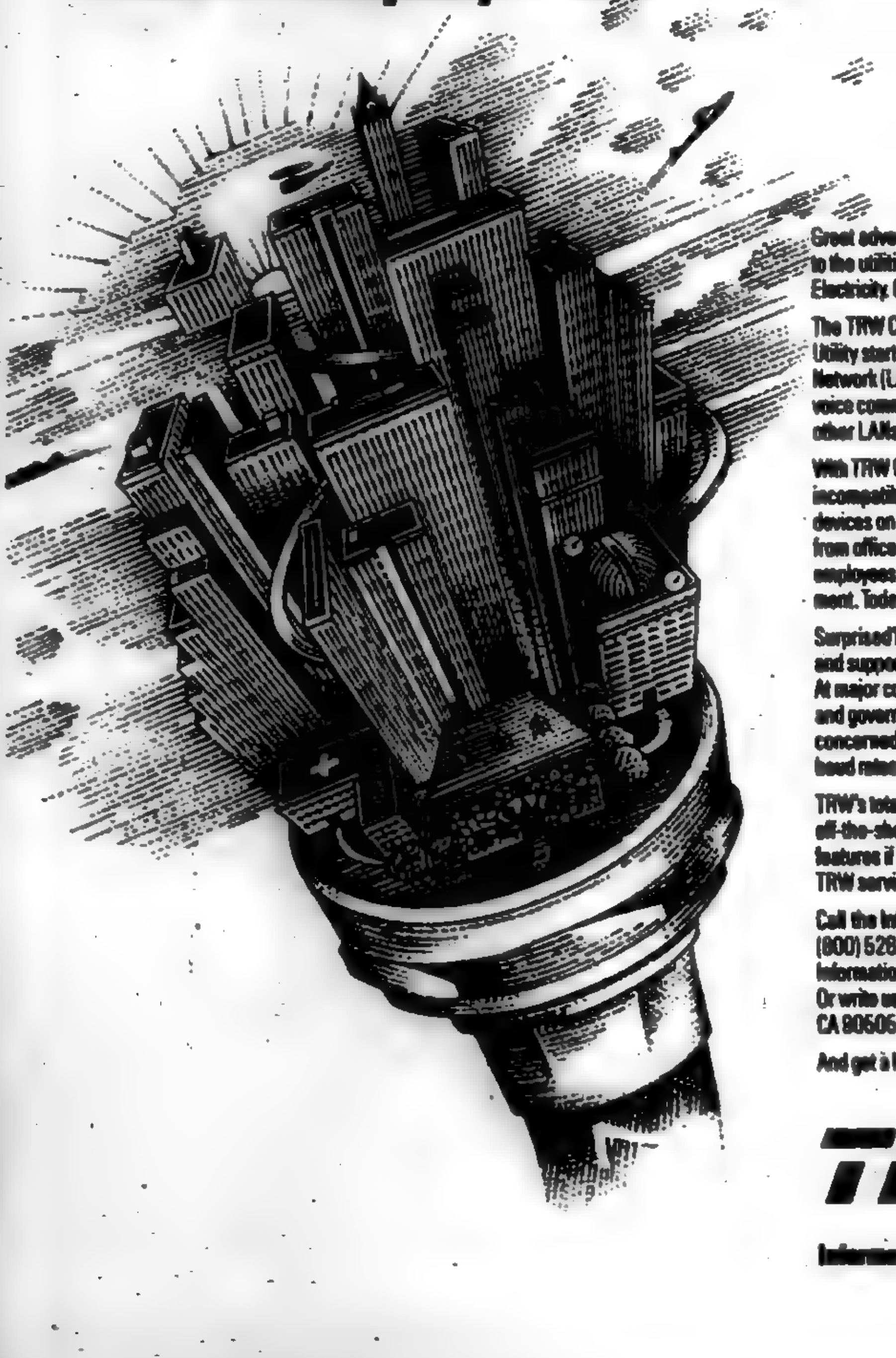
The remaining microcomputers in the network emulate 3278 and 3279 Model 2 display terminals communicating through the gateway to the host.

User interface software

Additionally, the company announced an AST-Network Program that costs $75 per node. The software is a user interface that facilitates sharing of data files, printers and hard-disk storage devices. The package uses IBM PC-DOS-like commands to simplify the task of selecting and managing network resources.

The package, which requires 128K bytes of memory, is said to be totally compatible with IBM's PC Network Program at the user command, server and Netbios levels.

A new version of AST's Knight Data Security Manager program, that costs $395 per network, is said to deliver password protection, a PC-DOS interface, usage auditing, electronic mail capabilities and a data encryption option. It protects both floppy and hard-disk storage devices, the vendor said.



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And get a head start on the Information Age.

TRW

Information Networks Division

Sidekick program goes on the road

From page 31

Traveling Sidekick can print Sidekick's calendar and appointment files in daily, weekly, monthly or yearly calendar formats. The printouts were designed to fit a 9-in. by 8-in. by 1¾-in. black vinyl binder included with the program.

New information can be added to Sidekick through a Traveling Sidekick input form.

The Traveling Sidekick day timer notebook contains travel data and pockets for receipts, business cards and other materials as well as reference pages for Borland products.

Traveling Sidekick is not copy protected, runs with Sidekick Version 1.5 and subsequent releases on the IBM Personal Computer and compatibles and requires 256K bytes of random-access memory.

The pair of products costs $154.90, but will be available for $124.95 in an introductory special through March 31.

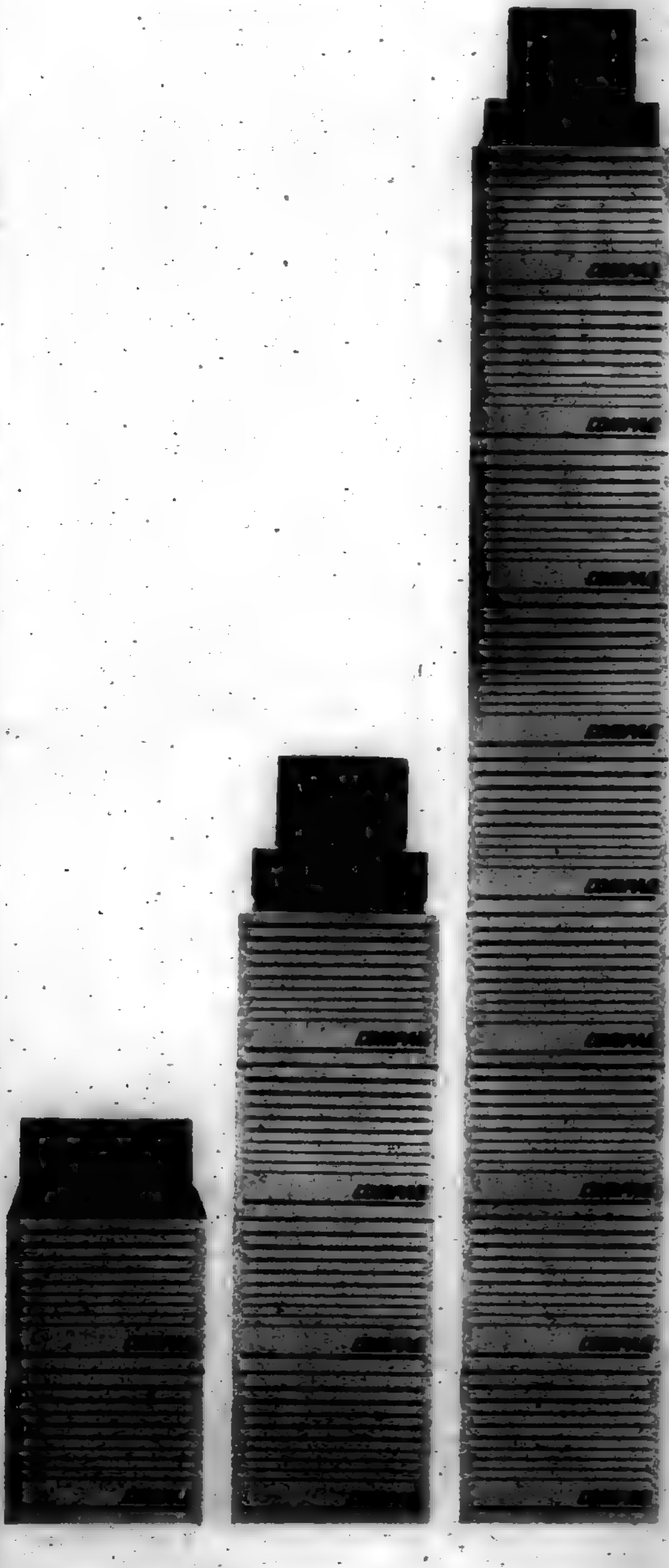
DRI unveils polished GEM

From page 31

of eight types of graphics to illustrate data, including symbol charts and a map, as well as the traditional pie chart and bar graph, also available in a three-dimensional version. Text can also be inserted. It sells for $249.

Digital Research noted that 100,000 copies of GEM applications, half of which are retail versions for the IBM Personal Computer had shipped by early November.

It's not that COMPAQ is the fastest growing computer company in the world...



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The people who set the industry standard just raised it.

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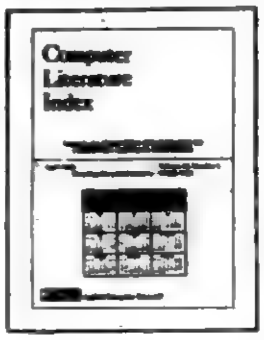
Computer Literature Index



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Broadband vs. baseband

From page 31

the market, IBM's Token-Ring was designed to run over "already installed" unshielded telephone twisted-pair copper wire, as well as shielded twisted pair and fiber optics.

Unfortunately, in most real operating environments, the usefulness of already installed twisted pair is more marketing hype than reality.

First, in many organizations, the telephone wiring is not owned by the company but rather by the building owner, a telephone company or some other entity.

And when telephone systems are replaced, even if the same telephone service system obtains the successive contract, new wiring almost always is installed.

No one knows where wiring goes

One of the major reasons is that most telephone wiring is undocumented. No one really knows where it goes or, in many cases, what it does.

Secondary uses of telephone wiring also may interfere with the primary use for voice communications, depending on the kind of switch or private branch exchange in service.

An organization can, of course, follow IBM's suggestions and not only wire for telephones, broadband video and data services but also wire with Big Blue's Cabling System.

The Cabling System, announced in 1984, contains both twisted-pair and fiber-optic cables. The state of the art in fiber optics currently precludes its effective use for most local net applications at the present time, although this will likely change over the next five years.

Token-Ring net limitations

The Token-Ring network has some potential limitations that differentiate it from the broadband PC Network. Like the broadband system, the Token-Ring has an initial limitation of 72 connected devices, at least when used with Type 3 telephone media. When used with data-grade media, however, the number rises to 260.

The initial limit on nodes supported by the broadband network also is 72 devices, but with a head-end translator available from Sytek, Inc., that number could rise to 1,000 devices.

When IBM announced its broadband PC Network in 1984, it also indicated that the operating software architecture announced at the same time would become standard for its other networks as well.

The four networks of IBM

IBM seems to be developing four networks: the PC Network, the Token-Ring, an industrial token-bus system and an apparent software overlay for mainframe 3270 networks, at least at the 3274 controller level.

If IBM carries out its original intentions, then all these networks should look much the same to the end user.

It is not at all clear that IBM's network software will or can become the standard. Clearly the software distributed for the PC Network will function best in a very small, homogeneous office environment.

In many respects other networking software products that run on the same hardware — Novell, Inc.'s Netware being a prime example — offer a better, more functional architecture. They also run on many kinds of non-IBM hardware.

As a final note, it will be interesting to see how IBM's marketing people deal with yet another net. The marketing people are just now beginning to be able to discuss nets in general and the PC Network in particular — but not in a very detailed fashion.

They should have a good time trying to explain the relative merits of broadband vs. baseband, Carrier-Sense Multiple Access/Collision Detection vs. Token-Ring and coaxial vs. twisted pair.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

Apollo founder sets new goal

While he may be moving into what he sees as an open market with no competition, outgoing Apollo Computer, Inc. founder John William Poduska may be setting some very high standards for himself.

Poduska, who reportedly has surrendered much of his day-to-day operating power to Apollo Chief Executive Officer Thomas A. Vanderslice in the past year, is venturing out to start yet another company, making yet another type of workstation. It is a workstation that Poduska said won't compete with Apollo's design workstations or even with the high-end workstation that Apollo plans to produce in cooperation with minisupercomputer maker Alliant Computer Systems Corp. and IBM-compatible workstation maker Spectagraphics Corp.

What Poduska plans to produce in an as-yet-nonexistent factory to be located someplace along the Massachusetts-New Hampshire border, with a nonexistent staff and an undeveloped business plan, is a networked graphics workstation that executes 20 to 30 million instructions per second. And, he plans to deliver a product in less than a year and a half.

"If he could do it in five quarters that would be awfully quick," summed up International Data Corp. analyst David Moschella.

In pure processing power, the workstation to be produced by Poduska's company, which has the working name "Newco," is intended to be only slightly slower than a high-end Alliant configuration but with much greater graphics

See PODUSKA page 45

DG boasts high availability

Eclipse supermini features fault tolerant-like methods

By Donna Raimondi

Data General Corp. is being careful not to call features of its new high-end Eclipse MV/20000 machine fault tolerant. But what DG refers to as Shared Highly Available Resource Environment (SHARE) features, while not traditional hardware fault tolerance, are said to give users of the uni- or dual-processor models methods for staying up when elements of the system are crashing.

DG is quick to point out that these features, dedicated to keeping users up and running, do not constitute a fault-tolerant strategy within the company.

High availability has always been an issue with users, according to Omri Serlin of Itom International, a research and consulting firm in Los Altos, Calif. Serlin, who watches fault-tolerant technology, saw little that was unusual or new in DG's SHARE offerings, he said, but noted that the features are becoming more possible to offer at prices a user can swallow. "DG's high-availablity features are simply a response to increased user expectations. They are not dramatically different than other vendors' offerings," he said.

Laura Stewart, director of distributed systems at the Yankee Group in Boston, agreed that availability features have become a market requirement that hardware vendors must address. "What they have done was required in the market," Stewart said, "and they seem to have well implemented the technology that will keep them competitive."

DG and Serlin both said that the most important features of the MV/20000's availability offerings are in its mirrored-disk subsystems. Due to a change in the disk controller's microcode, DG's Model 6236 354M-byte drive and its Model 6239

See DG page 46

Sperry memory expansion cost cut

Sperry Corp. has cut the price for internal main memory expansion of its mid-range 1100/61 and 1100/62 mainframes by about 40%, a move that is tied to its recent announcement that it is increasing the memory capacity in those systems from 4M to 12M bytes.

That memory increase was intended to help support Sperry's Mapper fourth-generation application development system, so Sperry is pairing memory expansion packages with Mapper. Memory is available in incre-

See [illegible] page 45

Laser disk-based systems offered

By Donna Raimondi

SAN RAMON, Calif. — Computime Computer Services, Inc. has unwrapped a $35,000 laser-optic mass on-line storage system and a $55,000 image processing system that uses optical media. Both products, Filebank and Imagebank, available now, are members of the company's Gigabank product line.

Computime, a private research and development company since 1981, went public recently and used the public funding to develop the laser systems, said Stanley Koder, the company's chief executive officer and executive vice-president. Koder said laser disk technology is available now, despite industry observers' claims that usable products are two years away.

Shelly Bakst of the market research

See LASER page 44

INSIDE

C. Itoh Electronics unwraps its first nonimpact printers, including ion deposition and color thermal printers/44

NEW THIS WEEK

- MDB Systems introduces two disk subsystems for DEC Q-bus computers
- Force Computers offers the CPU-5 for VME-bus
- For more on these and other new products, see pp. 83-98.

INSTANT ANALYSIS

"Every time I give a name of one of our OEMs, I get about five Japanese and a number of American vendors trying the get the account."

— John Robinson, of the optical disk manufacturer Alcatel Thomson Gigadisc

Pertec rallies with mass storage field entry

Firm's disk, tape products target OEMs

By Donna Raimondi

CHATSWORTH, Calif. — Four disk and tape storage products from Pertec Peripherals Corp. were introduced at the Comdex/Fall '85 show held last week in Las Vegas.

Three years ago, Pertec introduced an 8-in., 35M-byte device that turned out to be a near fiasco for the company, said Dominic Imonti, vice-president of marketing. "We were announcing 35M bytes, and the world was at 80M bytes and creeping up," he explained. "We were behind the power curve on that one." The newly announced products will prove the company's capability in the mass storage field, he added.

The products, targeted at OEMs, include two 8-in. Winchester disk drives, the DX548 and the DX368, that have capacities of 548M bytes and 368M bytes, respectively. Both units use oxide media and a storage-module drive interface that offers a transfer rate of 14.52 MHz. Optional dual-port versions are available, the vendor said.

The DX548 costs $5,300 in quantities of 250. It offers an average access time of 20 msec. The DX368, priced at $4,300 in quantities of 250, has an average access time of 18 msec.

The DP Series Data Package mass storage device incorporates either one or two Pertec DX series 8-in. Winchester disk drives and a power supply. It is configured in capacities from 199M bytes up to 1.096G bytes. Access to data is 18, 20 or 22 msec, at a data transfer rate of 9.67 or 14.52 MHz, depending on whether the company's previously released DX332 or the DX368 or DX548 drive is used.

Prices vary depending upon configuration. With a pair of DX332 drives, the DP332 package costs $5,300 in quantities of 250 and is immediately available. The DP368 device with dual DX368 drives costs $11,750; the cost for the unit with dual DX548s is $12,270 in quantities of 250.

The FS2000 ½-in. streaming-tape drive costs $6,500 in quantities of 250. It is a high-performance version of Pertec's FS1000. It has a front panel switch-selectable density feature (800, 1,600, 3,200 or 6,250 char./in.) and provides data capacities from 23M to 270M bytes unformatted. The 270M-byte capacity is achieved in the 6,250 char./in. mode on standard 10½-in. reels. Operating speeds are 25, 50 and 100 in./sec., switch selectable.

OSI 712 out from Isotron

By James Connolly

FAIRFIELD, Conn. — Isotron, Inc. has added to its line of AT&T Unix-based supermicrocomputers a refined version of its Ohio Scientific 710 multiuser system.

The OSI 712 was designed to allow systems integrators flexibility in configuring systems for office applications and industrial and laboratory control.

A company spokeswoman said the 712 and 710 use the same 10-MHz Motorola, Inc. 68010 processor and RTIX, Isotron's Unix-compatible operating system, but that the 712 was refined to make better use of the real-time RTIX. The basic 2M-byte 712 is bundled with Isotron's Uniplex integrated software package, supports three users and costs $8,900.

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C. Itoh unveils ion deposition, thermal printers

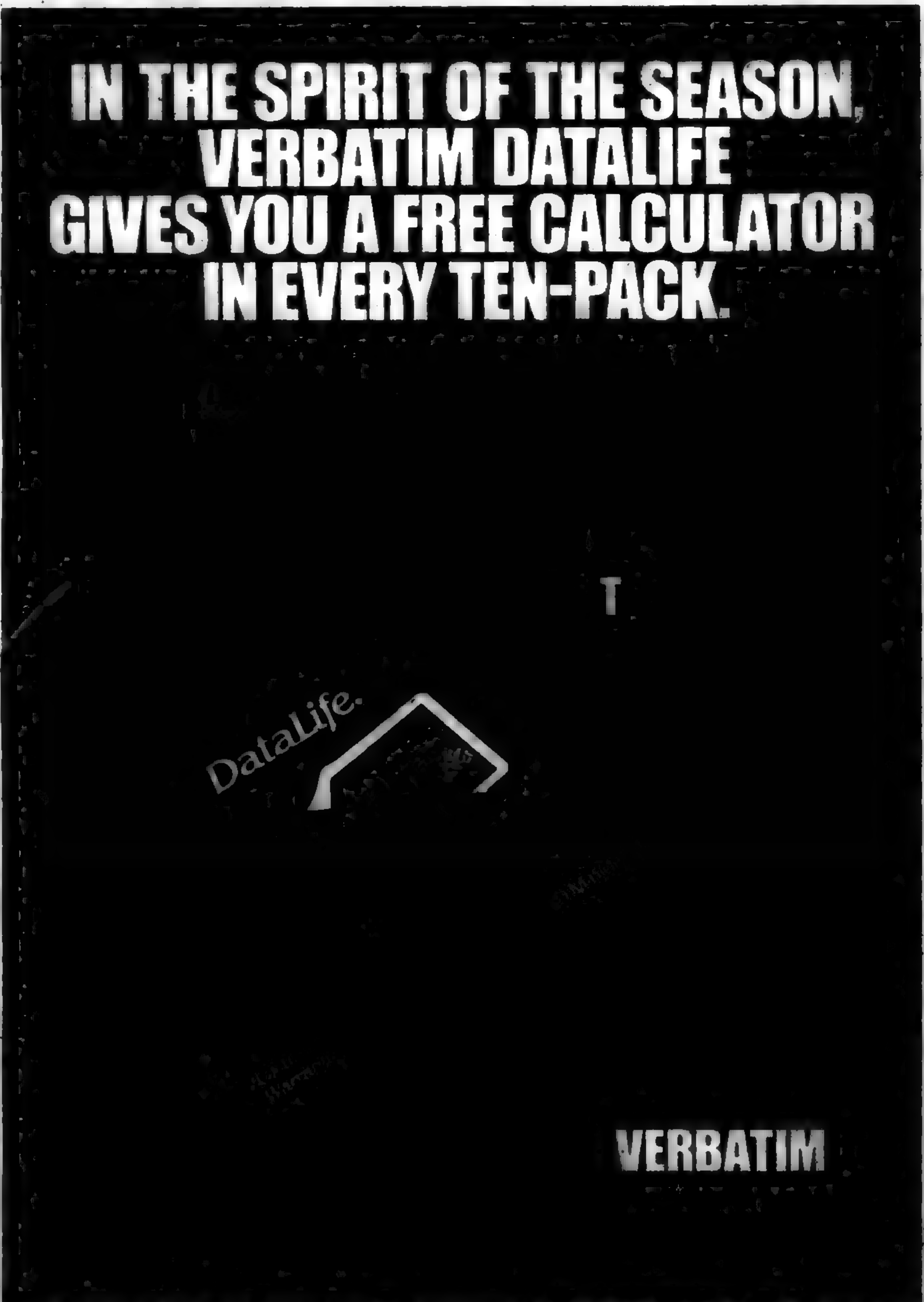
LOS ANGELES — C. Itoh Electronics, Inc. has announced a series of printers, including a three-speed letter-quality dot matrix printer and C. Itoh's first ion deposition and color thermal printers.

The nonimpact printers include four versions of 30 page/min and 45 page/min ion deposition printers jointly developed by C. Itoh and Delphax Systems. The ion deposition products, which are not yet named, were designed for use with systems ranging from high-end microcomputers through medium-size mainframes at prices of about $15,000, depending upon the desired resolution, a company spokesman said.

The TPX-80 color thermal printer, produced under an agreement with Tokyo Electric Co., operates at 50 char./sec. and 80 char./sec. or in graphics mode at 144 by 144 dot/in. It is compatible with the IBM Personal Computer XT and AT and costs $350.

The 9500 LQ dot matrix printer has a 10-in. carriage, and the 9515 LQ dot matrix printer has a 15½-in. carriage. The dot matrix printers, aimed at the lower end of C. Itoh's market, print at up to 250 char./sec. with draft quality, 125 char./sec. with memo quality and 28 char./sec. with letter quality. They cost $650.

All of the printers will be available during the first quarter of 1986, according to C. Itoh.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Laser systems announced

From page 41

firm International Data Corp., said that she was not familiar with the Computime product but that it appears they may be breaking a price barrier in the personal computer-based optical storage market. Other vendors' offerings for the personal computer have cost about $24,000 and do not have nearly the capacity that Computime is claiming, she said.

Through software developed by Computime, the Filebank storage system integrates the write-once laser system with all sizes of computers, from micros to mainframes, the vendor said, although its present focus is a turnkey system for the IBM Personal Computer and compatibles. The Filebank system incorporates the 1G-byte Alcatel Thompson Gigadisc 12-in. optical disk.

The maximum configuration possible on any computer is said to be eight Gigabank controllers, each governing eight read/write units for a total of 8G bytes of storage on each controller (using one-sided disks). Double-sided disks that double the capacity are also available.

A turnkey Filebank system includes the write-once disk drive, the software driver, application software, one disk and installation. The unit is targeted to financial institutions and hospitals, initially, the vendor said, for storage of scanned documents storing records rather than medical images such as X-rays.

Available for mainframes, minis

Both Filebank and Imagebank, Computime's image processing system, are available now for mainframes and minis, the vendor said. A typical one-controller installation for an IBM 3090-class machine connected via a host adapter would cost about $39,000 for the Filebank and $60,000 for the Imagebank.

A typical Imagebank turnkey system for a personal computer includes Filebank, a scanner, a 1,024 by 1,024 pixel CRT, a host adapter board with a small computer systems interface, software and two single-sided media.

Images are digitized and stored on optical media, then retrieved on the CRT, the printer or both. Up to 20,000 images can be stored on one side of an optical disk, the vendor claimed, and double-sided disks are available. Image widths are limited to 8½-in. at this time.

The systems come either as rack-mounted storage or as stand-alone systems. A 6-ft rack holds up to four units, the vendor said.

Bits: Fujitsu 780 series

From page 41

ments ranging from 2M bytes to 5M bytes. A 4M-byte block of memory plus the Mapper package costs $85,000. The monthly lease price is $2,065. For those customers who already have Mapper, the 4M-byte expansion costs $36,000 while the lease price is $1,000 per month.

■

Fujitsu Ltd. finally unwrapped the Facom M-780 — its rebuttal to the IBM 3090 — on Nov. 15 in Japan. The machine, Fujitsu said, is 1.7 to 6.7 times more powerful than the company's previous M-380 model.

Fujitsu said the 780 series will be composed of six machines that fall into three groups, based on the number of CPUs. They range from uniprocessors to four-processor units, with the dual-processor model being the equivalent of IBM's high-end 3090 Model 400, the company said.

The M-780's very large-scale integration (VLSI) circuits are mounted on both sides of a multilayered printed-circuit board. Each VLSI chip is said to offer 3,000 to 10,000 gates per chip.

For its M series computers, the No. 1 Japanese computer vendor simultaneously announced an upgraded operating system, the PSIV/F4 MSP. The new operating system reportedly is written in the C language in order to permit an interface between it and AT&T's Unix.

Deliveries of the six versions are slated for sometime between March and September 1987.

Fujitsu's Japanese rivals — NEC Corp. and Hitachi, Ltd. — wasted no time in announcing their own versions of competitors to IBM's 3090. Deliveries of new NEC and Hitachi mainframes are scheduled within the year.

■

Storage Technology Corp., the Louisville, Colo., maker of IBM-compatible peripherals, is singing a cheerier song these days. One veteran executive said plant visits by prospective customers have been steady with at least one per day, and he predicted that the company will be out of Chapter 11 of the Federal Bankruptcy Code court proceedings in 1986.

He also said the plug-compatible industry can learn from Storage Technology's experience with its 8380 Model E dual-capacity disk drive, scheduled for delivery in mid-1986. Most of the product development involved matching IBM's announced specifications rather than waiting eight months to begin reverse engineering when IBM delivered its own 3380 Model E.

■

At another company, Perkin-Elmer Corp., the staff is said to be happy about a recent development, that being the decision to spin off PE's computer products group. The Ocean City, N.J., company's establishment of Concurrent Computer Corp. was based on the belief that nobody thinks of PE — which is heavily involved in developing analytical laboratory equipment, semiconductors, optical equipment and other products — as a computer firm.

Although involvement in test equipment and other products doesn't seem to have hurt a computer maker named Hewlett-Packard Co., there is a logic in what PE says. Concurrent Computer is clearly a name for a computer company, particularly one that is seeking out new DP markets as is PE.

Poduska sets new goals

From page 41

capability. Poduska also said his product will utilize "parallel processing ideas," rather than strict parallel processing technology, and he ruled out use of reduced instruction set computer architecture in favor of application-specific integrated circuitry. But Poduska isn't saying who will help him build his machine.

The speeches at his departure were laudatory. He praised Vanderslice, and Vanderslice noted that Poduska was "going off to do what he does terrifically well" — start a company from scratch. Poduska emphasized that while he is leaving Apollo's board of directors, he isn't selling any of the 1.4 million shares of Apollo stock that he and his family own.

Vanderslice also said that it is anticipated that Apollo will invest in the new company and will establish OEM agreements with Newco.

Vanderslice and Poduska also agreed that Poduska can bring no more than six Apollo employees to his new company in the three-year start-up period. So if Poduska does what he said he hopes to do and builds a success story to match Apollo's, where does that leave Apollo?

Vanderslice has staked out a trail that seems to lead to an integration of the design workstation with the IBM mainframe world and with the power of Alliant-type systems. But that trail toward larger, more powerful workstations also seems to lead to a future decision on whether to go into battle with his own predecessor, Poduska, or forge some type of union between Apollo — the Newco of a few years ago — and Poduska's Newco.

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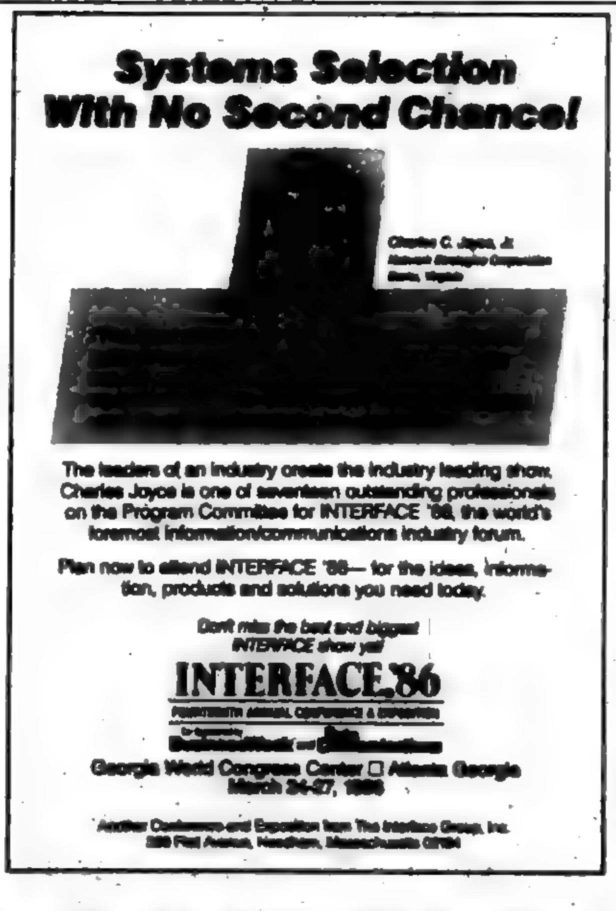

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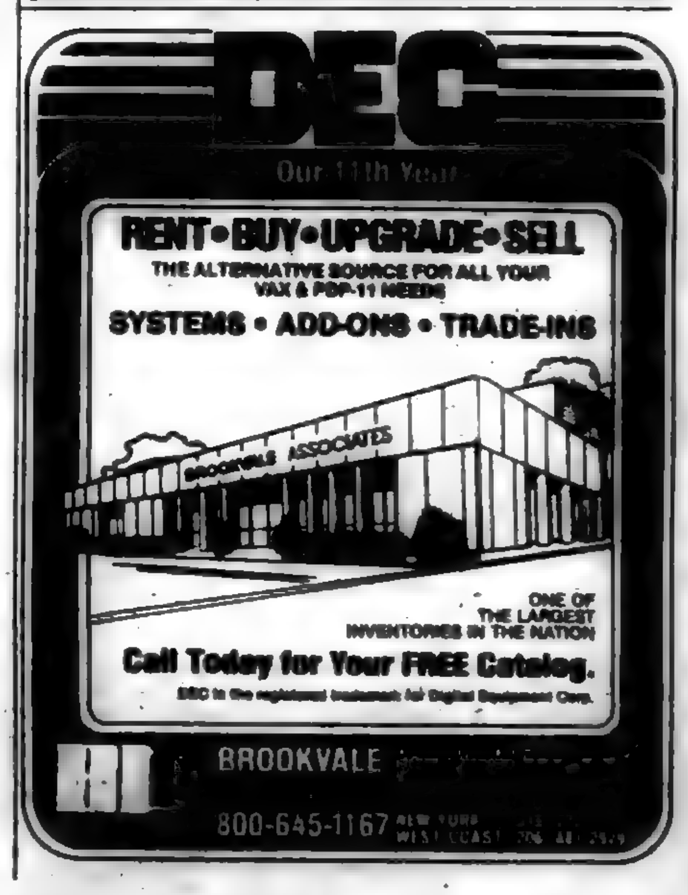

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DG boasts high availability

From page 41

592M-byte disk subsets are said to eliminate nonaccess of data during tape backups. When using mirrored disks, if a failure occurs on one disk, an up-to-date, accessible copy of the data will exist on the mirrored disk. Any write that occurs on the primary disk also occurs on its mirror.

Mirrored disks are generally found only in fault-tolerant systems, Serlin said, but they are beginning to appear in others. The clear advantage of disk mirroring, Serlin continued, is that when two tasks require the same data, you can satisfy both tasks at once.

The mirrored-disk capability is said to lead to better performance, according to Doug Richards, DG's product manager for MV systems. In a typical DP environment, there is a preponderance of reads over writes, he said. Performance is improved with mirrored disks because reads go to either disk drive, so two disk heads look for the information, Richards added.

For DG users at Levelor Lorentzen, Inc., a window coverings manufacturer in Rockaway, N.J., the SHARE features did not figure into their decision to place an order for one of the MV/20000s. John Fox, vice-president of administration in the firm, said the decision to purchase was based on the higher million instructions per second (MIPS) rating of the MV/20000 Model 1 — 5.5 MIPS — over that of the MV/10000 — 2.5 MIPS — and the better processing time for the company's large applications. Levelor has three MV/10000 systems in its corporate office and a dozen other MV/10000s at its branches.

Dual porting feature added

Dual porting of the disk drives, another availability feature, allows one disk to be ported to any two Eclipse MV CPUs, each with its own set of users.

The benefit of this, DG's Richards said, is that if System A fails, the drive can be brought up and made active on System B so that the data it contains will be available to users.

Dual porting, available for about 20 years and resident on all large IBM disks, is certainly an important feature for DG to add, Serlin said. If one I/O path failed, for instance, the data on the disk is good — but if you do not have a path to get the data, it is useless, he added.

Other features that make for high availability include double-bit error correction on the machine's 256K-byte random-access memory chips, which enable a memory chip that has developed one hard error to continue correcting soft errors. Serlin pointed out that many medium-scale systems — probably including IBM's 4300 line and Digital Equipment Corp.'s VAX machines — also have the feature.

The two central processors in the dual-processor Model 2 system are not fault tolerant in the sense that they duplicate, or mirror, each other in case one of them goes down. However, if the system crashes, whichever processor is not working can be cut out, while the operating processor continues to run the entire system — a feature Serlin said is available on most dual-processor machines.

Other features include a dedicated Diagnostic Remote Processor that is backed up with its own battery and has its own operating system. The system includes a full battery backup capable of powering the 56-slot CPU chassis — including cooling fans — for a total of two minutes minimum, without ac line voltage present.

DG is also offering a refinement of its AOS/VS operating system in Revision 7 that allows systems programmers or operators to establish classes of users. This feature is said to give guaranteed percentages of CPU time to a particular class.

While this feature is new to DG, it is available on any AT&T Unix machine, Serlin said, and has been part of DEC's VMS operating system "since Day One. It is not a feature that deserves a headline," he stated.

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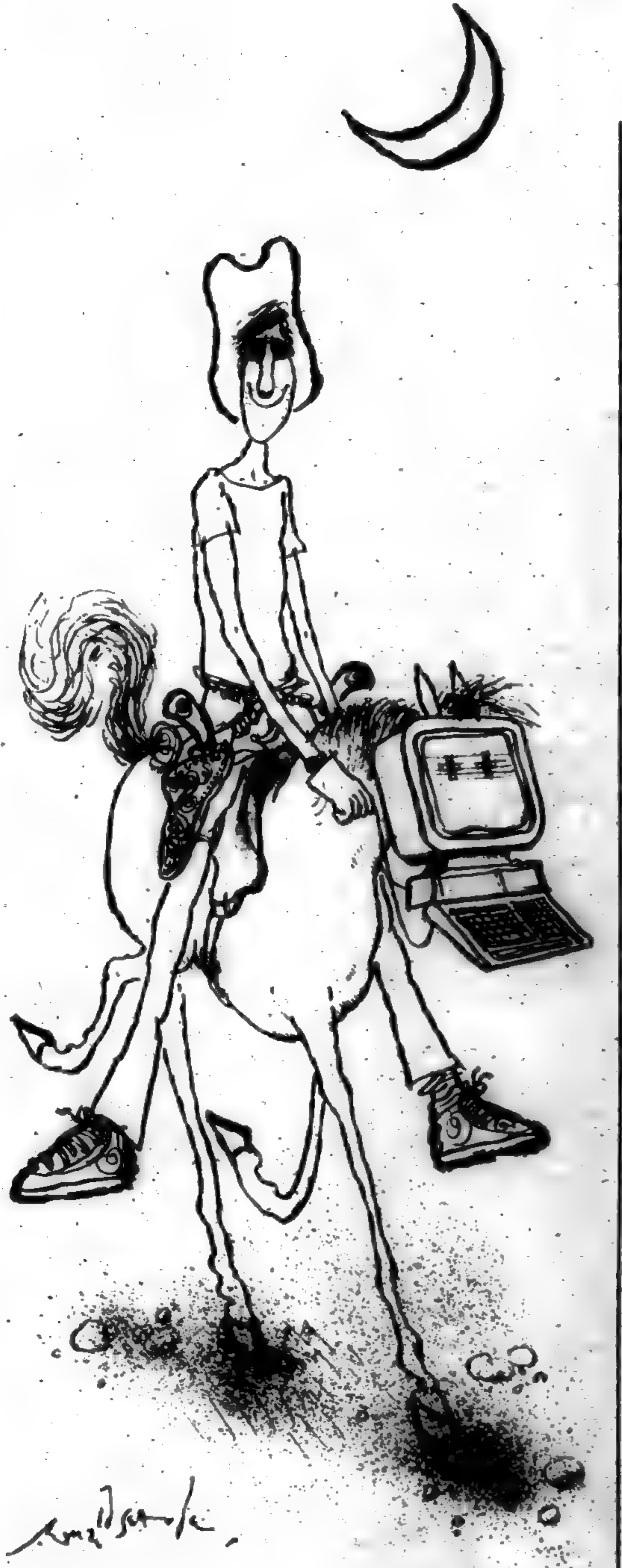

Jesse James at the terminal

An intrigue of security measures, audit trails and time bombs

By William Atkins

Jesse James Wheeler was angry. Seething. How could they pass him over for promotion again? Jesse was sure that the company would long ago have recognized and rewarded his ingenuity. But it hadn't, and he was mad. If they weren't going to give him what he deserved, he'd take it himself.

If one could trust appearances, Jesse was the very model of a modern systems analyst. At 29, he had put in six years with Technee Corp. He came in early and stayed late. He even took his personal computer home so he could work nights and weekends.

He had learned the company's computer system quickly, and just as quickly he had devised ways to bypass the controls and make it work better.

Though Jesse fit the picture of the up-and-coming computer professional, he also prided himself on his connections to his dashing and courageous predecessor, the intrepid robber of banks and trains. He bore the legendary name, of course — although his name, Jesse James Wheeler, came from his two grandfathers, so the conjunction happened entirely by chance.

But he also possessed James' cleverness. And his knowledge of Technee's computer system would bring him more money than a loaded pistol ever could.

The plan

Jesse's daring namesake had always sought to justify his banditry on grounds of persecution. Moreover, the original James gang used to brag that it had never robbed a friend, a preacher, a Southerner or a widow. Jesse decided that he would be just as considerate. He would not steal from anyone but the faceless corporation.

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He decided to set up a fictitious vendor-payable account in the computer and then transfer payments directly to his bank account.

Maxim: When information systems are involved, beware of disgruntled employees.

Like many large companies, Technee maintained extensive DP operations, with centralized and distributed computer systems as well as a flock of microcomputers wired into both. Management understood the value of its electronic treasure trove and had taken steps to protect it.

Special access-control software allowed terminal users — identified by user codes and passwords — to access only those records for which the users were authorized and to perform only specific, authorized functions such as reading files or adding or deleting information.

The software was also used to limit the amount of information available to each authorized user; restrict the central computer to private, secured phone lines; and allow end users access only to certain terminals. Perhaps most important, the software kept records of who accessed what, from which terminal and when.

Jesse had known that the specialized audit software existed, but its secrets were closely guarded by the auditors themselves. The software caused his biggest worry: Since he didn't know where the system's traps lay, he couldn't be certain of avoiding them. He decided to minimize the risk of being caught by leaving a little "present" during the robbery — a special program that would cover his tracks by eliminating any record of the transactions.

While working on his microcomputer, Jesse had noticed an inordinately long wait after he signed on with his user code and password before the central computer responded that he was logged on and could proceed. He decided to ask his supervisor about this.

"Not to worry," Matt said, "It's just security. The system cuts you off. It drops the line, so to speak, and dials you back. Or, I should say, it dials back the phone number you should be using. That's how it knows every terminal tapping into it is right where it ought to be."

Matt also told Jesse that every supervisor had a frequently changed password that allowed access to the "secured" systems. He had designed many of these features himself and was justly proud of them.

Maxim: All employees must be sensitized to security issues.

Technee's security managers did all they and the corporate insurance company deemed necessary. They knew about even more sophisticated and exotic access-control devices — gadgets that scanned potential users' fingerprints, voiceprints, even the blood vessels in the retinas — but these came at a price Technee wasn't willing to pay.

Jesse needed a password that would give him access to supervisory functions because to divert funds to a fictitious account, he first had to be able to create that account.

He needed a partner, and he found Frank — a computer operator with a bit of a gambling problem. Nothing serious, he told Jesse, just a few hundred dollars each week. Frank had no love for Technee either. But he did have a way of getting the master password list.

Maxim: Investigate your computer personnel before hiring, and be alert to evidence of such personal problems as compulsive gambling and alcoholism.

Frank used to work at Technee's world headquarters; in fact, somewhat against his wishes, he'd been transferred to Jesse's Eastern Region office in Newark, N.J., only a few weeks before. So nobody thought much about it when Frank showed up at Technee's world headquarters' complex in Stamford, Conn.

The sensitive nature of Technee's business necessitated its state-of-the-art physical security system. Both inside and outside the modern structure, surveillance cameras silently scanned every movement, day and night.

Frank knew the cameras picked him up the minute he pulled into the employee lot. But it didn't matter. His parking pass was still affixed to his windshield, and the identification badge hanging from his lapel cleared him to enter both the building and the computer installation.

Maxim: Keep all personnel records and privileges up to date.

"Hi, Frank," Butch said, smiling from ear to ear. Butch was Technee's oldest security guard. Even though he knew Frank had been transferred, he didn't bother to check whether he should be there. After all, he'd known him for years.

To get the password list, Frank needed to enter the computer installation. He could do that the same way he always had — by punching a four-digit code into a keypad on the door panel. True, they had changed the code since he left, but getting the new code wouldn't be that difficult.

Frank simply wandered into the programming section. "Hey!" he yelled at no one in particular. "What's the code this week?"

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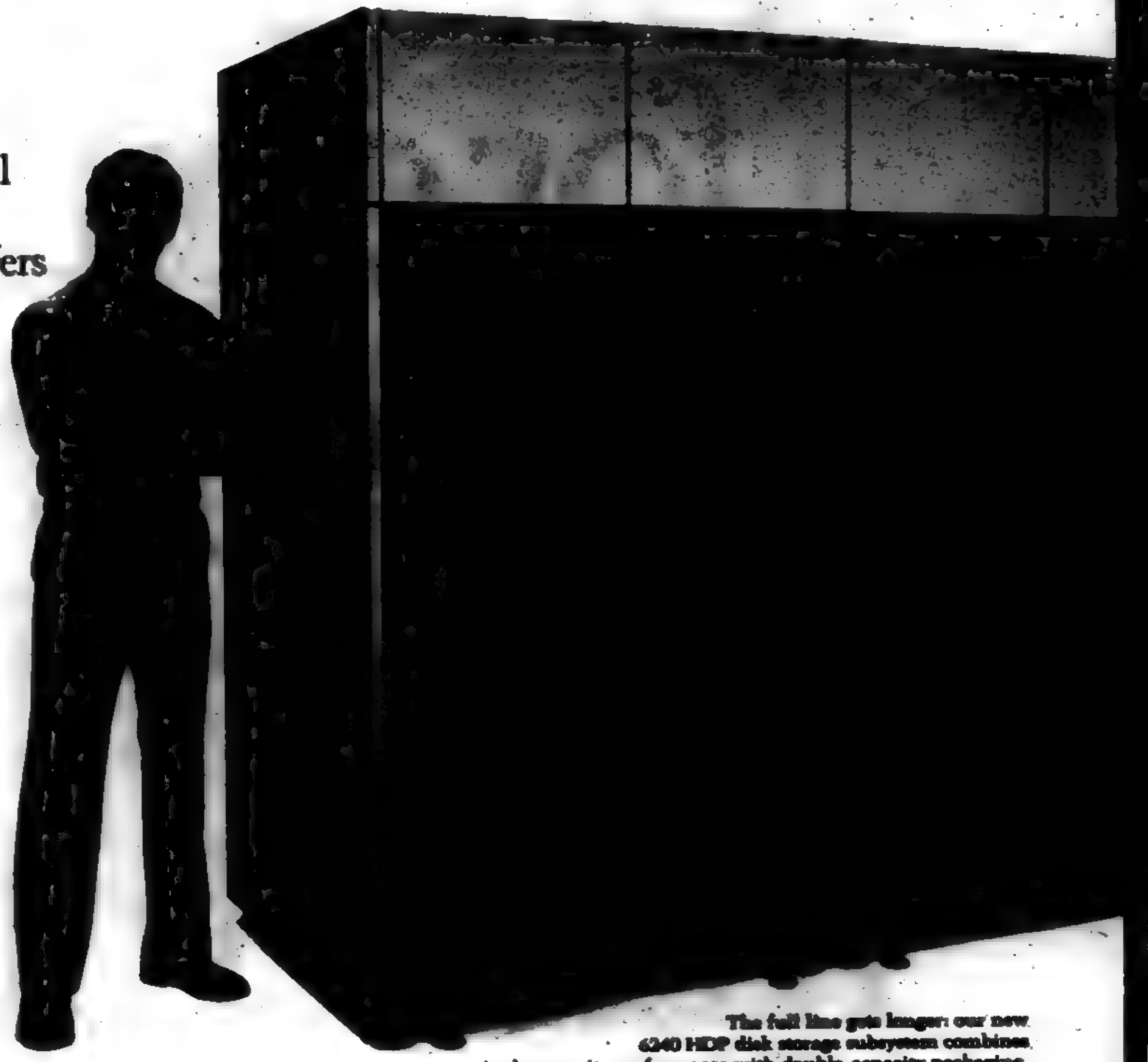

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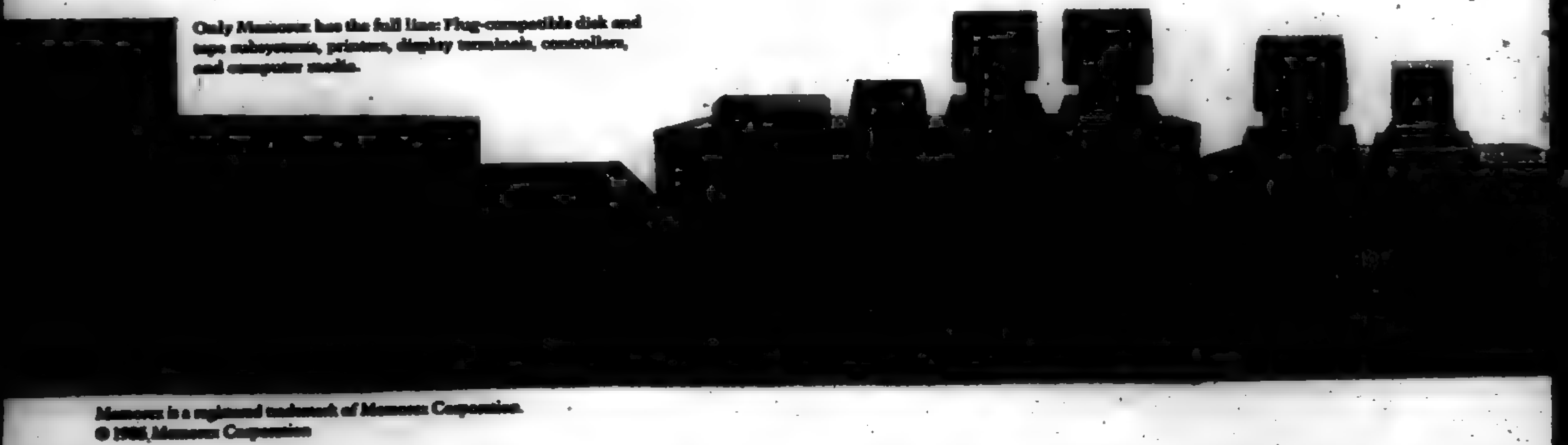

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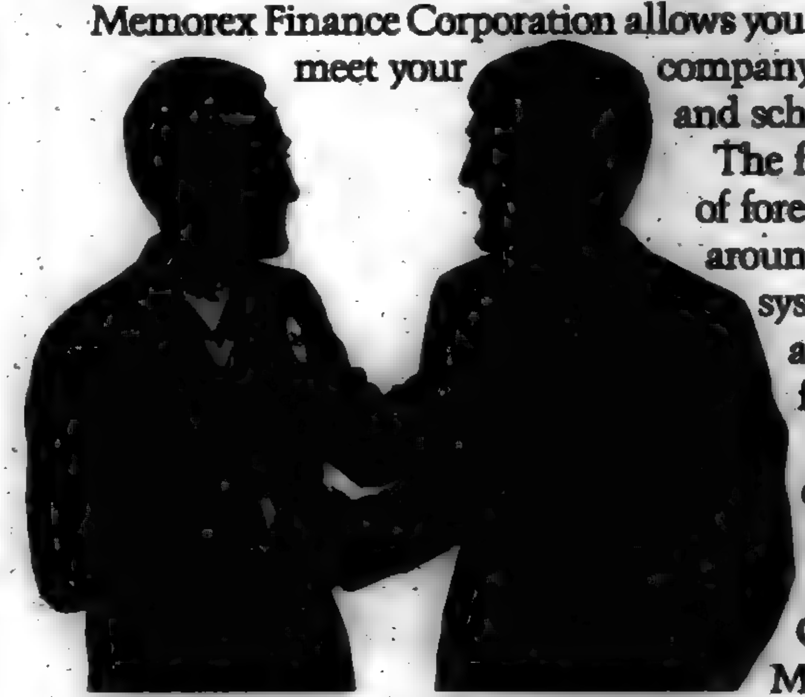

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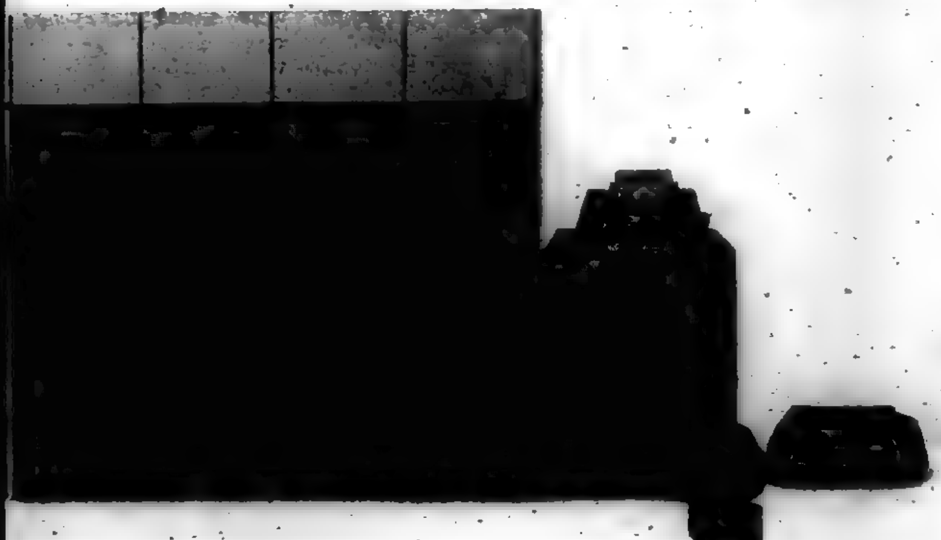

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"It's 313," was the reply from a neighboring cubicle. Like all Technee codes, this was simply a telephone area code. Following standard procedure, Frank prefixed a "1," punched 313 and entered the installation.

The main computer was, as befitted its delicate controls, enclosed in a scrubbed-clean room to the right, sealed off from the printers with their dust, confetti and vibrations. Frank turned left into the print room and, after a few minutes of rifling through the output reports that awaited pickup, found what he wanted — the list of supervisor password codes and the special terminal passwords.

"I've got the passwords," thought Frank in silent triumph. "But I couldn't have done it if those people hadn't helped me. In the end, people are what's important."

Maxim: Keep all security codes strictly secret.

During his six years with Technee, Jesse had learned about many of the operation's complete security features. Quite early on, he had noticed that, whereas each vendor account number had only six digits, the order entry group keyed seven numbers into the system.

He knew that the seventh digit was a check digit — part of the security system — and that to create a new account, he would have to devise a correct check digit of his own.

Since he knew many of the accounts' full numbers, Jesse could use his own computer and a simple program to arrive at the numerical process that unlocked all the account numbers. Having the check digit process and the passwords, he would be able to construct new account numbers that the system would readily accept.

Jesse's first assault on Technee's computer system was a failure. The kind of failure, in fact, that would have bloodied, if not killed, his train-robbing namesake.

As he had often done before, Jesse brought home his personal computer. Remembering what Matt had told him about the callback security feature, he first took the precaution of forwarding his office phone calls automatically to his home phone.

"No control device exists," he thought smugly, "that can tell when a call is being forwarded." Using the password list Frank had given him, he logged on and entered Matt's supervisor code.

He headed straight for the program for creating new accounts — and directly into a very expensive, very subtle and very clever trap. For although the system seemed to be following his instructions obediently, in reality it was doing nothing he asked and was all the while recording his every move.

Jesse had been snared by a state-of-the-art software auditing package that gave him access to a set of false files and freedom to do as he wanted.

To give due credit to his thespian talents, it must be noted that Jesse showed no trace of panic when the chief security officer from Technee's world headquarters called him into Matt's office the next afternoon. There on the desk was the evidence — a printout declaring:

```
OPERATOR IDENTIFIED AS
SUPERVISOR 31686
ON INVALID SUPERVISOR
TERMINAL 5479,
TELEPHONE NUMBER 555-2504,
ACCESSED THIS PROGRAM
FROM 1954:50 TO 2003:25,
6.19.85.
```

Matt, of course, denied using Jesse's terminal — as did Jesse himself. The building guards could not say for sure that Jesse had taken a terminal home the previous night. He was off the hook; there was no way they could prove he — and not someone else — had used his terminal.

The experience, though almost fatal, proved immensely valuable to Jesse, for now he possessed a piece of vital knowledge — namely, that there was another level of security to be breached. The company had installed a security system on the terminals themselves, so that not all terminals could do all things.

Jesse needed a supervisor's terminal. And he needed it on a Thursday so that Friday morning the accounts payable program would make a payment to his fictional account.

Maxim: Sophisticated security software systems are only as reliable as the people who guard them.

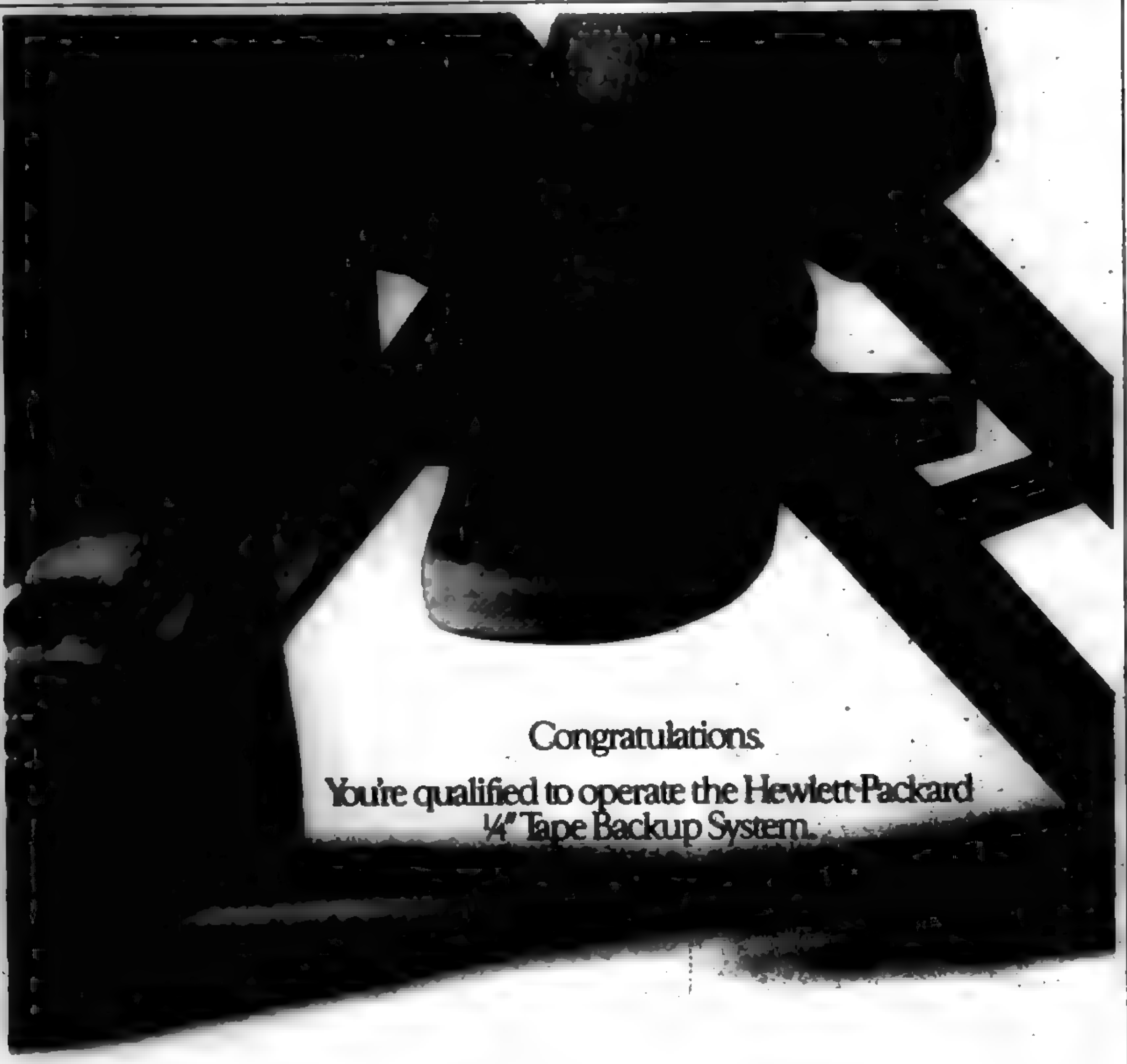
Another long day at the office. Time to scoop up the micro and lug it off to do some homework. At the employee exit, Danny, the security guard, was just getting ready for a restful evening.

"Hey, Danny!" Jesse called out. "My computer's on the fritz and I've got a boatload of work tonight. How's about letting me into Matt's office so I can use his? He said I could use it anytime."

Danny had never paid much attention to those typewriter-TV screen things; if you'd seen one, you'd seen 'em all. Jesse, of course, knew better. He needed Matt's five-star Supervisor I with circuit boards that would make that audit software program roll out the red carpet.

While picking up the machine, he set the callforward to his home phone. With unusual good cheer, he wished Danny a good evening. He himself intended to have one.

It is 11:30 p.m. Jesse is seated comfortably in his bedroom. His elaborate preparations are behind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him. It had all come down to this:
the silent predator with his elemental weapons — Jesse James with a terminal and a modem.

The crime

It had all been rather simple. Using everything he had learned at Technee, Jesse tapped into its central computer and created an account in his name. He had noted carefully all the necessary numbers: account, check digit, vendor, bank, American Bankers Association transit and bank account.

Carefully, he read from his notes. By simply inputting the appropriate purchase order and balances, he initiated next-cycle payment transactions totaling $2 million. He then applied a finishing touch of criminal acumen: a little time-bomb program that would remove all evidence.

Jesse didn't sleep a wink that night. He alternated between imagining how he would spend such an enormous amount of money — villas, yachts, wining and dining, gambling — and gloating over how he had beaten the billion-dollar Technee with all its policies, procedures and precautions.

In the morning, Jesse panicked. The long night had taken its toll. When the alarm had sounded he had turned it off automatically and fallen asleep. Now it was 7:15 a.m. He got dressed quickly, grabbed the computer, and dashed for his car. Usually at work no later than 7 a.m., Jesse knew that Matt came in about 8 a.m.

Practically knocking someone over, he rushed breathless up to Bob at the guard desk.

"Is Matt in yet?" he asked. Jesse's mind was racing as he tried to figure out what he could say if Matt was already there. The monitoring system would show that there was no problem with Jesse's terminal. How would he be able to explain taking Matt's?

"Haven't seen him," replied Bob. The answer seemed to take an eternity to sink in. He just stood there. "Thank goodness," he said finally. He didn't even notice the stares Bob and the other person gave him.

Jesse, explaining to Bob that he had used Matt's computer because his was broken, got him to unlock Matt's door. He set the machine down on the desk, connected it to the electrical outlet, plugged in the telephone jack and canceled the call-forwarding instruction. "What presence of mind!" he congratulated himself. "Switzerland, here I come."

> ”
>
> *It had all been simple. Using everything he had learned at Technee, Jesse created an account in his name.*

The witness

Jane Clades, a waitress in Technee's executive dining room, hadn't missed a day since the doors opened at this branch just over nine years ago. She was proud to be part of Technee and its success; she felt she belonged.

She read the monthly employee bulletin regularly and had been interested recently in the article titled "Security: Everyone's Responsibility." She liked the fact that Technee believed its first line of security rested in its employees. The article emphasized a family image: everyone pulling together and all keeping alert.

Jane also liked the friendly chief security officer from world headquarters who wrote the article; he'd visit at least once every few months and always stopped in the restaurant for a cup of coffee.

Jane didn't like Jesse's bumping into her that morning without one word of apology. He hadn't hurt her, but his bad manners annoyed her. She also kept thinking about how nervous he looked when he asked the guard to let him into a supervisor's office. Why did he need to get into that office in such a hurry? Why couldn't he just wait?

Jane told the short-order chef what had happened. The more they talked, the more she thought Jesse had behaved suspiciously, and the more the chef encouraged her to do something about her suspicions.

Telling herself she had nothing to lose and encouraging herself with the article she had read, Jane called Technee's chief security officer and told him her story.

The capture

Even with considerable assistance, security personnel took more than 36 hours of work around the clock to uncover enough evidence to indicate embezzlement. (If Jesse hadn't applied his time-bomb program, they could have reconstructed events in a few hours.) Because they had no way to prove the crime, the rest was up to the chief security officer.

Waiting for his taxi to the airport, Jesse looked over his luggage. It seemed everything was in order. In just 90 minutes, he would be on the plane; in a few hours, he would be skiing and beginning to enjoy the $2 million.

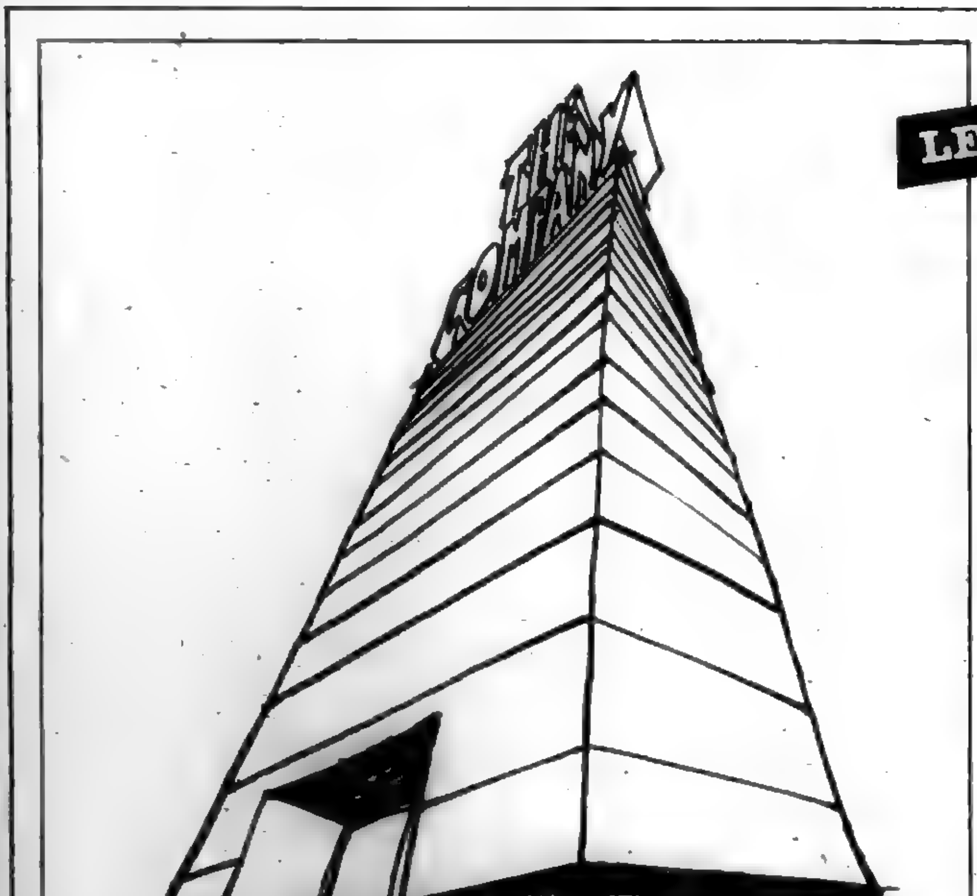
He heard the door bell and, with a smile of anticipation, picked up his skis, boots and suitcase and opened the door. Jesse's face turned white, his mouth went dry and his legs began to shake.

The last person he expected to see on his doorstep at high noon on a Sunday was the chief security officer of Technee. "Do you know how you're going to spend it all yet?" asked the officer.

Jesse couldn't believe he had made a mistake. He had to know where he had gone wrong. "I don't understand," he blurted out. "How did you work it out?"

The officer's bluff had worked.

And Frank had been right. In the final analysis, people make the difference.



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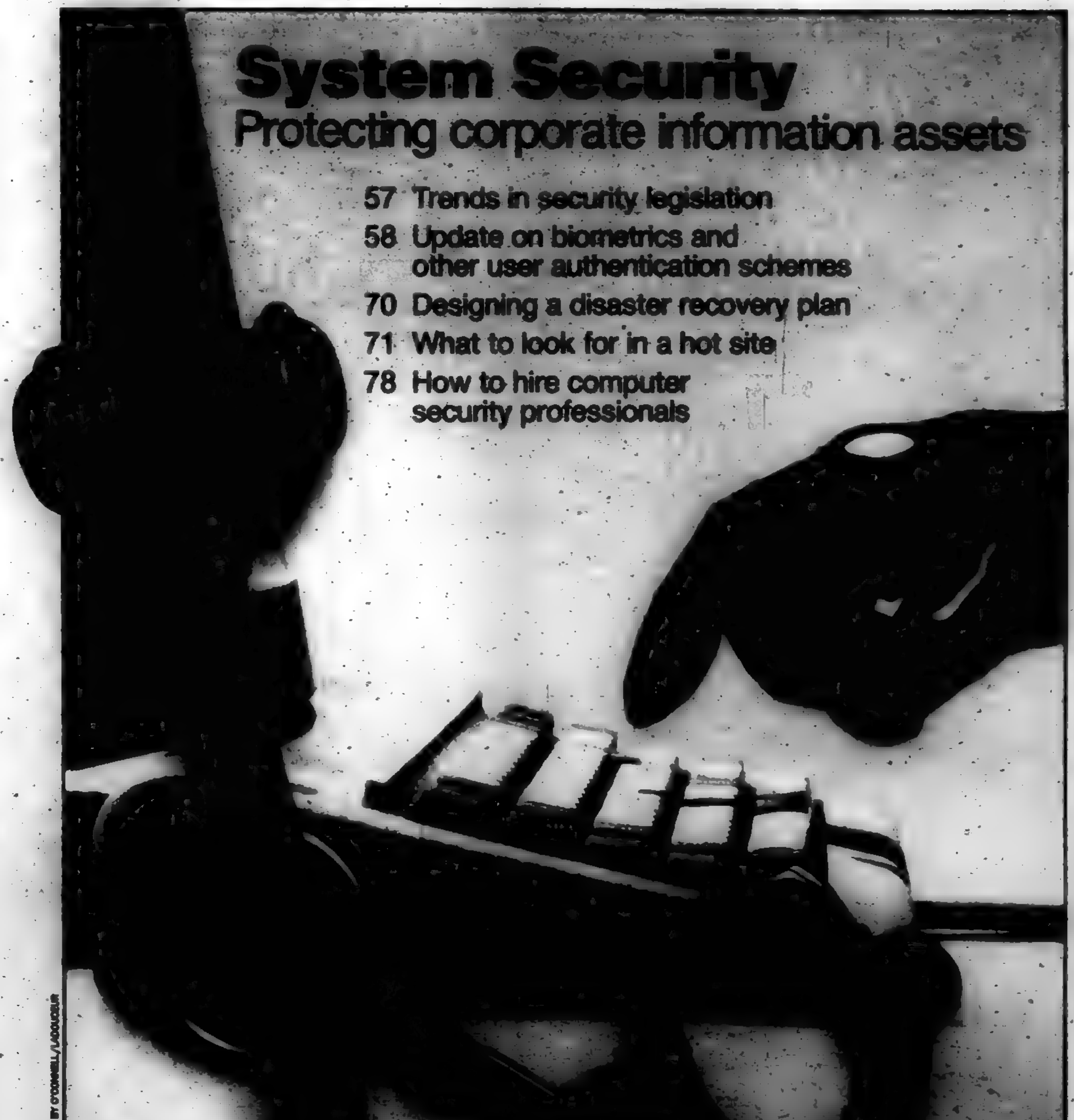

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CW PHOTO BY O'DONNELL/LADOUCEUR

Special Report

Cracking down on computer crime

Congress grapples with political, legal issues in effort to draft bills

By Mitch Betts

If a business competitor gets unauthorized access to your sensitive electronic mail messages, is that an invasion of privacy or criminal trespass and burglary, or both?

That is one of the many legal questions the U.S. Congress is wrestling with as it tries to develop computer crime legislation covering computers used in interstate commerce. Congressional leaders hope to pass such a computer crime bill — perhaps as soon as early 1986 — but several legal and political issues must first be resolved.

In the U.S. House of Representatives, which has taken the lead on this issue in the federal arena, there are two computer crime bills getting very active consideration in different subcommittees of the House Judiciary Committee. One has its philosophical roots in the privacy category, the other in the crime category. They also overlap.

The Electronic Communications Privacy Act of 1985 (H.R. 3378) is sponsored by Rep. Robert W. Kastenmeier (D-Wis.), who is chairman of the Subcommittee on Courts, Civil Liberties and the Administration of Justice. The bill has been referred to his subcommittee and already has strong support from the American Civil Liberties Union and the Electronic Mail Association.

This privacy-oriented bill was designed to outlaw the interception of electronic mail and data communications, thus giving electronic communications the same legal protection that the 1968 federal wiretap law gives to ordinary telephone conversations. The bill also outlaws the interception of electronic communications while they are stored in the computer.

"It would be inconsistent to prohibit the interception of digitized information while in transit and leave unprotected the . . . information while it is being stored," Kastenmeier explained. "This part of the bill assures consistency in this regard."

Philip M. Walker, counsel for GTE Telenet, Inc. and spokesman for the Electronic Mail Association, said the provision covering messages while stored in the computer is crucial "since the most likely method of privacy invasion comes when the perpetrator attempts to enter the electronic mailbox of a system user."

That provision also expands the bill from a communications privacy bill to a computer crime bill, thus creating the overlap with the second major House bill, sponsored by Rep. William J. Hughes (D-N.J.).

Hughes, the chairman of the House Subcommittee on Crime, has long sought a computer crime bill covering the private sector. Last year, he pushed a crime bill that outlawed unauthorized access to both private sector and government-related computers, but only the provisions on government-related computers became law, the Computer Fraud and Abuse Act of 1984 (Public Law 98-473).

Still pursuing the issue, Hughes this year introduced the provisions covering the private sector — the ones that failed to pass last year due to Senate objections — as a new bill (H.R. 1001).

The approach of the 1984 law and the latest Hughes bill is that unauthorized access to computer systems amounts to a criminal trespass and perhaps criminal fraud.

As Hughes explained his bill, it would establish a federal felony for unauthorized access to computers if the defendant, in carrying out a scheme to defraud, gets $5,000 in illegal gains in one year. The bill also creates a misdemeanor offense when there is not a scheme to defraud, if the financial loss adds up to $5,000 in one year.

"It is aimed at white-collar criminals and hackers who would violate our privacy and carry out high-technology schemes to defraud," Hughes said earlier this year.

So far, the Kastenmeier and Hughes bills are moving in separate and somewhat competing tracks in the House Judiciary Committee, but ultimately they may have to be merged.

"I think they can proceed separately, independently, and then later in the process, they could easily be joined" for passage by the House Judiciary Committee and then the full House of Representatives, commented P. Michael Nugent, who is Washington, D.C., counsel for Electronic Data Systems Corp. of Dallas.

Meanwhile, the Senate Judiciary Committee has a remarkably similar situation. Sen. Patrick J. Leahy (D-Vt.) has introduced the Senate version of the Electronic Communications Privacy Act of 1985 (S. 1667), and Sen. Paul Laxalt (R-Nev.), chairman of the Subcommittee on Criminal Law, recently held a hearing on the subject of computer crime.

Further complicating the legislative scene is a proposal drafted by the U.S. Department of Justice, the Federal Computer Systems Protection Act of 1985, which would make it a federal felony to engage in computer fraud or theft or to damage computer hardware or data when the offense involves computers used by the government or businesses engaged in interstate or foreign commerce.

Congressional leaders would like to arrange a compromise so that any final bill will have the support of the Justice Department, which will enforce the law, congressional aides said.

According to congressional testimony and interviews with computer crime experts, the legislative negotiations will require the resolution of several outstanding issues:

- At what point should the federal government assert jurisdiction? Should the "trigger" for federal jurisdiction be a large financial loss, such as in the Hughes bill or the fact that the computers are located in different states?
- Will the federal law trample on state laws and prosecutors? Should the jurisdictional dividing line be stated in the statute or left to federal-state negotiations?
- Will the legislation be an adequate deterrent to hackers? The Justice Department says the law should let federal authorities seize the hacker's computer equipment.
- Should the privacy of data communications be protected even if the parties do not take any steps, such as encryption, to protect the communications? Should the Electronic Communications Privacy Act cover forms of communications that are meant to be public or that have no expectation of privacy?

See CRIME page 65

Betts is a correspondent in Computerworld's Washington, D.C., bureau.

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Portrait of a hacker

GAITHERSBURG, Md. — [illegible] a hacker? Look for a boy who eats junk food or Chinese food from 24-hour restaurants.

That is one of the characteristics described by Julie A. Smith, an analyst for the government's National Computer Security Center, at the recent National Computer Security Conference.

[illegible]

Computer crime victims have recourse to novel legal remedies

Civil suits, restitution, injunctions possible

By Jay BloomBecker
Special to CW

With each new story of hacking, the inescapable truth becomes clearer. Democracy has come to computer crime. Millions of teenagers now have the opportunity, the means, the motivation and the information necessary to pester, if not cripple the business computer user community.

Fortunately, democracy works both ways. As the number of potential criminals has grown, so have the defenses available to the business user community. All but four states now have computer crime laws, with West Virginia, Vermont, Arkansas and Indiana as the only holdouts. With these laws, prosecutors are no longer handcuffed when attempting to prosecute cases brought to their attention.

Perhaps the most important feature of the new computer crime laws, one largely overlooked by the professional press, is the variety of new remedies offered the victim of computer crime. It is no longer necessary to wait for the prosecutor to act to punish an alleged computer criminal. A number of novel civil remedies have been written into law, each offering alternatives that the business user should carefully consider in the appropriate case.

Civil suits. Even without special legislation, victims of computer crime are often entitled to sue the perpetrator under common law. Stealing a businesses' property or doing damage to it are torts for which the victim can recover damages. In some cases, however, the damages may be difficult to estimate if the property is intangible, such as computer time, software or data.

Added to these traditional remedies, there are now new "causes of action" (the legal phrase meaning bases for a lawsuit) that allow suits when someone has been victimized by a computer crime.

Some of the new causes of action are particularly appealing to the victim of a computer crime because they allow for recovery of far greater damages than traditional law would provide.

Connecticut, for example, allows for damage suits alleging computer crime. Where there is proof of "willful and malicious conduct" by the defendant, the victim may be awarded treble damages. Similar to private antitrust suits, this provision is likely to increase the motivation of computer crime victims to bring suit.

California and Virginia also provide for civil suits arising out of computer crime charges, though neither provides for treble damages. California addresses two practical problems of civil suits. It allows suits against the parents of minors who are alleged to have committed computer crimes. This provision should provide some added incentive to businesses victimized by teenage computer enthusiasts.

The California law also defines injury to include "any expenditure reasonably and necessarily incurred by the owner or lessee to verify that a computer system, computer network, computer program, or data was not altered, deleted, damaged or destroyed" by any illegal access of the computer system. The cost of this sort of verification could easily exceed any other item of damages.

Injunctions. Connecticut, New Jersey and Delaware provide that a business believing itself to be the victim of a computer crime can apply to a court for injunctive relief to stop the crime immediately. The same application can ask for the appointment of a receiver to take control of the property of the party alleged to be committing the computer crime.

This is, of course, an extreme remedy not likely to be granted except in extreme cases. It can be important where there is an ongoing dispute, for instance concerning the ownership of software and immediate resolution of the property rights involved is desirable to all concerned.

Restitution hearings. A third important remedy available to victims of computer crime is a cross between civil and criminal litigation. After a computer criminal has been found guilty or has entered a guilty plea, a court in Connecticut or Delaware may award the victim up to twice the defendant's "gain" from commit-

See VICTIMS page 65

BloomBecker is the director of the National Center for Computer Crime Data, a research institute based in Los Angeles, Calif., that produces publications and seminars on the topics of computer crime, computer security and computer ethics.

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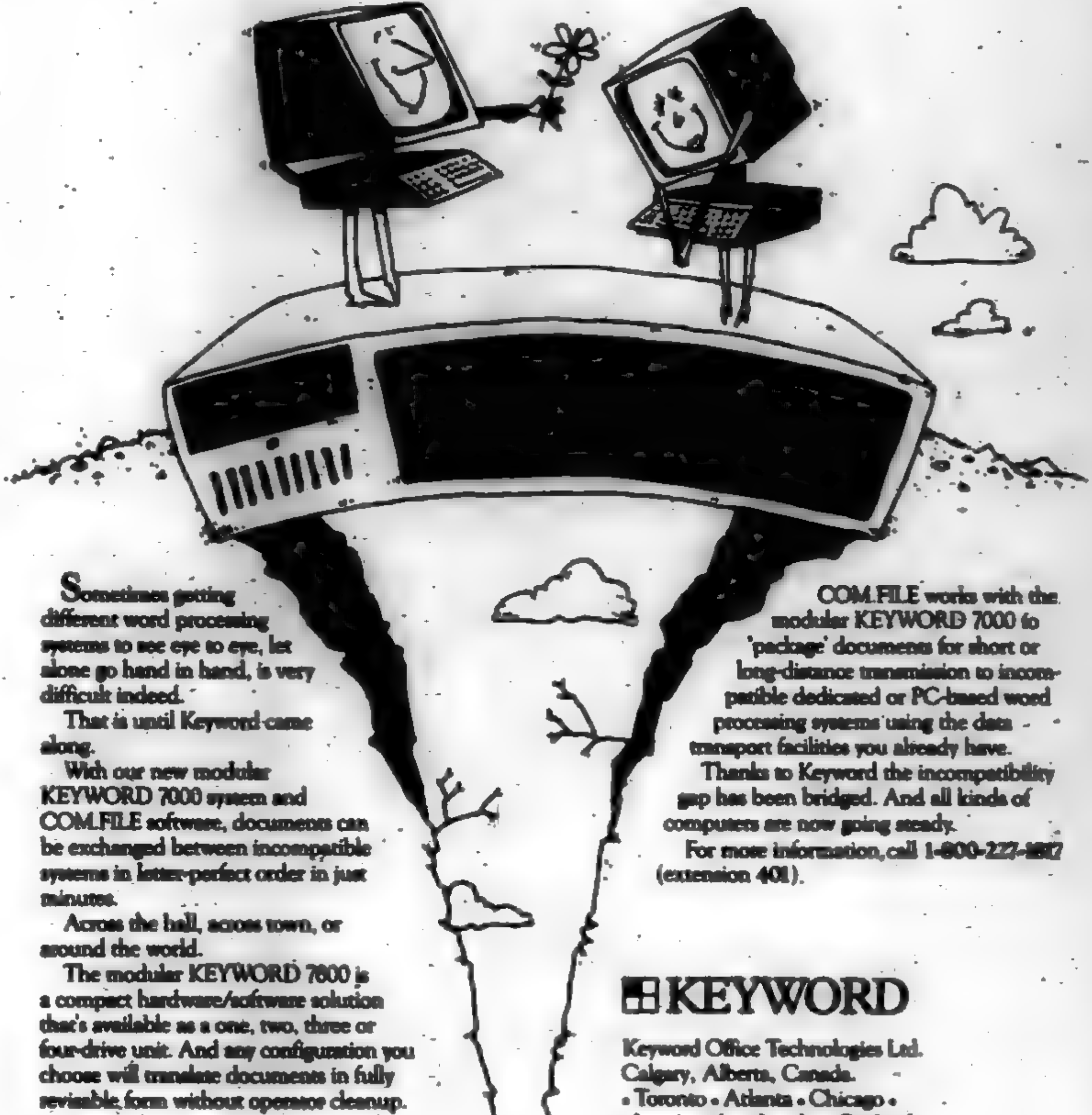

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Special Report

Futuristic authentication schemes overcome passwords' limitations

ILLUSTRATION BY BRUCE GILFOY

By Stephen Seidman
Special to CW

Passwords cannot, in themselves, ensure the security of a computer and its files, mainly because they give no indication of who is trying to gain access. But now authentication schemes that have their roots in the concept of password control can overcome this fault.

Certainly, passwords are not useless: They at least provide an incremental improvement over totally uncontrolled access. But people are careless with them — and always will be.

Users write their passwords on bits of paper near their workstations or scrawl them on pieces of tape attached to the workstations themselves. In such cases, the security administrator's inability to know who is entering the password opens a major loophole.

Even when users handle their passwords with care, administrative carelessness can lead to breaches in security. Most passwords are rarely changed. A potential perpetrator of computer crime can acquire a legitimate password by casually looking over the shoulder of an authorized user and can use the password later, when the authorized holder is away from his terminal.

In recent months, vendors have introduced products that overcome the problem of fixed passwords. These products, hand-held devices that generate randomly selected and encrypted codes, are based on constantly changing passwords that are never repeated.

After an authorized user logs on to his workstation with an initial, fixed password, he obtains a generated password from the device and enters this code into his workstation. Code entry is accomplished by one of three means, depending on the type of generating device the user has:

- Most devices require the password to be entered at the workstation keyboard. Enigma Logic, Inc.; Security Dynamics, Inc.; and Sytek, Inc. supply such devices.
- Other devices need to be plugged into a reader that is attached to the user's workstation. These are provided by Analytics Communications Systems, Inc.; Codercard, Inc.; Datakey, Inc.; and Digital Pathways, Inc.
- A third type of device, manufactured by Gordian Systems, Inc., is optically connected to the system. The user enters the generated password by holding the device up to the display screen of his workstation.

All of these offer one great improvement over use of the traditional, fixed password: They defeat hackers' attempts to breach systems by initiating computer-controlled searches for legitimate passwords. A hacker's chance of hitting a randomly generated password are nil.

But these password-generating devices have a shortcoming as well. Many users write their initial-access passwords on their hand-held devices.

Anyone who acquires a lost or stolen device can use it as well as the authorized owner can, and anyone clever enough to steal a device can easily commit a security breach. Such theft is not terribly difficult because authorized users often leave their devices plugged into terminals, lying on desk tops or sitting in unlocked desk drawers.

Security administrators need to know who is holding the device and who is attempting to gain access to the system. To find the answer, they require some implementation of the newly revitalized technology of biometrics.

Biometric devices allow or deny access by comparing a stored record of a personal characteristic unique to a device's authorized user with the actual characteristic of the user who is attempting

See **FUTURISTIC** page 67

Seidman is managing editor of "Smart Card Reports," a series of market-sector reports published by Smart Card Reports, a division of the Palo Alto Managment Group, which is based in Mountain View, Calif.

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Special Report

Trends in computer security: An interview with Jack Bologna

Security has been a professional concern of consultant and author Jack Bologna for the past 30 years.

During that time, he spent 14 years in federal investigative agencies, including the Internal Revenue Service criminal investigation division and the Drug Enforcement Administration.

Now, as president of Plymouth, Mich.-based Computer Protection Systems, Inc., Bologna focuses his work on corporate computer fraud auditing, computer crime investigation, disaster recovery planning, loss prevention programs and security awareness training. His company publishes the "Computer Security Digest" and "Forensic Accounting Review."

In addition, he is a full-time professor of management at Siena Heights College in Adrian, Mich.

During a recent interview with Computerworld *Special Report Editor Janet Fiderio, Bologna discussed computer security issues and current computer security legislation.*

Do you think that recent legislative proposals now moving through Congress to curb hacking will be an effective deterrent to hackers and other computer criminals?

They are a step in the right direction. Whether they are going to function as a long-term deterrent is something I still have reservations and doubts about.

I think the reason why hackers seem to exist is because they fundamentally don't understand the value of the information they are accessing and how sensitive some of it is.

Being able to dial into a credit data base may sound like a lot of fun if you are 14 or 15 years old. Once, however, you realize that they are exposing millions of people to invasions of privacy in the process of doing something which sounds simple and prankish, then the characterization of that particular act changes.

It is going to have a major social impact.

"If research and development is not protected down at the worker level, it will not amount to a hill of beans."

Do you think our judicial system is prepared to process cases that involve computer crimes?

The judicial system in the U.S. today, which includes the whole criminal justice system, police, prosecuting authorities and judges, is not adequately trained to either appreciate or prosecute computer-related crimes. I am not being supercritical by telling you that; I think that the computer explosion in the last 10 or 15 years has caught these people off guard, and they really don't seem to understand what is involved.

As a consequence, we see a lot of strange things happening. There are far more prosecutions of hackers, for example, teenagers, than there are of sophisticated systems progammers who have found ways to get away with millions. The major losses, in terms of dollars not of privacy, are not necessarily understood or prosecuted [by our legal system]. One of the problems here is that the firms that have been victimized are often reluctant to go forward and complain because of the possible embarrassment and the publicity that might result.

Even if the publicity is very factual, it makes management look slightly derelict in the minds of stockholders and the general public. To look derelict to the public is bad enough, but if the stockholders think management was derelict in exercising its responsibilities, they are going to turn around and start a stockholders class-action suit against them for mismanagement.

Then an organization's management can be found liable if care and prudent judgment aren't used to protect its information assets?

Not only can they be, but they have been. While this is not necessarily true in a criminal context, it is certainly in a civil sense [such as the example just mentioned]. Courts are beginning to assess damages against corporate officers personally. When this happens, the company's directors and officers bond doesn't necessarily pay for that part of the judgment.

In the future, I expect that more courts will handle like situations similarly. They may turn to a corporate officer and say look, the corporation has got a $5 million bond, and the bonding company will pay to reimburse the company, but you have been so derelict in this circumstance, that we think that you personally are liable. Therefore, you should donate a half million dollars to the corporation's treasury for the damage you did.

Now if that happens, which is not totally unlikely in view of the current events in some courts, we are going to find corporate officers much more willing to spend money for security.

Do you think that computer systems and software vendors are more conscious now of incorporating security features into their products? Are the vendors more security-oriented than they have been in the past?

In my opinion, software and hardware providers are basically interested in generating the product that is going to sell. The kinds of things that sell information products are speed of processing, capacity, memory — none of which has anything to do with security except in a negative context. Actually, security slows down processing and requires more capacity and memory than nonsecurity systems.

As a consequence, design engineers of the hardware companies and the software developers are pursuing a product strategy of user-friendliness, not of product integrity or product security.

In the last three or four years, however, I have seen more conscious planning in terms of security for both hardware and software products — far more than I have ever seen before. I think it is finally beginning to hit home to the designers of hardware and software that the user community is now willing to pay a little more money for security or, at the least, is a little more willing to be inconvenienced.

What role should an auditor play in the planning of a good security system?

The audit staff, and in big corporations, the internal audit staff, should be intimately involved in the design of new systems that have accounting applications in mind.

The expertise of the auditor from the standpoint of building in internal security controls in the design phase should be utilized when that system is about to be designed.

Right now, I think we are finding more and more situations where the internal audit staff and finance people are intimately connected with the design of internal controls when a new system is being designed.

What part do you think training and personnel security awareness should play in a security system?

I think that training is critical. In this day and age, the way to win people over to a security perspective is by making security training part of general orientation for an organization's new employees.

As new hires are brought on-board, it should be made very clear to them that the corporation has an information protection policy and what breaches of this policy will result in.

I also recommend periodic renewals of those education efforts. This is not to terrorize people or to feature the punishment aspect of the corporation's security policy but to reinforce the security issues introduced during their orientation . . . to remind them of the value of that information.

I don't believe that employees of very large companies realize that some of their organization's most expensive assets don't appear on the balance sheet — that is their information assets.

What do you think is the most common information security breach that most companies suffer from?

Browsing. Browsing by legitimate users, the guys who aren't happy with the limited rights they have. These people are a little bit bored, and they begin to experiment by way of their terminal to see what else they can get into. It is not done with malevolence in mind. I think it stems a little more from boredom because the people that are doing it mostly tend to be very bright, sophisticated and adventuresome folks.

They don't recognize that their little act of browsing today, in a sense, is challenging the integrity of the whole system tomorrow.

How can system operators guard against browsers?

The classic protection is to have a data security administrator and a data security officer. [That way] access to the mainframe is being monitored and logs are being kept of who attempts to access programs when their access rights were inconsistent for accessing those programs.

Therefore, the best way to defend against browsing is by having good access control and by being able to log who is abusing their rights and privileges as system users. If you don't have that kind of mechanism for control, for all intents and purposes, you can't do anything about browsing.

Of all the security concerns we have talked about today, what is the issue that concerns you most?

The issue that worries me the most is that many people who manage information and information systems and work with those systems, don't fully appreciate their value. . . . If research and development is not protected down at the worker level, it will not amount to a hill of beans.

A corporation can spend $100 million on a given research effort and then not protect the results of that research to the point at which all its competition knows about it almost immediately. When this happens, whatever competitive advantage the organization might have had is dissipated because its own staff didn't realize that this $100 million worth of experimentation and research was what could have built that corporation into a multibillion dollar company.

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Centralized access control software assists telephone, helicopter firms

SAINT JOHN, New Brunswick — A Canadian phone company called on a software security system to serve double duty while it was being installed. Before the software began controlling access to corporate data, it had to help the company find out who was using the data in the first place.

The confusion at New Brunswick Telephone Co. arose from a piecemeal security system that had been in place before the installation, which took place in 1980. Until then, people who owned data had been responsible for securing it, according to DP Security Coordinator Preston Taylor, and each group implemented controls pretty much as it pleased.

USER REPORT

NEW BRUNSWICK TELEPHONE CO.

Problem:
Inability to know who used any given application; piecemeal access control.

Solution:
Centralized access control software.

Benefits:
Knowledge of usage patterns; sense of security; end-user respect for security procedures.

"We really didn't have the tools to know who was into what," Taylor said. The phone company, in fact, chose its centralized access control software, SKK, Inc.'s ACF2, primarily for that reason.

The software operated on the basis of access by exception, denying access to data unless it was specifically granted. No user could tap in to any data base running under IBM's IMS or MVS on New Brunswick Telephone's 24M-byte IBM 3081 host unless system administrators arranged for him to do so.

To determine who needed to have access granted and to what types of files, New Brunswick Telephone's DP security staff took two preliminary steps:

- It asked programmers who had been responsible for maintaining applications programs to help develop access rules for those programs and to determine who had been using the applications in the past.
- It brought up the security software in a mode that tracked access attempts as users made them, without denying access in any case.

From the information it gathered, New Brunswick Telephone established a set of rules it hoped to impose under its security software. Before the firm put the rules in place, however, it switched ACF2 into an intermediate mode that gave users a warning every time they gained access to something that would be denied once the rules went into effect.

After security staff members and users alike were satisfied with the way the security scheme worked in this intermediate mode, they switched to a permanent security mode, one in which the system denied any access attempt for which a user did not have specific authorization.

Altogether, the implementation took about six months, according to Taylor. "The major portion of that time," he said, "wasn't so much a matter of making the program work as it was of training users to think securely." The effort on that front consisted of a number of actions.

First, before the software was installed, New Brunswick Telephone drafted a written security policy and circulated the policy to end users. The policy explained why the firm chose to implement centralized security procedures and how these procedures would affect users' jobs.

Security staff members then made presentations to user groups to further explain the implications. "This gave us the chance to disarm fears that we would be making people's jobs more difficult," Taylor said. Few users had any qualms with the proposed system. Those who did — mainly heavy users who feared that security constraints might slow down their work — came away with the satisfaction that their concerns were being addressed.

Next, during the implementation itself, the firm appointed one person in each affected user group as security coordinator. That person held responsibility for settling problems that arose. "This gave users a specific person to call with questions," Taylor said. "It humanized the process and made it less threatening."

Last, as the software came up, New Brunswick Telephone passed responsibility for data resources on to the security coordinator in each user group. As a matter of policy, the firm considers end users the true owners of all application systems, Taylor said. "Ideally, nothing goes into the system without them knowing about it." In line with this policy, the firm looks on development and maintenance programmers as custodians of users' systems.

End-user ownership dictates procedures for granting access to data through ACF2. System owners determine who should have access to their systems. They then go through a series of procedures to justify their recommendations. If management accepts the justifications and approves the recommendations, Taylor's staff sets up access through the security software.

GRAND PRAIRIE, Texas — The inflexibility of a hard-coded security system and the vulnerability of on-line access pushed a helicopter manufacturer toward a decision to install an access control software package on its host.

Until recently, Aerospatiale Helicopter Co. secured only one of its applications, an inventory system, against unauthorized access. The homegrown security scheme that the firm used for the system worked well, according to MIS Director Herb Finmark. But because it was coded within the inventory application, it imposed tremendous maintenance problems.

"Every time you added a user, changed a user's access capability or altered an authorized rule, you had to change the program," Finmark said. "That, in the long run, was ridiculous."

He said his staff of 21 programmers could not keep up with the maintenance demands and their development responsibilities without short-shrifting one or the other. Aerospatiale's programming group had initiated development on shop scheduling, project management and inventory applications and was beginning to address micro-mainframe communications issues as well.

The security scheme posed another problem in that it was limited to one application. Finmark said he wanted a more comprehensive approach to access control because Aerospatiale was leaning heavily toward on-line applications, which the firm realized were especially vulnerable to instances of unauthorized access.

Aerospatiale runs a 6M-byte IPL Systems, Inc. 4445 mainframe that supports CICS files and IBM's DL/1 data base management system under DOS/VSE. More than 100 terminals, located in operating divisions throughout the firm's headquarters, have on-line access to business applications on the host.

To keep the entire system secure, Finmark wanted to be able to control access by record and segment content, by type of access, by terminal location and by time of day.

He said he is confident that the access control software Aerospatiale installed — On-Line Software International, Inc.'s Omniguard, which went live late in 1983 — provides the necessary checks. The firm has set up the system to block access under a range of physical and functional conditions:

- Specific terminals have access to specific categories of information. Because of this constraint, anyone who tries to gain access to an accounting application from a terminal in the engineering department, for example, will fail in his attempt.
- Specific user identifications are tied to specific terminals. If a user from accounting tries to log on to a terminal in the manufacturing area, his attempt will fail.
- Terminals located in business areas that do not generally operate during the evening automatically shut down after 5 p.m. or another specified hour, unless a system administrator grants an exception through the software.

USER REPORT

AEROSPATIALE HELICOPTER CO.

Problem:
Inflexibility of hard-coded security system; vulnerability of on-line data.

Solution:
Centralized access control software.

Benefits:
Low maintenance overhead; physical and functional access control.

These, combined with common limits on the access an individual can complete with his user identification, put barricades between unauthorized users and the firm's confidential information.

The security system allows authorized users some room for error, but not much. Users get a few chances to make their way into a file or data base, but if they make enough mistakes, the system renders their ter-

See CONTROL page 65

Aerospatiale manufactures helicopters for commercial use.

Victims have recourse

From page 57

ting the offense.

Where the amount of gain is not clear, the court may hold a hearing to determine it. This award is to be paid by the defendant in the case instead of paying a fine to the state.

The major question these laws pose is, What are we going to do to reduce the incidence of computer crime? A growing partnership between business victims and the prosecutor's office becomes easier now that there are these powerful civil tools available to the victim for legal recourse.

Like any other tools, however, they are powerful only if they are used.

Crime crackdown

From page 56

Legislators and lobbyists say that none of these issues is insurmountable, and with bipartisan support and help from industry and other interest groups, it appears that some form of computer crime and electronic privacy legislation will be enacted in 1986.

Hughes and Leahy, for example, have publicly urged that such legislation be passed before the end of the 99th Congress next December. As Sen. Charles McC. Mathias Jr. (R-Md.), cosponsor of the Leahy bill, put it, "If the law lags behind [the] technology, then our task is to revise the law to catch up."

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ISN

Hacker portrait

From page 56

computer hackers.

She said hackers tend to lose interest in schoolwork that is not related to computer science, and thus, their school grades plummet. College-age hackers tend practically to live in the computer buildings on campus.

Smith's research provided additional characteristics of hackers:

- They are almost 100% male.
- Like computer programmers, hackers are extremely bright, investigative and logical thinkers, competitive and prefer structured but creative activities.
- With every successful action at the keyboard, hackers see themselves as asserting authority over the machine and whoever is connected to it, giving them a sense of power and control. Thus, they are more concerned with gaining this sensation of power than they are with the effects of their actions on others.
- Hackers tend to dabble at computer projects with no long-term goal and do not plan ahead.
- Hackers have little respect for those who know nothing about their favorite subject, computers.

"Every aspect of their lives soon becomes linked to computers," Smith said, referring to hackers' social isolation from families and nonhacker friends. "Their speech becomes short and precise in order to avoid any ambiguity in communication, and they often use computer jargon which nonhackers do not understand," she said.

But hackers find refuge in their strong bonds with other hackers, in a hacker culture where individual achievement is highly recognized. "Young hackers love to share information with each other concerning their hacker exploits," Smith said.

In fact, John F. Maxfield, a computer security consultant in Detroit who operates an investigative service called Boardscan, told *Computerworld* that one way to investigate hackers engaged in criminal activity is to catch them bragging about their exploits on electronic bulletin board networks.

The conventional approach to steering hackers away from criminal activity is to lecture them about computer ethics, but this approach has had only mixed success, Smith said. Instead, the social and environmental forces that reinforce hacker behavior must be changed, she asserted.

"It appears as if the best way to combat the narrow-mindedness that young hackers often develop is to change educational patterns so that bright students with an interest in computers are not bored in school," Smith said.

If school is more challenging, teenagers with hacker personality traits may develop interests in subjects like music.

Developing young hackers' interests in noncomputer fields would further develop their intellectual abilities, give them exposure to different environments and enhance their social skills, Smith said. She praised a special Duke University program for talented students that features a balance of challenging academic work and well-planned extracurricular activities.

Furthermore, Smith suggested that "by allowing young hackers to work with computers in an environment where the point of their work is more focused and supervision is available, they would be able to continue to enjoy working with computers at the same time that they are experiencing them as a tool with a purpose beyond the realm of hacking."

— Mitch Betts

Control aids firms

From page 64

minals useless. "They get three shots," Finmark explained, "and then the terminal is taken out of service."

Finmark said that in addition to preventing unauthorized access across the board, the security software has been a special boon to inventory control.

Before Aerospatiale installed the system, workers on the shop floor sometimes tried to circumvent parts acquisitions procedures. If they wanted a part, they went and got it rather than waiting through the acquisition cycle. This meant high-priority projects had to wait for parts that should have been allotted to them but got used, instead, for less important jobs.

With the security software in place, only people who are authorized to allot inventory can do so, he said, and inventory control has improved.

The system's simplicity has allowed Aerospatiale to assign maintenance tasks to its general systems staff members and to free programmers for development work. Programmers no longer spend any time at all maintaining access control.

Aerospatiale expects to extend its security umbrella even further late next year, when it begins equipping its technical field representatives with portable microcomputers.

Finmark said the portable micros, which will allow field representatives to exchange reliability and inventory information with the home office, will be secured under On-Line Software's Omniguard because they will access the host in terminal emulation mode.

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Makeshift recovery plan saves credit union after disaster

WASHINGTON, D.C. — Within hours after one of the largest fires in this city's history rendered a credit union's computer systems useless, the union began patching together a makeshift recovery plan that would keep its essential operations in service.

The U.S. Postal Service Federal Credit Union had no choice but to act fast in the wake of last year's fire. The union had made no arrangements for disaster backup or recovery, yet it needed a working system in order to dispense cash to its members on their payday — only three days away.

With some extraordinary help from its hardware and software vendors, the credit union met its deadline. But, according to Marsha King, executive vice-president, this fortunate outcome was far from assured.

AP/WIDE WORLD PHOTOS

This four-alarm fire set the credit union scrambling to assemble a recovery plan.

"It just happened in this case that our backup was an exceptionally well-functioning team that supported us far beyond the terms of our contractual agreements," she said. "One could not ordinarily expect to depend on this emergency service from vendors without a prearranged plan."

The four-alarm fire that sent the credit union on its urgent search for backup processing power was reported at 11:23 p.m. on Oct. 16, 1984. It started on the ninth floor of U.S. Postal Service Headquarters at L'Enfant Plaza and spread upward to the 10th and 11th floors before fire fighters extinguished it two hours later. Although the credit union's third-floor offices did not burn, they suffered heavily from smoke, water and chemical damage.

DP manager Ann Tran said she and King surveyed the credit union's computer room the next morning and found the union's host, a 2M-byte Digital Equipment Corp. PDP-11/70, soaked through with water. King called DEC's district office and asked for help.

The representative who answered the call said DEC could send a replacement immediately to the credit union's backup site. Tran's reply was strained, she said in a recent interview. "I don't have a site," she told the representative. "I don't have anything."

At this, the representative said he would try to arrange something with DEC's national headquarters. Two hours later, he called back to say the vendor would bring up a temporary replacement for the credit union's host at DEC's office in Lanham, Md., a 45-minute drive from Washington, D.C.

In the meantime, King and Tran contacted the credit union's software vendor, Users, Inc., to alert their representative there to the problem and to request help. The credit union stored its member data file and ran all of its services under Users' Datasafe financial services software system. Users' management promised to lend whatever help it could.

The recovery began in earnest two days later, Oct. 17, one day before Postal Service employees' scheduled Thursday payday.

Tran removed the credit union's data file tape from the L'Enfant Plaza office building and drove with it to DEC's Lanham office. There, representatives from DEC and members of the credit union's staff worked all day to bring up the system. Representatives from Users kept in touch over the telephone.

By early Thursday morning, the credit union was ready to go. At 3 a.m., King called a Users' employee for help with the system generation. "We did the sysgen together through the early morning hours," she recalled.

Once the system came up, King and Tran worked throughout the morning to post payroll data to members' accounts. On Thursday, the credit union set up a temporary office in a trailer at L'Enfant Plaza. It urged members to withdraw enough cash to tide them over for a few days; because of security concerns, the credit union had to limit trailer service to that one day.

Even after the credit union cleared this initial payday hurdle, it had a long way to go — almost four months — before it could return to normal operations. First, the union had to wait for an outside contractor to clean and bake each component and each wire of the PDP-11; the cleanup took a full month.

During this time, credit union employees had to travel from Washington, D.C., to Lanham every day to post information to members' accounts. Twelve-hour days and six-day weeks became the office norm, according to Tran.

In mid-December, the union moved back to its headquarters and began testing its hardware and software. After a week of tests, staff members had the system up and running. Clerks stopped traveling to Lanham and began posting accounts in the office.

The DP shop's troubles, however, continued well into February, according to Tran. She said the PDP-11 and its software had been so thoroughly contaminated that they could not handle their normal processing tasks. Despite the staff's constant efforts, the system crashed every night for almost two months.

Normal operations resume

Finally, everything worked as it had before the fire; the union resumed normal operations in February.

In the interim between the fire and the resumption of normal services, the credit union made arrangements with other government and private sector financial service institutions so Postal Service employees could make deposits and withdrawals. In addition, the credit union's Potomac, Md., branch office operated throughout the disaster recovery, and some Postal Service employees made their financial transactions there.

Tran said the credit union learned its lesson during the disaster and is currently pulling together a permanent recovery plan.

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Futuristic schemes

From page 56

to gain access. Identification can be determined with fingerprints, palm prints, voice prints, retina prints and signature dynamics (the characteristic motions a person makes with a pen or stylus as he signs his name).

Voice-print security systems have not yet emerged from development laboratories, but devices that make other types of biometric identifications are commercially available from a number of vendors:

- **Hand geometry devices:** Esselte/Ericsson, Stellar Systems, Inc., Mitsubishi Electric Corp. and Palmguard, Inc.
- **Retinal scanners:** Eyedentify, Inc.
- **Fingerprint readers:** Fingermatrix, Inc. and Identix, Inc.
- **Signature dynamics equipment:** Crossfield Data Systems, Inc., a U.S. subsidiary of the British company De La Rue Co.

Biometric technology has been around for many years, but to date it has been expensive. One of the least expensive commercial devices, the Fingermatrix Ridge Reader, costs about $3,500 per unit. Biometric products that cost one-tenth that price should be introduced in 1986, as several companies are currently working toward that end.

A problem of resources

Any personal identification product introduces a resource problem: An organization's host must store biometric identification data for all authorized users and must process verifications each time a user wants access to the system.

As a matter of convenience and economy, it would be useful to perform the biometric identification and verification process offline, at the entry point to the system. But this presents a local storage problem; it also provides an opportunity for security breaches because local data bases can be easily compromised.

Organizations that want to use biometric identification schemes need a local authorization technique that is totally secure and relatively inexpensive. Such a technique can best be implemented with smart cards, plastic devices the size of credit cards that contain embedded computer memory.

The computer embedded within smart cards is typically an 8-bit microprocessor with between 1K and 8K bytes of memory, and this memory can be segmented so that a portion of it cannot be accessed electronically.

With smart cards, an authorized individual's unique biometric identification data can be stored locally, as can that individual's level of access to specific hosts and specific files.

Each card can locally authenticate its bearer by comparing the bearer's actual biometric data with that stored on the card.

The combination of smart cards and biometrics goes a long way toward providing definite personal authentication. The system always knows whether an authorized or unauthorized person is attempting access. No passwords are required, and if a smart card is lost or stolen, it is useless to its illegal owner.

Many European and Japanese companies make smart cards, and foreign vendors are establishing themselves in the U.S. Micro Card Technologies, Inc., for example, represents France's Groupe Bull S.A.; Paymatec/Schlumberger represents France's Schlumberger N.V.; and Casio Micro Card Corp. represents Japan's Casio Computer Co.

Several U.S. companies are gearing up to produce smart cards, as well. Among these are Corpra Research, Inc., Smart Card International, Inc. and Smart Card Systems, Inc.

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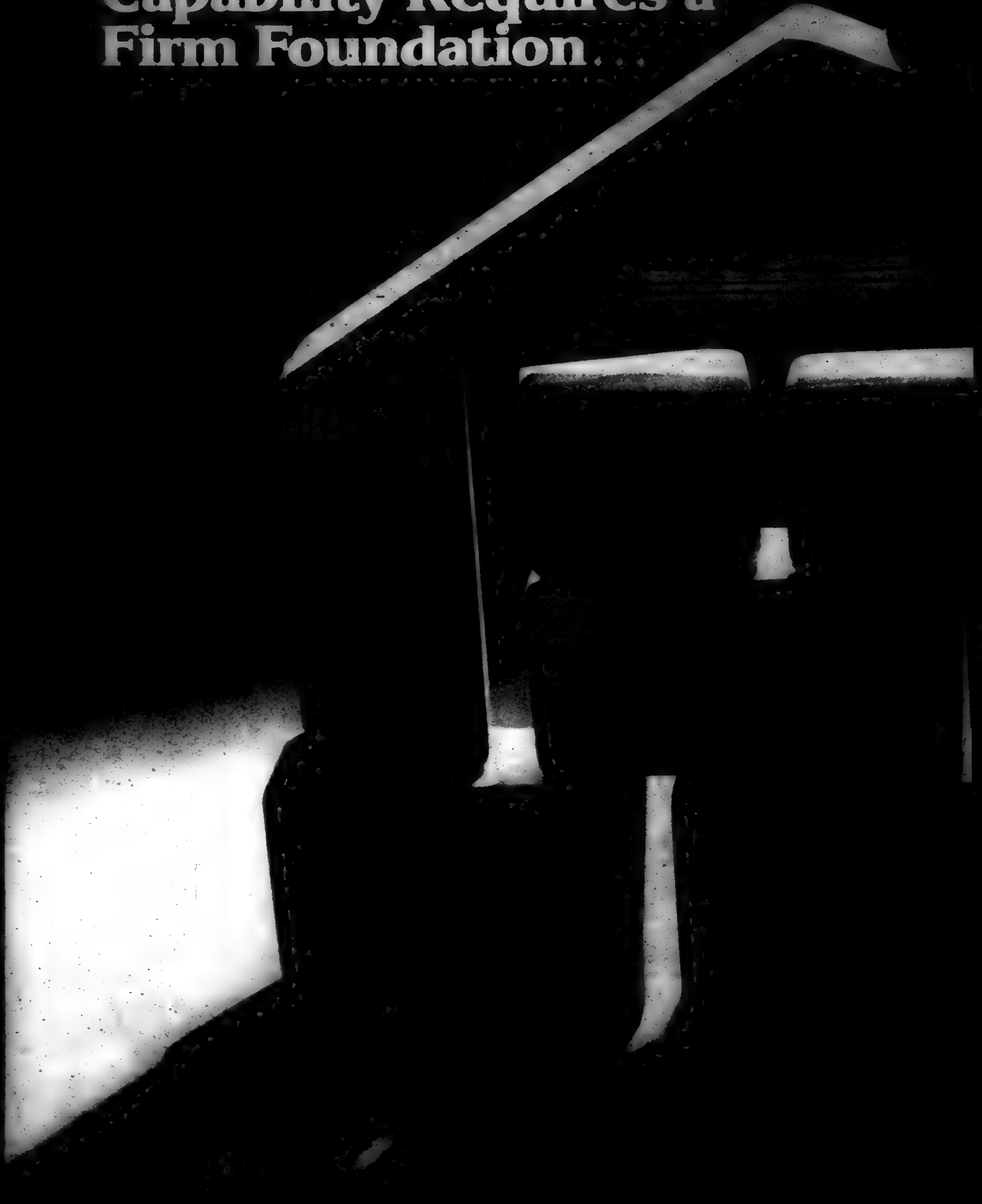

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How to assemble a comprehensive disaster recovery plan

A step-by-step guide to corporate survival

By Jeffrey E. Gardner
Special to CW

In the early afternoon of Sept. 28, 1983, a transformer exploded into flames next door to the data center at the First National Bank of Chicago. The coolant used in the transformer was polychlorinated biphenyls (PCB), which by itself is not dangerous. When burned, however, PCB produces dioxin, a compound that the Environmental Protection Agency considers one of the most highly toxic substances known.

As the fire marshal began making air-quality tests to determine whether the building was contaminated, the disaster recovery procedure was put into motion. The hot site was notified. Off-site storage was alerted. The recovery team was ready. An unacceptable air-quality test would have closed the 57-story downtown building instantly. Nothing could have been moved out — not one single magnetic tape. The building would have been sealed until the dioxin could be cleared away, a process that could take years.

As it turned out, the air-quality test was acceptable. Everyone went back to work the next day.

The First National Bank of Chicago was smart; it had a disaster recovery plan in place. If the primary processing center had been shut down, it would have been able to maintain its operations until it had a permanent relocation site.

Not all companies, however, have that much foresight. Security industry research has shown that 25% of the Fortune 1,000 companies do not have disaster recovery plans. Another 25% to 50% of the remainder have inadequate plans in place.

A proper disaster recovery plan ensures that an organization will survive most physical disasters such as floods, earthquakes or hurricanes, along with accidents such as fires or intentional acts of destruction. It encompasses all activity, personnel, supplies, equipment and procedures for a smooth transition to recovery processing and the return to normal processing.

The first step to designing a disaster recovery plan is to decide which applications are critical to your organization and whether they must run uninterrupted through a recovery period.

It is helpful to assign a "maximum acceptable outage" duration to each application. For example, if your organization has funds transfer applications that need to be up and running within an hour after a disaster, that should be noted in your disaster recovery plan. Performing a thorough applications risk analysis on the organization's work will define the high-priority applications in an installation.

The second step to designing a disaster recovery plan is to decide upon a place to go during recovery (see story page 71). An organization has several choices:

- It can subscribe to one or more hot sites.
- It can subscribe to a shell site.
- It can build its own disaster recovery center.

The third step is to outline all actions and procedures that should occur during recovery. The end result of this step is a master outline of procedures, inventories and personnel that is required to process the recovery work load. A copy of this document should be kept off-site with other vital records.

The detailed plan

A disaster recovery plan is based on documentation and procedures that are used in the normal production environment; the better that applications are documented for day-to-day operations, the easier it will be to develop and test a recovery plan.

A comprehensive data center disaster recovery plan should include 12 basic elements:

- **Objectives and assumptions.** The types of disasters addressed by the plan should be defined, and the conditions required for successful recovery should be identified.
- **Definition of recovery teams.** The recovery teams and individual staff member's responsibilities need to be defined. Questions such as, "Who will do what work?" and "Which team will do which task?" must be answered.
- **Vendor notification procedures.** This section of the recovery plan provides management with each vendor's emergency numbers and equipment lists, software or other resources that have been provided. Perhaps preprinted forms such as checks will be required. Equipment serial numbers and model numbers, along with maintenance contract

See ASSEMBLING page 71

Gardner is the vice-president of CHI/COR Information Management, Inc., a Chicago-based consulting company that specializes in disaster recovery planning.

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Choosing a backup facility: Check staff, hardware, extras

By John F. Sensenich
Special to CW

The selection of a data processing backup facility, or hot site, grows in importance with the level of computer dependence in a company. The greater the reliance on computers, the more vital a hot site becomes.

Managers interested in contracting with a hot site facility for a backup site can do so with a minimum of trouble if they know what to look for.

The following is a checklist of hardware, staffing and features that most reputable hot sites provide.

Hardware

A quality hot site should provide the hardware and services needed for an organization to pick up its data processing responsibilities immediately after a disaster.

The hardware basics include the following:

- CPUs.
- DASD.
- Front-end processors.
- Tape drives.
- Laser printers.
- Network equipment.

Since hot site facilities with various equipment configurations are available throughout the U.S., it is important that management chooses a hot site facility that offers hardware compatible with the equipment that is currently operating. Hot site equipment should not only be compatible with the organization's equipment, but also it should be in use and running smoothly.

Managers should look long and hard at any hot site representative that assures them that a new piece of equipment, which is vital to an organization's needs, will be installed in the very near future or in the event of a disaster.

Additionally, management should try to ascertain if the backup facility regularly upgrades its equipment to keep pace with new technology. This can be done by asking the vendor for its published migration plans.

Hot site staffing

The best equipment in the world is next to worthless without skilled people to operate it. A hot site facility should employ a core group of staff members that will help an organization move swiftly to implement its contingency plan when needed. These people should represent several disciplines so that every phase of the backup operation is professionally implemented, including start-up, testing and actual disaster planning. These staff disciplines include the following:

Telecommunications specialists. Engineers and technicians should be available to help develop, design and implement an organization's network hot site requirements. When an emergency is declared and the hot site must be occupied, these professionals can provide testing and troubleshooting assistance.

Systems programmers. Some hot sites provide systems programmers to help bring up a corporation's applications in the least amount of time. These systems programmers should be well versed in all the major operating systems in the hardware environment.

Customer support representatives. These DP professionals provide services such as documentation, configuration information, test scheduling and so on. Good customer support representatives can assure the subscriber of the successful use of the facility in test and/or disaster situations.

See CHOOSING page 72

Sensenich is the director of the Sungard Recovery Services Center, an IBM disaster recovery services provider based in Philadelphia.

Assembling a recovery plan

From page 70

numbers or other pertinent information that is needed to replace damaged equipment, should be provided.

- **An action plan for the recovery process.** This plan should provide details for all aspects of the recovery process, from the time of the disaster to the return to the rebuilt data center. A step-by-step guide of the actions needed to make a smooth transition from your damaged primary site to the recovery site should be detailed. Moving plans should include detailed instructions for moving to the recovery center, equipping and moving to shell sites and rebuilding/returning to the stricken primary data center.
- **Vital records recovery.** These documents should list locations and media for all records, both computer-readable records and manual documentation.
- **Detailed software configuration.** These documents should detail the software and software-reconstruction procedures necessary during initial recovery at a shell site and at the primary data center.
- **Applications priorities and operating procedures.** Specific, detailed instructions need to be provided at this point for processing all priority and nonpriority applications. Remember, high-priority applications were determined in the first step when risks were assessed.
- **Equipment inventory and configuration.** An equipment inventory complete with configuration information for the initial recovery center, shell site processing and the primary data center should be provided.
- **Telecommunications requirements.** This section should list in detail all of the telecommunications requirements of the initial recovery center, the shell sites (if required) and the primary data center.
- **Data center security.** Information needed to establish immediate security at the recovery site, any required shell site and the primary data center should be detailed.
- **Plan maintenance.** It is critical to review a disaster recovery plan frequently and include ongoing update procedures to reflect changes to your environment as they occur. After each review, the plan should be updated with current information concerning personnel, equipment, application priorities and the like.
- **Plan testing.** Once a disaster recovery plan has been designed, it should be tested. A test for each of the 12 sections of your plan should be devised. Each test needs its own detailed procedures and expectations.

Whether it be an act of fanatics or an accident, the company that develops its disaster recovery plan today will be the survivor of tragedy tomorrow. It only takes one disaster to be out of business.

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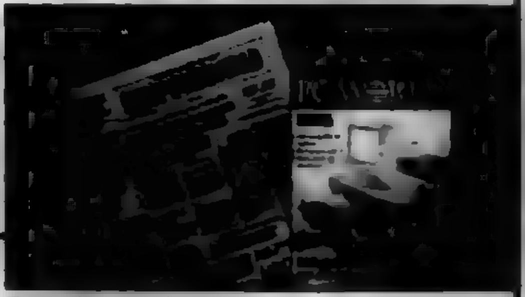

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Micros linked into local-area networks need access controls

Users pose greatest threat to data security

By Paul Shaw
Special to CW

Large-scale computer systems traditionally use a variety of access control measures to protect data from unauthorized access. When microcomputers are viewed within an organization as stand-alone, single-user units, such measures usually are not considered necessary or practical.

But when microcomputers are more widely used, and when they link into existing system networks, the need for adequate access control exists.

When microcomputers are linked together in a local-area network, relatively simple procedures for access control should ensure the following:

- All users are identifiable.
- Adequate user verification is performed by passwords and IDs.
- Network access points are not left unattended once verification of a user has been completed.

The user threat

Perhaps the greatest threat to data security in a local-area network is the corruption of data by the users themselves. Controls must be in place to guard against access to sensitive data by people who are not authorized or from simultaneous update by two different users. Confidential memos and data that were once hand carried between offices or delivered in sealed envelopes can now be sent via electronic mail and may be read by anyone on the network unless adequate security controls are in place.

Microcomputers with access to mainframe data should be required to use the same access control procedures as any other dumb terminal. Standard procedures should include user identification with verification via password or key.

Users, however, should not store their identification and passwords on the microcomputer as a convenience measure to perform an automatic logon — this will negate any security facilities in place on the mainframe since the microcomputer itself may not be totally secure. As with other terminals connected to the network, microcomputers should never be left logged on and unattended so that unauthorized individuals can use the computer resource and gain access to sensitive data.

A microcomputer, unlike the vast population of the currently installed dumb terminals, is capable of storing and processing the data it obtains from the mainframe. Once critical or confidential data is moved from the relatively secure environment of the mainframe computer to the microcomputer, the microcomputer user and the organization must take additional precautions so that the information is not compromised. Alternative procedures can be developed depending on the nature of the data.

For highly sensitive data, an acceptable procedure would be to download the data to the microcomputer, analyze and process the data and then return the data to the mainframe computer for more secure storage. None of the critical data should be off-loaded from the microcomputer and stored on diskettes that may be stolen or used by unauthorized personnel. If the data must be kept at the microcomputer site, products that will encrypt the data should be used so that casual browsers or thieves cannot easily decipher the data on the diskettes.

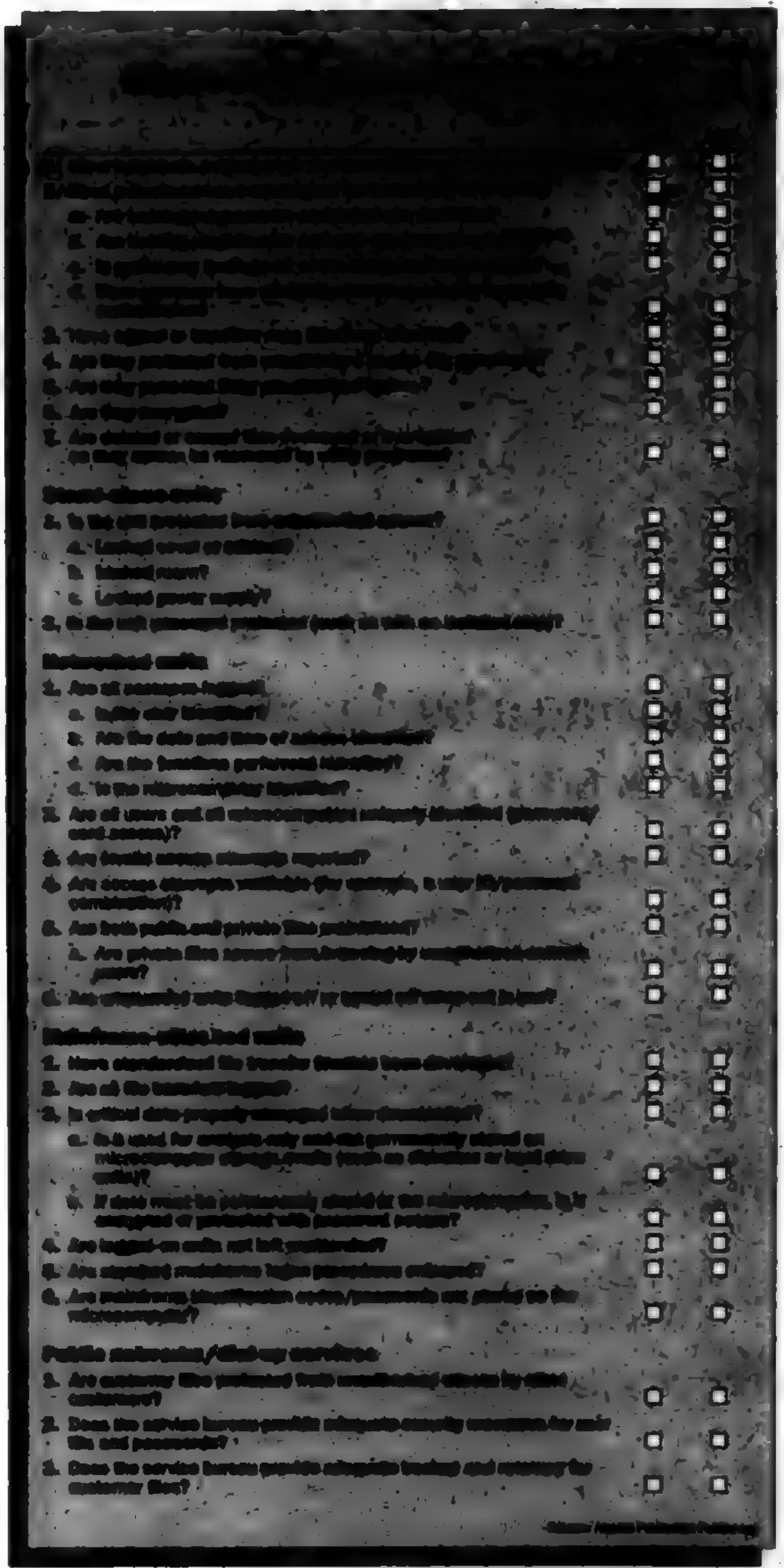
Dial-up access

Dial-up access for microcomputers has become an attractive service for users with occasional needs to access mainframe files. But a dial-up port waiting for a phone call can be a tempting target for an information thief.

Access to dial-up telephone numbers should be restricted, and individuals who do have dial-up privileges should be aware of the security implications of distributing the access number. It's expected that once a dial-up link has been established, some type of verification of the intended user will take place.

A good mainframe security system should be monitoring dial-up lines so that repeated failed access attempts alert an operator or automatically disconnect the line. A dial-back device can also be used to minimize invalid access attempts. Once a user has dialed into an information network, these devices disconnect the caller and dial a preestablished number for that user. Not only must the user be valid, but the request must come from a valid location.

Shaw is publisher and editor of Data Processing and Communications Security *magazine. This is based on an excerpt from "Microcomputers — A Checklist of Security and Recovery Considerations," available free from Assets Protection Publishing in Madison, Wis.*



Access controls are needed when microcomputers link into an existing system network in a corporate environment. This checklist presents key questions to consider when establishing microcomputer access control guidelines.

Choosing a facility: Check staff, extras

From page 71

Recovery operations specialists. These specialists will work with an organization's operations personnel to provide them with the tools and the access needed to use all the on-site equipment properly. They should be available to subscribers during all testing and disaster situations.

Administrative staff. These staff members ensure the accurate shipping and receiving of tapes. They also assist the customer in setting up its offices at the hot site and to provide security.

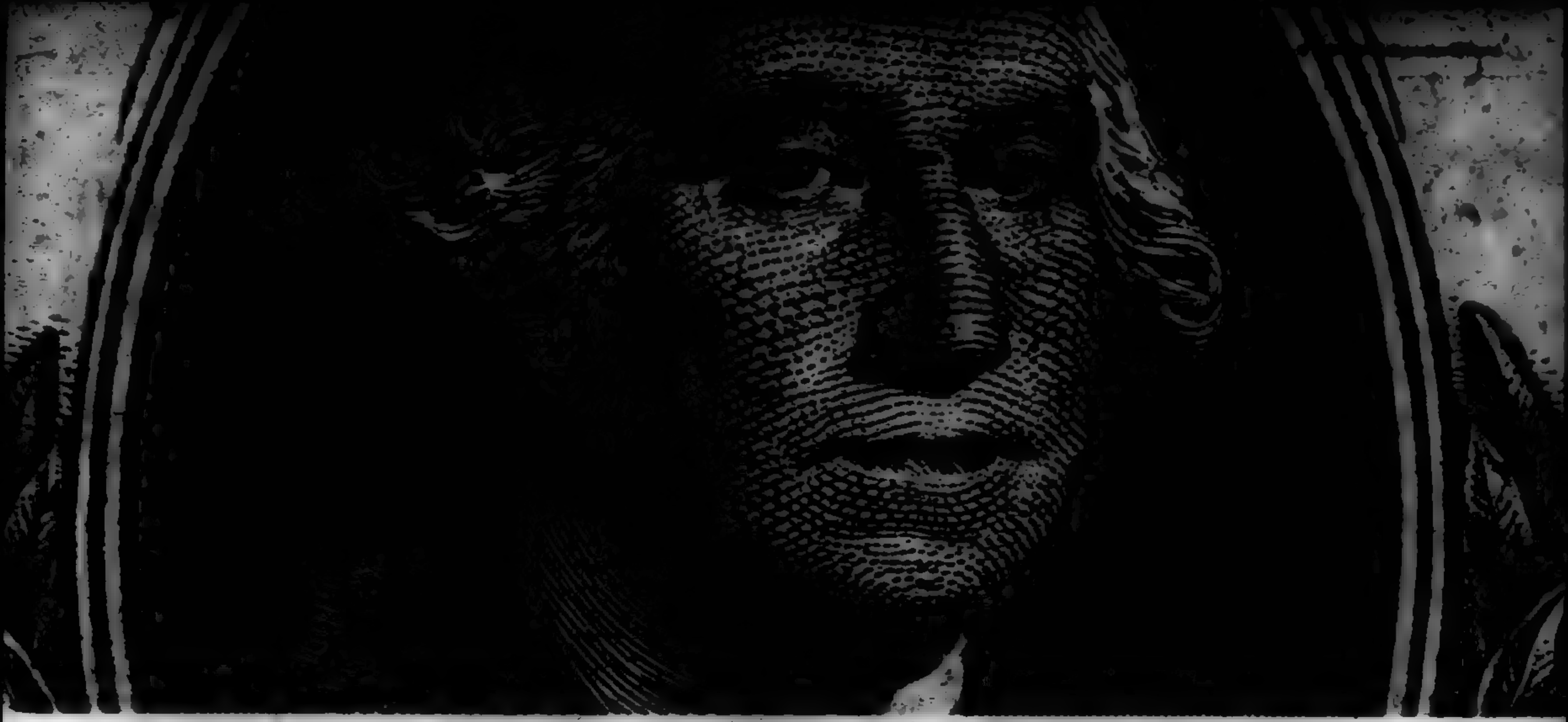
Consulting services. Some hot sites provide consulting services for ongoing assistance in contingency planning.

Features

A disaster recovery facility should also include certain other features, including the following:

- A fully prepared cold site (shell facility with chilled water piping, air-conditioning, fire and security equipment) ready for installation of the subscriber's own equipment if needed.
- A technical manual library for subscribers.
- A complete guide to the use of the facility.
- Start-up workshops.
- Adequate office space for subscribers.
- Creature comforts for subscribers during extended tests or actual disaster.
- A good physical location that is situated in a secure area, close to public transportation and not in an area prone to natural disasters.
- Quality and quantity telecommunications services to meet subscriber demands.

Most importantly, a reputable backup facility vendor must provide its subscribers with equal access to all of the equipment for which it is contracted. No customer or group of customers should receive preferential treatment in terms of the use of the hardware and support staff.



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Special Report

Audit tools promote tight security independent of DP staff

By Ann Levine Wolf
Special to CW

Off-the-shelf audit software tools — prewritten programs that assess the validity and accuracy of systems operations and output — promote tighter security than other auditing aids because they allow auditors to work independently of the DP staff.

The programs automatically capture user- and event-oriented data, analyze the information, document it and format it for management reports. They also compare original and modified programs to verify the accuracy of changes.

Without these packaged tools, auditors must depend on in-house programmers either to analyze systems manually or to write customized routines that do the job. In either instance, the auditor compromises himself by relying for help on the very people whose work he is calling into question.

To grant auditors the freedom that packaged auditing tools allow, an organization's management must understand what types of products are available and must choose the ones its auditors will find most useful.

There are two major categories of packaged auditing programs: those that audit data and those that compare source codes.

Data audit programs. One of the auditor's roles is to sample transactions to make sure the system processes them correctly. Data audit programs help by examining computer files, establishing data validity and producing reports. The audit programs extract data, do file handling, calculate formulas and complete footing values. Some programs also include routines for writing letters and preparing reports.

The programs vary in their ease of use. One of the most popular ones, EDP Auditor from Cullinet Software, Inc., features canned routines that require few manipulations; nontechnical auditors can use these to their advantage. More technical auditors have the option of rewriting the canned routines to develop specialized methods for auditing unique applications and systems.

Before an organization chooses a data auditing program, its MIS manager should gauge the audit team's level of technical expertise and determine the willingness of team members to master complex routines.

Before selecting a data audit program, the MIS manager should also see that the product supports the same type of data structure as the organization does, be it fixed, variable or both.

To use a data audit program, an auditor enters a request via a terminal, a punched-card reader or a magnetic tape. The program then retrieves all requested data from the host's files, performs the necessary calculations or analyses and presents the information in the requested or predetermined format.

Audit programs will perform some or all of the following tasks:

- Data sampling, including interval, random, statistical and monetary value sampling.
- Data calculation, summarization and resequencing.
- Detection of rule violations.
- Financial analysis.
- Frequency distributions and histograms.
- Linear regression with the creation of scatter diagrams.
- Trend line analysis with the creation of scatter diagrams.

In addition, some programs include data directories that store the data names and column headings that will be printed on future reports. Auditors use the data directory as a control point to maintain all descriptions of relationships, elements, formats and attributes. If a number of auditors contribute to a single audit or if one auditor will follow up later on another's work, the control that a directory offers can improve consistency.

Many packages also feature audit trails that constantly log users' data base modifications. During an audit, the auditor will review printed or on-line reports of the activity that the audit trail has captured.

Source code comparison programs. In addition to checking individual transactions, the auditor must make sure full systems have not been compromised by faulty modifications. Source code comparison programs, which match different versions of source code against each other, help the auditor perform this task.

The auditor merely runs the comparison program against historical versions of the code and makes sure recent versions generate results that are similar to those the older versions produce. He makes sure that all differences the program uncovers agree with notations in the shop's change control log; if they do not, the auditor reports the problem.

See AUDIT page 79

Wolf is an associate editor for "Datapro Reports on Information Security," a loose-leaf reference service offered by Datapro Research Corp. of Delran, N.J.

SPECIAL REPORT

Forecast '86

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Special Report

Zoning concepts structure physical security planning efforts

By Richard J. Bessenhoffer
Special to CW

Because no two buildings and no two data centers are the same, every organization's physical security plan requires different components. Any shop can benefit, however, from structuring its physical planning efforts around a general concept known as security zoning.

Zoning depends on physical and functional partitions for the protection of resources. To implement the concept, organizations must take three types of action:

- Establish physical zones.
- Monitor the movement of employees and materials.
- Control security efforts from a central spot.

Physical zoning. An organization's effort on this first front should begin at the building's outer perimeter and work its way into the data center itself.

At the outermost perimeter, zoning requires a number of steps. Organizations should, for example, establish separate vehicle-access points and separate parking lots for employees and visitors. Both efforts allow for the positive control of vehicles and for the protection of employees' property.

The organization should, if possible, designate separate building entrances for employees and visitors. This approach promotes controlled and efficient movement of people and materials into and within the building. It should minimize any threats to areas in which computer resources reside.

Within the data center itself, an organization should implement zoning as a physical compartmentation of functional areas — one to a room. The computer room, for example, should stand apart from the data entry department and the data entry department apart from the telecommunications center. Organizations should also keep I/O, storage, computer-output microfilm and support system equipment in separate rooms, all of which should lie adjacent to the computer room and have immediate, controlled access to it.

Compartmentation of functional areas within the data center helps an organization enforce its employee traffic patterns and preserve the integrity of its security and operations plans. Zoned areas also offer high levels of security and logical maintenance of work flow patterns.

Monitoring. Once an organization physically separates its functional areas, it must install security systems to control the movement of people and materials within and between zones.

An effective device for controlling movement is a card-activated access system consisting of card readers that are placed strategically to channel traffic into and through different zones. Levels of access authority should depend entirely on employees' need to enter sensitive areas. All nonessential traffic poses a threat to the data center.

A network of doors and gates fitted with alarms can further help an organization channel its pedestrian traffic. These barriers should stand wherever necessary — both between and within zones — to prevent wanderings outside of routine traffic routes. Emergency exits, for example, should be identified and monitored.

Every organization must, of course, make sure its entire access-control system complies with municipal life safety codes regarding means of egress. No security measure should work to trap employees if an emergency arises.

Motion detection devices like closed-circuit television systems can work in conjunction with access-control measures to track unauthorized activities in remotely located areas. These include storage rooms, stairwells, crawl spaces, equipment rooms and executive offices.

Closed-circuit television systems have the potential to clash with the corporate image. Cooperation between the security director and the building architect should help an organization attain effective security through discreet installations.

For most firms, access control and closed-circuit television systems should suffice for monitoring movement within and between zones. But companies whose data center is located on the first or second floor of a building that has glass perimeter walls may require an additional system, one composed of sound attenuator sensors. These sensors detect the cutting or breaking of glass and sound an alarm signal within the security monitoring station.

Central control. An essential element of the overall security posture is the capability to monitor and control the various systems, subsystems and components that make up the security system, including fire pro-

See ZONING page 79

Bessenhoffer is vice-president of facility design and security for Total Assets Protection, Inc., a computer security consulting and architectural/engineering firm based in Arlington, Texas.

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Special Report

Four crucial elements form basis of security zoning plan

To put the concept of security zoning into practice, an organization must take specific measures that address four areas of concern:

Lighting. Proper lighting plays three important roles in security: It helps a firm maintain normal operations, ensures employee safety and promotes the effective use of surveillance equipment.

Standard interior lighting levels suffice for most areas, but zones equipped with closed-circuit television systems require special attention. If an area under closed-circuit surveillance is inadequately illuminated, it will have to be monitored by low-light-level cameras. These cameras are expensive, and they drive up the cost of the closed-circuit television system.

Organizations must also pay special attention to their exterior lighting designs. Outside lighting is usually soft to complement the aesthetics of the building and its grounds. But exterior lighting must provide enough illumination for cameras to produce high-quality videos. An organization's security director and its building architect should try to agree on some middle ground.

Building construction. The construction of the computer center plays an equally vital role: It can protect against the spread of fire, prevent most attempts at forced entry and help maintain environmental controls.

Organizations should surround their computer rooms and associated areas with walls, ceilings and floors that have two-hour fire resistance ratings. Walls should also include vapor barriers that help maintain a controlled environment within each room.

Building designers should avoid glass, because glass doors and windows cannot provide sufficient protection against the spread of fire. Moreover, glass serves to increase the data center's visibility and, in so doing, reduces an organization's overall security posture.

Fire protection. Fires rarely break out in computer environments, but when they do, their impact can be catastrophic. To prevent widespread damage, every organization should institute fire protection as a major element of its computer center security plan.

In addition to installing fire-resistant barriers around the computer center, every organization should take steps to promote speed, accuracy and efficiency in detecting and extinguishing fires and in alerting and protecting employees.

Automatic detection systems should rely on devices that detect particles of fire and smoke in the air. The two most common system types rely on either ionization detectors or photoelectric detectors; these are sufficient for most purposes.

To aid in extinguishing fires quickly, automatic detection systems should interface with automatic suppression systems. Halogenated suppressants are most effective. Halon discharges quickly and extinguishes fires rapidly. In addition, it has the ability to penetrate computer component cabinetry. All of these abilities serve to keep downtime minimal.

Some municipalities or insurance firms may require their business constituents or customers to use water for fire supression. But water and highly energized equipment simply do not mix. If an organization must install a system of water sprinklers, it should install the system as a supplement to its halon system — not as a replacement.

To be effective in alerting employees, fire alarms must be distinct from all other alarms in the facility. In addition, the alarms should be capable of warning personnel of different stages in the progression of a fire.

Another crucial element of the fire protection plan is an employee training program. An organization must educate all its employees so they fully understand the system, have no fear of its intent or operation and recognize it as a preventive measure to a life-threatening condition.

Local fire authorities often provide help with employee training programs, and their value extends to other areas as well. If an organization keeps its local fire department abreast of its security measures, the department will respond well to any emergency. Security directors should keep this in mind and maintain a strong liaison with the fire department. In any case, most business fire protection plans require the approval of local fire authorities.

Mechanical and electrical support systems. Computer operations depend totally on systems for air-conditioning, chilled water and power generation, among other requirements. Because of this dependence, these systems must stay as secure as any others.

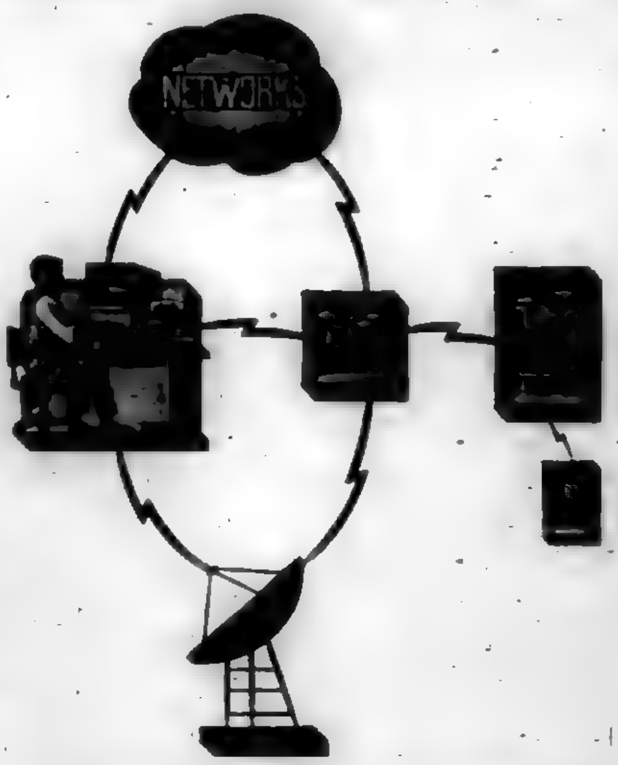
Some or all of these systems, however, reside outside of the secured computer center (in cooling towers, chilled-water condenser farms or transformer pads, for example). The security plan for the computer center, then, must extend to these usually unprotected areas.

— Richard J. [illegible]

Se·cure·Net™

\si-kyoor´-Net\, *pron.* **1.** Family of products from Digital Pathways, Inc. allowing organizations to manage the secure access to data at the workstation, computer and network levels. **2.** A systems solution to information security comprising the Defender II Computer Access System, Encryption Products and Personal Identifiers. **3.** An integrated approach to implementing the data security you need as you need it.

lead·er \lēd´ēr\, *n.* **1.** One who goes ahead or in advance. **2.** Digital Pathways' position in the information security marketplace. ■ Single vendor solution ■ Direct sales/service ■ Large installed customer base ■ GSA, UL, FCC approvals.



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Headhunter offers tips on hiring security professionals

By Cameron Carey
Special to CW

The most elaborate security controls will do little good if an organization hires the wrong people to implement and maintain them.

Without a great deal of study, no outsider can gauge any one shop's particular staffing needs. But general rules for hiring security professionals apply across the board. Any shop large enough to warrant a comprehensive security plan needs a dedicated, competent security staff to keep that plan on target.

In most medium-size firms — those with between 150 and 250 MIS staff members — the MIS manager should concentrate on hiring a core staff of four security professionals:

- An information security administrator.
- A data access control specialist.
- A data access control analyst.
- A contingency planning specialist.

Larger firms, of course, can hire two or more people within each job category, and smaller firms may want to give two or more tasks to one person. No matter what a shop's size, however, its MIS manager must find people with the abilities to fill each role.

Security administrator. This employee is responsible for securing all information that the organization deems important to itself and its customers — regardless of storage or processing medium.

To find a person with the ability to carry out this duty, the MIS manager should look for applicants with three general strengths: a strong sense of office politics, excellent communication skills and a substantial amount of experience in security.

Other useful traits are a high threshold for frustration, a great deal of cooperativeness and a willingness to do whatever must be done to resolve problems before they land on top managers' desks.

More specifically, the person who fills the administrator's slot should have solid experience with plans, cost/benefit analyses, policies, standards, data access control schemes, systems reviews, micro-mainframe and communications security procedures, contingency planning efforts, employee security awareness programs and administrative controls.

Anyone who has a managerial or project management background in DP, security or controls should fit the bill to some extent.

Annual salaries for people who excel in this position generally range from about $48,000 to $65,000.

Data access control specialist. This senior-level employee is responsible for implementing logical access to data. He makes sure that workers who need to find special information can do so and that people who do not need the information cannot get it.

The traits the MIS manager should seek in a data access control specialist are an understanding of the far-reaching repercussions of access control, an ability to communicate well and the experience to make judgments about access control packages.

Strong candidates for this position will have logged between three and five years of experience as a DP analyst, with hands-on use of a popular mainframe access control package. Anyone who has gone through the effort of comparing different vendors' offerings is especially well qualified. Experience with definitional problems — data ownership or departmental vs. individual access to data sets, for example — also weighs in an applicant's favor.

Increasingly, the problems of limiting microcomputer access to mainframe data will fall on this employee's shoulders, so experience in micro-mainframe links cannot hurt.

Senior data access control specialists generally earn between $38,000 and $45,000 a year.

Data access control analyst. This employee, who supports the data access control specialist, takes responsibility for daily administration of the security system. The analyst also generates reports and reviews security violations.

Strong candidates for the job will understand how to operate a security system and make use of its various features. They will be able to investigate unauthorized access attempts, establish administrative controls and procedures and help users understand how to cope with access control software.

To do these jobs well, applicants must understand how to use security software tools with proficiency; a two- to four-year background in DP is essential.

Access control analysts' annual salaries generally range from $31,000 to $35,000.

Contingency planning specialist. This senior-level employee sets up

---

Carey is founder and president of Computer Security Placement Service, Inc., a recruiting firm based in Northboro, Mass.

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the plan that will keep the organization functioning should a hurricane or fire knock out the data center and follows through with that plan if such a disaster actually strikes. The person in this position also develops and documents a plan for bringing operations back to normal after the disaster passes.

MIS managers should look to hire a person who has proved, in a previous job, that he can integrate security and organizational plans, research different types of backup site strategies and initiate efforts to determine which of an organization's hardware and software systems are essential to its business.

In addition, anyone who takes on an organization's contingency planning role must be able to develop teams of emergency workers and to keep communication flowing among team members if a disaster occurs. The candidate should also have the skill to prepare press releases in case an organization's operating problems must be explained to the public.

Annual salaries for these professionals typically run between $38,000 and $45,000, depending on total responsibility and geographic location. Mid-level analysts who support the contingency specialist usually earn between $35,000 and $39,000 annually.

Annual payroll budget — DP security staff*

Security administrator	[illegible]
Access control specialist	[illegible]
Access control analyst	[illegible]
Contingency planning specialist	[illegible]
Total	[illegible]

*This core security staff is recommended for companies with DP shops of between 150 and 250 DP professionals.

Source: [illegible]

Specialists for special needs

Any organization that promotes substantial efforts in data communications or microcomputer use should also consider hiring security professionals who specialize in those fields.

Candidates who seek to manage an organization's micro security should have worked for two years in a data access control position. With this background and some experience in using and evaluating micros, they should have no trouble learning the specifics of micro security.

Applicants who want to manage communications security should have research and evaluation experience with security tools such as encryption and dial-up devices. If an applicant is familiar with such tools and has a solid technical background in communications, he should be well suited for the job.

Salary information for these specialists is sparse. An educated estimate, however, would indicate that micro security professionals earn between $40,000 and $45,000 annually and communications security professionals earn between $45,000 and $50,000.

Audit tools promote security

From page 74

Vendors offer source code comparison programs that compare different types of elements.

Packages also differ in their capabilities. Some only compare entire programs; others compare specific areas within two programs. Still others look for similar text anywhere in the code, ignoring the line numbers of the two program codes that are under comparison.

Auditors find this option especially helpful if the organization's programmers do not follow a specific numbering scheme.

Organizations can also purchase packages that make comparisons between two source code libraries. These products generally let the auditor choose whether to compare entire libraries or selective subsets of libraries or to make comparisons only between elements that appear in both libraries.

Some source code comparison programs generate output to either printers or display terminals. If an auditor is comfortable using a terminal to verify a program's code, the display option lets him eliminate unnecessary paper output.

An organization's data audit software package may include source code comparison features. If it does not, the MIS manager should not hesitate to purchase a stand-alone program that does.

Zoning concepts structure efforts

From page 76

tection and environmental networks. This usually requires a central security console.

The console should be the termination point for all card readers, alarm sensors, fire protection systems and other devices that require constant monitoring.

From the console, trained security personnel can monitor the status of all systems and evaluate activities occurring in the protected areas. They can also respond to emergency conditions and keep management informed of the security posture.

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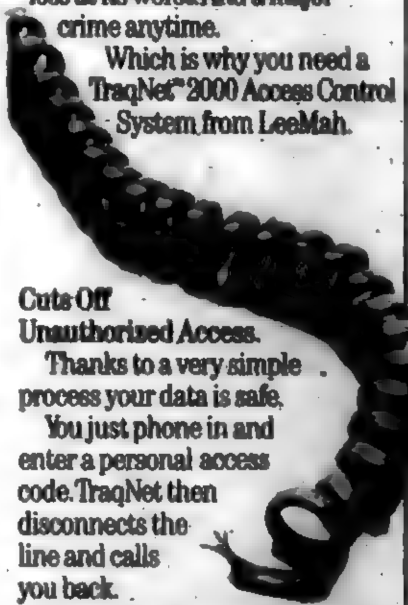

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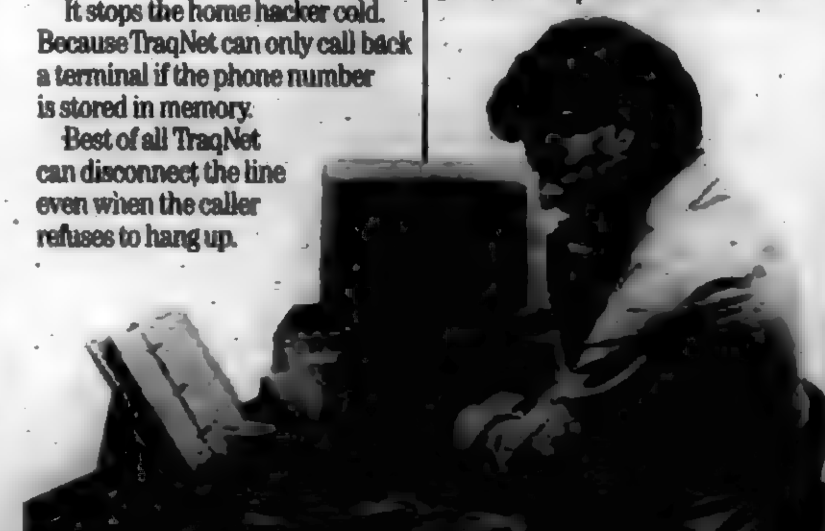

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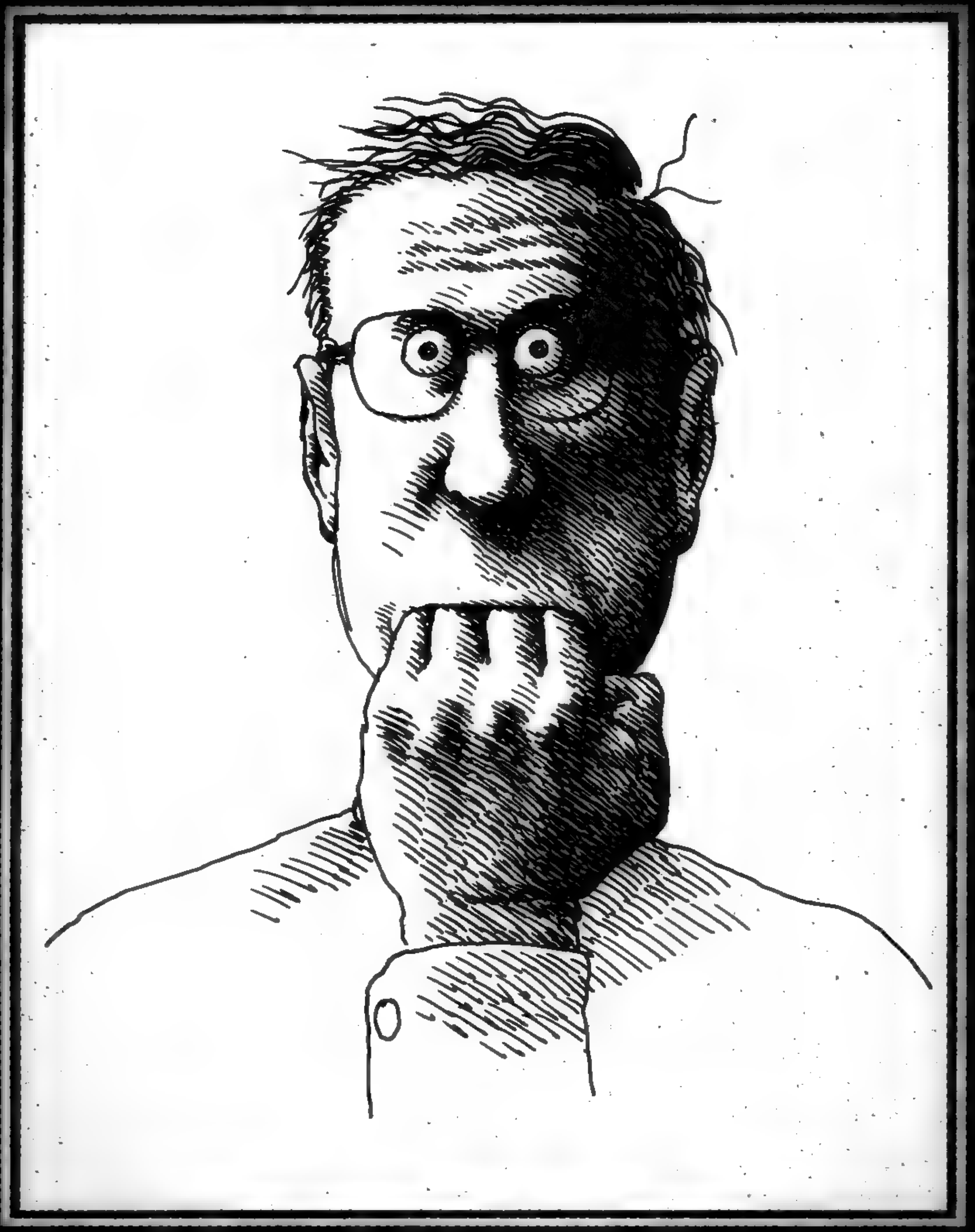

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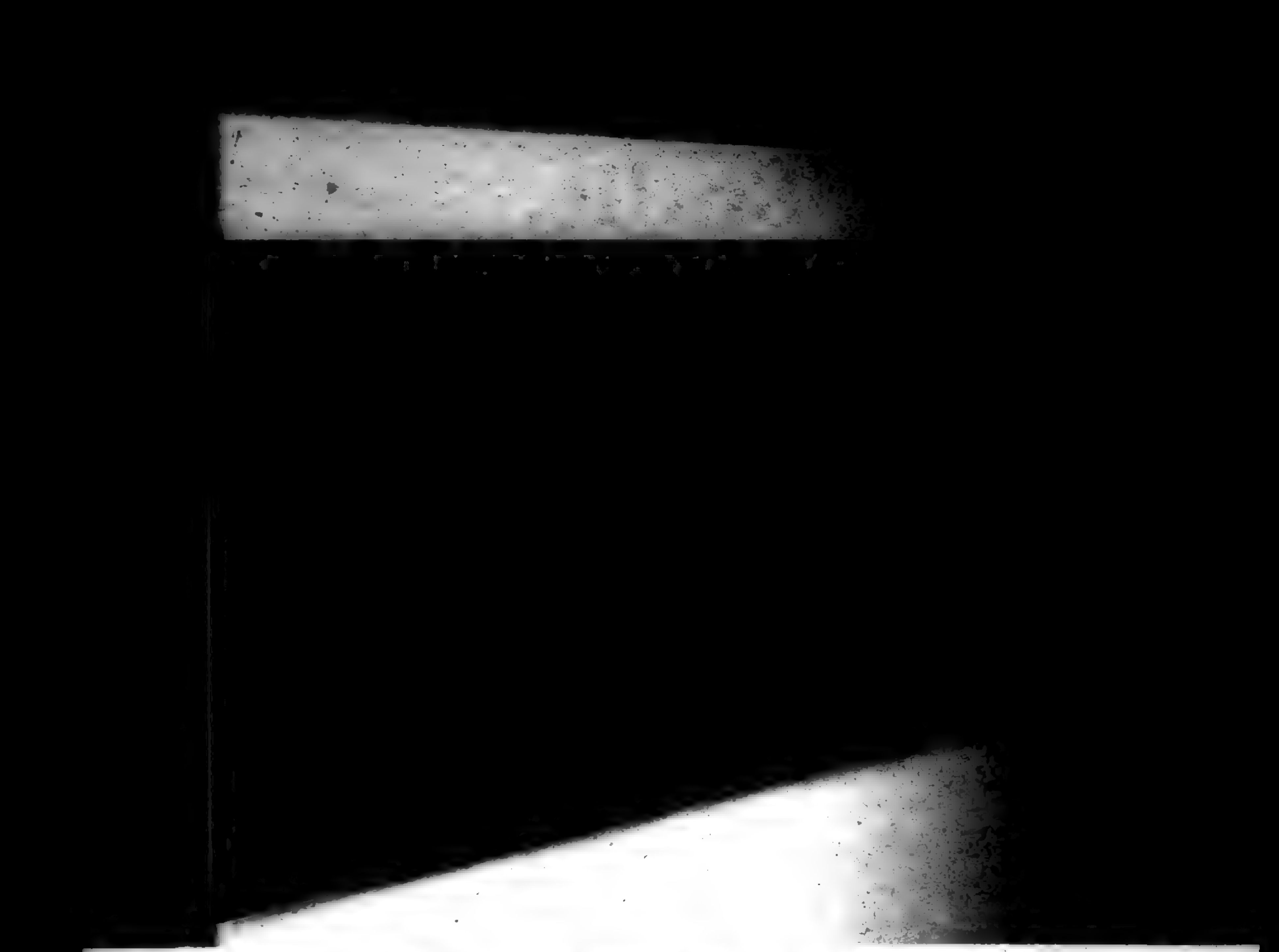

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NEW PRODUCTS

Insystec office system bows

Integrates processing, communications equipment

Insystec, Inc. of Winter Park, Fla., has introduced an office automation system that integrates the functions of many types of information processing and communications equipment.

The system, based on a voice/data workstation, is offered in three compatible models: the Executive, which is portable; the Professional, which has a tilting 25-line CRT terminal that fits on top of the basic computer unit; and the Secretary, with a tilting, swiveling 27-line CRT terminal mounted on a pedestal.

The Professional workstation

The basic workstation contains a microcomputer with integrated word processing, spreadsheet, data base, graphics and communications software, a video display and keyboard, a 3½-in. disk drive, a complete Ethernet local-area network interface, a modem, a private branch exchange (PBX)-compatible telephone, a telephone answering machine, a speakerphone, a dictation machine, electronic mail with digital voice messaging and an officewide electronic calendar. It provides interfaces to various other devices including Winchester drives, printers and telephone headsets.

The computer's proprietary operating system permits change from one application to another, provides a multitasking windowing environment and accepts Microsoft Corp. MS-DOS as a guest operating system. The communications software includes terminal emulation for Digital Equipment Corp. VT100 and IBM 3270, and 1M byte of random-access memory (RAM) is standard.

Each workstation's telephone provides two-line capability, tone or pulse dialing, automatic directory dialing and autoredial. It can be used with an office PBX or a normal direct line.

The built-in modem will transmit at 300 and 600 bit/sec. in both half- and full-duplex modes and at 1,200 bit/sec. in half-duplex mode. It meets AT&T 202 as well as Consultative Committee on International Telephony and Telegraphy specifications. The Ethernet local-area network sends information as fast as 10M bit/sec.

The Insystec integrated voice/data workstations are being marketed to OEMs. The price for each model is $4,000. The workstations will be available during the first quarter of 1986.

Telecomputer workstation debuts

Compushop, Inc. of Dallas, a wholly owned subsidiary of Bell Atlantic Corp., announced that it will sell a version of Compaq Telecommunication Corp.'s Telecompaq workstation, which combines a personal computer with built-in telephone and data communications features.

Carrying a base price of $4,195, the Alex Telecomputer was designed to collect, analyze and communicate information. The unit accesses phone features such as speed dialing and automatic redial as well as computer features such as a phone directory, electronic mail, a personal calendar, an electronic notepad and a calculator. Functions are accessed by touching a button labeled with the function name.

The unit inclues 80 programmable private branch exchange features, a speakerphone, tone or pulse dialing and last-number redial.

Alex uses a 16-bit Intel Corp. 8086 microprocessor and the Microsoft Corp. MS-DOS operating system. The base configuration includes 384K bytes of internal memory, while another model with 640K bytes of memory costs $4,495.

Alloy beefs up multiuser micro line

Alloy Computer Products, Inc. of Framingham, Mass., has enhanced its PC-Plus Family of multiuser personal computer products, enabling them to access data faster and run under IBM PC-DOS 3 or Microsoft Corp. MS-DOS 3.

According to a spokesman, the PC-Plus products are now equipped with the NEC Corp. V20 microprocessor that provides up to 30% faster performance than before.

The PC-Plus Family cluster approach to multiuser systems uses integrated personal computer storage subsystems, such as Alloy's multiuser expansion board, PC-Slave/16 and a terminal for each user to create personal computer clusters of up to 31 terminals operating off an IBM Personal Computer host. Terminals attached to the host function as fully configured, networked personal computers.

Alloy's proprietary multiuser software permits sharing of data and peripherals by clustered terminals and provides file and record locking capabilities.

Runs with PC-DOS 3 or MS-DOS 3

The enhanced software, ATNX and MTNX, allows disk caching and supports hard-disk volumes over 32M bytes. ATNX runs with PC-DOS 3 or MS-DOS 3 and higher on the host personal computer. It is priced at $295. Current users of Alloy's RTNX software can upgrade to ATNX for $100.

MTNX software provides all the features of ATNX, plus it allows users to run several tasks concurrently on a cluster's host personal computer. MTNX is priced at $395. Current users of Alloy's RTNX software can upgrade to MTNX for $200.

PC-Slave/16 boards now include the NEC V20 chip, which, in addition to reportedly increasing processing speeds, executes all Intel Corp. 8088 instructions and provides IBM compatibility. The PC-Slave/16 is priced at $895 with 256K bytes of random-access memory (RAM). In additional RAM configurations of 512K bytes, 768K bytes and 1M byte, prices are $995, $1,095 and $1,195, respectively.

INSIDE

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Samna ports word processing, office automation software

Samna Corp. of Atlanta has ported its Samna Word III word processing software and Samna+ office automation software from DOS operating systems to computers running under the AT&T Unix System V operating system.

Samna Word III is a word processing package that incorporates features such as spelling correction, automatic table of contents and index generation, line drawing, footnote, glossary and mail merge.

Samna+ is a document processing package that combines word processing capabilities, such as an integrated spreadsheet and a word base manager. It provides capabilities such as IBM Data Interchange Format file translation, floating cells and the ability to print to multiple printers.

Both Samna Word III and Samna+ support the IBM Document Content Architecture format.

The Unix versions will be available in March 1986. Prices for Word III will range from approximately $1,250 for the minimum configuration to $11,000 for a 30-user system. There is a charge of about $325 for each additional user over the 30-user limit. Prices for Samna+ will range from about $1,550 for the minimum configuration to about $13,850 for a 30-user system. The charge for each additional user will be about $410.

Versanet network kits out

Software Clearing House, Inc. of Cincinnati has announced Versanet, a personal computer interconnection system developed by Masterlink, Inc.

Versanet, designed for use with IBM Personal Computers and compatibles, is a fully functional network that automatically allows users of application programs and IBM PC-DOS or Microsoft Corp. MS-DOS commands on personal computers to access files and printers on other personal computers.

Versanet includes Masterlink's High-speed Upgrade Box (HUB), an external device that upgrades signals from a personal computer's serial port and pumps them up to 1,000 ft with effective throughput capacity of up to 50,000 char./sec.

Versanet's software includes Netbios, which makes a personal computer-to-HUB connection emulate an IBM Network Adapter card, providing IBM PC Network compatibility.

Versanet kits include everything necessary to create the network. Up to 32 personal computers can be linked using Versanet. It supports PC-DOS and MS-DOS Versions 2 through 3.1. Prices range from $225 to $175 per personal computer depending on the number of micros. Delivery is scheduled for January.

Information appearing in the New Products section has been provided by manufacturers and has not been independently validated by Computerworld.

NEW PRODUCTS/PRICE REDUCTIONS

Codex Corp. has announced price reductions on the Codex 2270/2260 series of error-correcting personal computer modems.

The line consists of 13 products. The price range is now $395 to $995, depending on the model.

Codex, 20 Cabot Blvd., Mansfield, Mass. 02048.

■

Through February, **Multimate International Corp.** will include $245 worth of software with each purchase of its **Multimate Advantage Professional Word Processor.**

Included are Multimate Graphlink Text and Graphics Integrator that allows integration of graphics produced by other software into Multimate documents and Multimate On-File Information Manager that uses index card-style operation to organize and file data.

System requirements are an IBM Personal Computer, Personal Computer XT, AT or compatible running IBM PC-DOS 2 or Microsoft Corp. MS-DOS 2 or higher. Multimate Advantage requires 320K bytes of random-access memory.

Multimate Graphlink requires a graphics or laser printer and IBM or compatible color graphics board, the vendor said.

Multimate International, 52 Oakland Ave., East Hartford, Conn. 06108.

SOFTWARE & SERVICES

Systems software

Software Assistance Co. has announced **SA/Archive,** a software program for IBM's VM operating system.

SA/Archive operates as a disconnected virtual machine that provides archive facilities. Files may be saved by the user, or there is an automatic save feature that may be set to save at certain times of the day. System-wide defaults are allowed, as are defaults for individual users. File security is provided.

SA/Archive is priced at $7,000.

Software Assistance, P.O. Box 2101, Santa Clara, Calif. 95055.

■

Signal Technology, Inc. has announced that its **Pace Plus** software for tracking hardware and software usage in the Digital Equipment Corp. VAX/VMS environment now includes DEC Vaxclusters.

The product lets users process all resource data from a Vaxcluster in one central data base. The product runs on all VMS versions.

Pace Plus prices start at $2,450.

Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

■

Syncsort, Inc. has announced **Release 5.3 of Syncsort CMS,** its sort/merge product for IBM VM/CMS environments.

Release 5.3 runs up to three times faster than previous releases. It has an enhanced Help facility, an alternate parameter file and a new exit interface that supports user exits.

Syncsoft CMS is licensed at $9,300 for three years.

Syncsort, 560 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Productivity aids

Raxco, Inc. has announced **Release 4 of its Rabbit-5 Backup and Restore System** that backs up data from disk to tape for Digital Equipment Corp. VAX/VMS systems.

Rabbit-5 provides automated resources such as tape librarian, command procedures and use of the VMS batch mechanism. Users may access data in disks other than the one being backed up while backup is done.

Full and incremental backup are available as are a full wild carding in file specification, inclusion and exclusion file lists, file journaling and progress reporting options. Rabbit-5 can store up to eight levels of subdirectories.

Rabbit-5 Release 4 will be available Jan. 1, 1986. Prices range from $995 to $6,995, depending on the CPU used.

Raxco, 1370 Piccard Drive, Rockville, Md. 20850.

■

Softouch Systems, Inc. has announced **CICS-Juggler/SVT.**

The software allows users to have up to nine concurrently active CICS transactions on the same terminal. Through the use of function keys, the user can move between applications without logging off or losing the current status of transactions.

The product is available for all operating systems and CICS releases. It costs $3,500 for the DOS version and $5,000 for the MVS version.

Softouch Systems, 8265 S. Walker, Oklahoma City, Okla. 73139.

■

Dylakor Co. has announced **Release 5 of its Dyl-280 IBM mainframe** utility/report writer.

Release 5 offers the implementation of commands to support more efficient handling and qualifications of data names. A capability called Move Corresponding has been added to allow identically named fields to be moved between records. The program's cross-referencing index now handles tag names and data name qualification.

DYL-280 Release 5 costs $11,000 for both OS and DOS versions.

Dylakor, 17418 Chatsworth St., Grenada Hills, Calif. 91344.

■

Computer Information by Design, Inc. has announced **Modify Writer,** a code generator for use with Information Builders, Inc.'s fourth-generation language Focus.

Modify Writer runs on IBM TSO and CMS operating systems. It automatically generates a general-purpose maintenance procedure, with color attributes optional, that is based on a Focus data description.

Modify Writer is priced at $4,500.

Computer Information by Design, Suite 411, 2444 Wilshire Blvd., Santa Monica, Calif. 90403.

■

Financial Technologies International, Inc. has announced **DBaid for DBRC,** a menu-driven productivity tool for use with the IBM IMS Data Base Recovery Control (DBRC) feature.

DBaid for DBRC operates under IBM ISPF and is used to generate DBRC cards and execute DBRC in foreground or background mode. It facilitates setup, execution and maintain-recovery procedures for IMS

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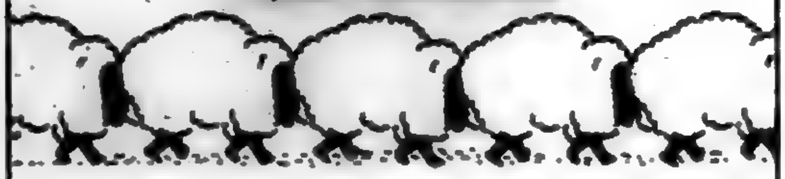
WHY FOLLOWERS OFTEN LOSE SIGHT OF THE LEADER



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NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 84

data bases.

The product is available for a permanent-license fee on the first CPU of $15,000.

Financial Technologies International, One World Trade Center, New York, N.Y. 10048.

Application packages

Michaels, Ross & Cole Ltd. has announced **MRC-Retriever Release 7** for use with the IBM System/38.

MRC-Retriever enables nontechnical users to utilize relational data base inquiry capabilities. It is one module of six in the MRC-Query series. It allows users to build on-line inquiries into multiple files using any access path. New functions include a masking facility that allows data base scanning within fields and Help key documentation.

MRC-Retriever is priced at $1,440.

Michaels, Ross & Cole, P.O. Box 4538, Oak Brook, Ill. 60521.

■

System Support Products, Inc. has announced the **Deskworks/34-36 Spreadsheet** for the IBM System/34 and 36.

The program allows users of the Systems/34 and 36 to utilize the systems for spreadsheet processing. Features include spreadsheet sizes up to 999 columns by 9,999 rows.

Deskworks/34-36 will be available Jan. 1 for $295.

System Support Products, 7620 Arlen St., Annandale, Va. 22003.

■

CHI/COR Information Management, Inc. has announced the **CHI/COR Order Management System** and the **CHI/COR Accounts Receivable System** for the IBM 4300, 370, 3000 or compatible mainframes running DOS/VSE, OS/MVS or VM/SP.

CHI/COR Order Management includes file maintenance and inquiry, order entry, processing, billing, history, analysis and inventory control. The Accounts Receivable system can be used as a stand-alone or with the Order Management system. It features data entry, cash application options and management reports.

CHI/COR Order Management is priced at $90,000. CHI/COR Accounts Receivable is priced at $50,000. Customization is available.

CHI/COR Information Management, 10 Riverside Plaza, Chicago, Ill. 60606.

■

ABC Management Systems, Inc. has ported its **ABC/MM Maintenance Management** package to the Digital Equipment Corp. VAX and Honeywell, Inc. DPS 6 systems.

ABC/MM is is a menu-driven online full-function Cobol system. It combines a common data base and eight integrated program modules. The modules accommodate labor records and time cards, work order scheduling to available capacity, job estimates, backlog planning and time and accounting performance control.

ABC/MM for the DEC VAX and Honeywell DPS 6 is priced between $10,000 and $65,000, depending on the configuration.

ABC Management Systems, Suite 3, 806 Dupont St., Bellingham, Wash. 98225.

Gateway Design Automation Corp. has unveiled **Aidasim-A**, a distributed processing version of its Aidasim concurrent fault simulation package for Apollo Computer, Inc.'s Domain workstation networks.

Aidasim-A can run a simulation that processes parallel activities on up to 10 networked workstations, the vendor claimed.

It is priced from $50,000.

Gateway Design Automation, P.O. Box 1545, 235 Great Road, Littleton, Mass. 01460.

Languages

Whitesmiths, Ltd. has released **Version 3 of its Pascal to C Translator** for AT&T Unix running on the Digital Equipment Corp. VAX or AT&T 3B series.

The new version conforms to Level 1 of the International Standards Organization's standard. New features include a built-in file inclusion capability, relaxed rules for ordering declarations, a built-in string data type, an Otherwise clause in case statements and extended reset and rewrite statements for opening files by name.

Version 3 costs $1,000.

Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

■

Rexcom Systems Corp. has ported its **Rexcom** fourth-generation application development and management environment to Digital Equipment Corp. VAX/VMS systems.

Rexcom includes a high-level development language, an active integrated data dictionary and an multiuser transaction processing manager.

The basic Rexcom package is priced at $17,500 for VAX-11/725 and 730; $26,500 for the VAX-11/750; $34,500 for the VAX-11/780, 782 and 785; and $39,500 for the VAX 8600.

Rexcom Systems, Suite 400, 10333 Richmond Ave., Houston, Texas 77042.

■

Kuck & Associates, Inc. has announced the **Mini-KAP/AF** Fortran source vectorizer.

The Mini-KAP/AF accepts Fortran 77 and produces a listing that shows the vectorized Do loops in array-Fortran syntax. It uses data dependence and code analysis techniques to

Continued on page 86

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COMPUTERWORLD

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 93

transform the program and discover array operations, according to the vendor.

The Mini-KAP/AF is available now for systems running the VMS operating system and will be available Jan. 1 for the University of California at Berkeley Unix 4.2 operating system. The product is priced at $6,000.

Kuck & Associates, Professional Commerce Center, 1808 Woodfield Drive, Savoy, Ill. 61874.

[redacted]

Software

MCBA, Inc. has announced **Accounts Payable, Accounts Receivable, Bill of Material Processor, Customer Order Processing, General Ledger, Inventory Management and Payroll**, seven accounting and distribution software packages written in RM/Cobol for the IBM Personal Computer AT running Microsoft Corp.'s Xenix operating system.

The packages include features such as the ability to use a variety of terminals and to access customers, vendors and inventory items by name, description or identification number.

Prices range from $1,000 to $2,500.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

■

FTG Data Systems has introduced **Emu-Tek**, a software program that allows an IBM Personal Computer to function like a Tektronix, Inc. graphics terminal.

Emu-Tek comes in two versions. Emu-Tek Level 1 provides full Tektronix 4010 and 4012 emulation. It includes a screen copy facility that allows graphics screen images to be copied on paper using a dot matrix printer.

Emu-Tek Level 2 offers emulations of a Tektronix 4014, a Digital Equipment Corp. VT100 and a DEC Engineering VT640. Level 2 permits uploading and downloading of files. It has a redisplay feature and also includes a concurrent pen-plot capability.

Emu-Tek requires an IBM Personal Computer, Personal Computer XT, AT or compatible with a minimum of 256K bytes of memory, an asynchronous communications adapter and a graphics display adapter. IBM's PC-DOS or Microsoft Corp.'s MS-DOS 2 or later is necessary.

Level 1 costs $295. Level 2 costs $395.

FTG Data Systems, Suite M-2, P.O. Box 615, 10801 Dale St., Stanton, Calif. 90680.

■

Harvey Invisible Software has introduced **Prodisk Control**, a software program designed as an alternative way to invoke IBM PC-DOS or Microsoft Corp. MS-DOS commands.

Prodisk Control is a menu-driven program that is resident in random-access memory (RAM). It lets users create, save or change menus to run applications, perform PC-DOS or MS-DOS operations or select other menus with a keystroke.

Prodisk Control requires 196K bytes of RAM and PC-DOS or MS-DOS 2 or higher.

Prodisk is priced at $90.

Harvey Invisible Software, P.O. Box 1863, Cape Coral, Fla. 33910.

■

Computer Innovations, Inc. has announced **CI Probe**, a source-level debugger designed for use with the company's C86 C compiler for the IBM Personal Computer family.

CI Probe features full macros, the ability to single-step trace through both C and assembler codes, set breakpoints, view and/or alter C variables during execution and break into the program while debugging.

CI Probe is priced at $300.

Computer Innovations, 980 Shrewsbury Ave., Tinton Falls, N.J. 07724.

■

Seaside Software has released **Asksam Version 2.2.**

Asksam is a free-form, text-oriented data base management system that allows users freedom from fixed fields, fixed records and limited indexes. Version 2.2 offers a revised manual.

Asksam runs on the IBM Personal Computer and compatibles running IBM PC-DOS or Microsoft Corp. MS-DOS 2 or higher.

Asksam is priced at $149.95. Current users will receive the upgrade free of charge.

Seaside Software, 538 Parade Drive, Corpus Christi, Texas 78412.

Systems

On Time Systems has announced **Time Tracker**, a time and attendance system for IBM Personal Computers, Personal Computer XTs, ATs and compatibles.

The Time Tracker provides time and attendance software and comes with a Panasonic Industrial Co. electronic data collection time clock system.

It monitors each employee who clocks in and out and prints status reports by employee or by department. Available reports include absenteeism, late attendance and failure to clock in or out.

The Time Tracker is priced at $3,496.

Up to 16 time clocks can be added at a cost of $1,100 and up, depending on the quantity ordered.

On Time Systems, Suite D, 2565 E. Chapman Ave., Fullerton, Calif. 92631.

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NEW PRODUCTS/MICROCOMPUTERS

CPT Corp. has announced the **CPT Office Companion 3000**, a workstation that provides 16-bit Microsoft Corp. MS-DOS capability and interfaces to the CPT Office Dialog System and CPT Shared Resource System products.

The workstation works with the IBM Personal Computer and compatibles. It allows users to edit text and process DOS applications. The system includes 640K bytes of memory, one 3½-in. floppy disk drive with 720K-byte capacity and an RS-232 serial port.

The system costs $2,300.

CPT, 8100 Mitchell Road, Minneapolis, Minn. 55440.

■

Dekatek, Inc. has introduced **PC-Mailer**, an electronic scale mailing system and a United Parcel Service (UPS) manifesting system integrated into one.

PC-Mailer is IBM Personal Computer based and requires one 360K-byte disk drive, 128K bytes of random-access memory, an RS-232 serial port and Microsoft Corp. MS-DOS 2 or higher.

PC-Mailer includes domestic and international U.S. Postal Service, UPS and Federal Express rates. It can handle more than 1,000 transactions per day.

PC-Mailer costs $3,995.

Dekatek, Suite 211, 3401 Investment Blvd., Hayward, Calif. 94545.

Communications

E+E Data Comm announced the addition of the **Avatex 1200HC modem** and the **Avatex 2400 PC modem** to its Avatex line.

The Avatex 1200HC is AT&T 212A and 103 compatible. It offers diagnostics, automatic self-testing, remote testing and full Hayes Microcomputer Products, Inc. software compatibility.

The Avatex 2400 PC is a true half-card internally mounted 2,400 bit/sec. modem for IBM Personal Computers and compatibles. It is compatible with the Consultative Committee on International Telephony and Telegraphy standards and AT&T 212A and 103. It operates at 300, 1,200 and 2,400 bit/sec.

The 1200HC costs $299.95, and the 2400 PC costs $459.

E+E Data Comm, 2115 Ringwood Ave., San Jose, Calif. 95131.

■

Dialectron, Inc. has introduced the **Smart Answering Machine (SAM)**, a voice communications and telephone management system for the IBM Personal Computer, Personal Computer XT, AT and compatibles.

The SAM package includes software, a half-size interface card and a modular phone extension cord.

It costs $295.

Dialectron, Suite 17, 2035 California St., Mountain View, Calif. 94040.

■

GTE Data Communication Products, a unit of GTE Communication Systems Corp., has announced **Trailblazer**, a 10K-bit/sec. asynchronous modem designed for personal computers.

Trailblazer operates over dial-up lines. It is available in a printed-circuit board version that fits into an IBM Personal Computer, Personal Computer XT, Personal Computer AT or compatible or in a stand-alone version. A communications software package is included with the board version.

The desktop unit costs $2,395, and the circuit board version costs $1,995.

GTE Data Communication Products, Lakeside Plaza 2, 5225 Wiley Post Way, Salt Lake City, Utah 84116.

Storage

Sumo Systems has introduced a **mass storage subsystem** featuring a 10-, 20- or 33M-byte fixed drive and a 10M-byte removable cartridge disk drive for IBM Personal Computers and compatibles.

The subsystems are available in a single configuration with a fixed or removable disk drive or in a dual configuration with any combina-

Continued on page 88

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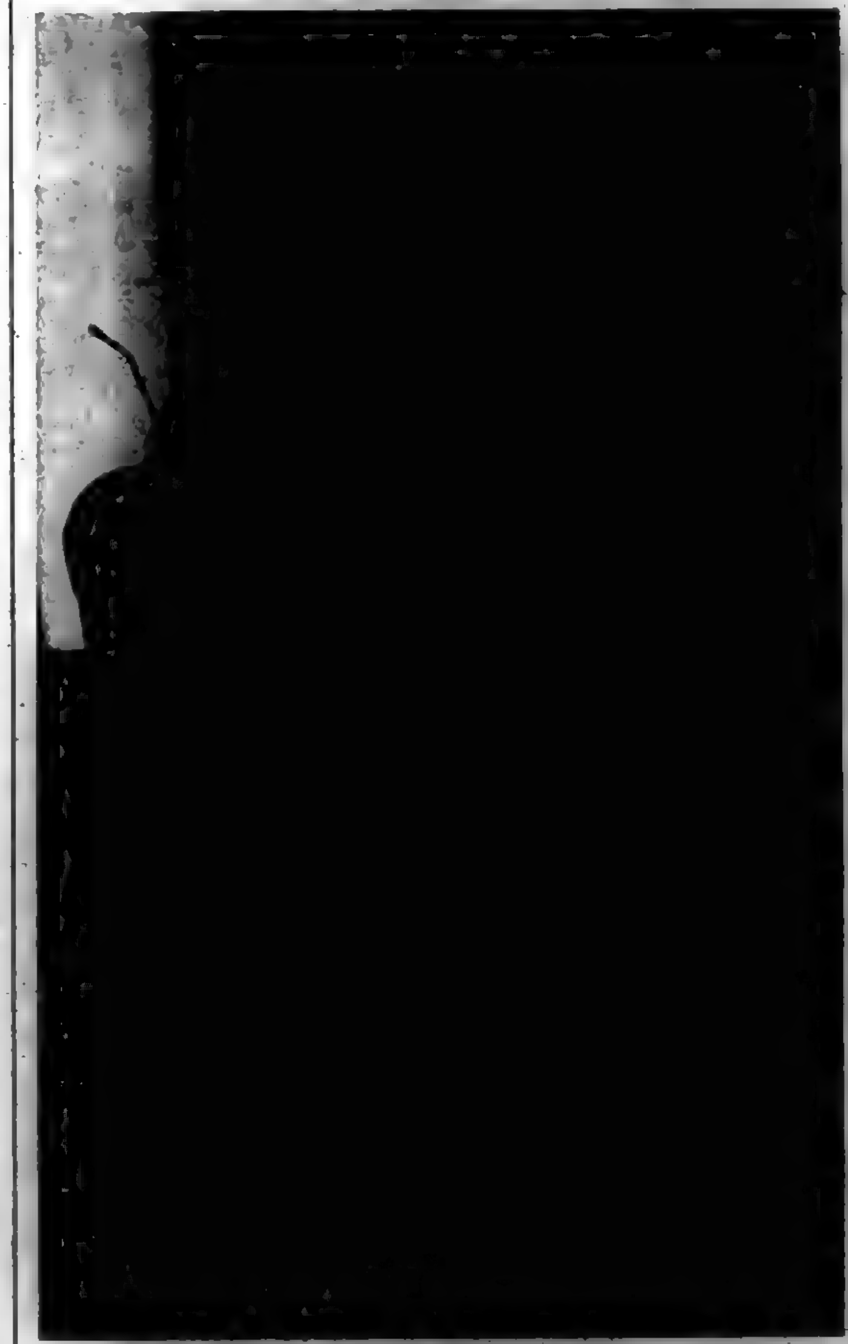

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NEW PRODUCTS/MICROCOMPUTERS

Continued from page 97

tion of two fixed or removable drives, according to a company spokesman.

Each subsystem includes a standalone hard-disk cabinet and power supply, an IBM Personal Computer XT-compatible controller with shielded external connector, a shielded round interconnect cable and an installation guide. Both the fixed and the removable drives reportedly are also available for the IBM Personal Computer AT. All the subsystems require IBM PC-DOS or Microsoft Corp. MS-DOS 2 or higher, the vendor explained.

Prices range from $3,295 to $3,995, depending upon the configuration.

Sumo Systems, Suite C103, 1580 Old Oakland Road, San Jose, Calif. 95131.

Alpha Microsystems, Inc. has introduced the **Videotrax** videotape backup subsystem, a videotape-driven hard-disk backup for the IBM Personal Computer, Personal Computer XT, AT and compatibles.

The product offers 80M bytes of interactive hard-disk backup. A circuit board mounted on a full-size expansion slot converts computer data into a video format, and vice versa, that any standard VHS or Beta videotape or videocassette recorder can read. The system runs on menu-driven Microsoft Corp. MS-DOS-compatible software.

The Videotrax subsystem including the controller board, software and a computer-controlled videotape drive is priced at $1,595. Without the videotape drive it is priced at $795.

Alpha Microsystems, P.O. Box 25059, Santa Ana, Calif. 92799.

Printers/plotters/peripherals

T.S. Microtech, Inc. has announced the **Dreamer**, a function keyboard for the IBM Personal Computer, Personal Computer XT, Apple Computer, Inc. Apple II+ and Apple IIe.

The Dreamer features a 20-key numeric keypad with independent cursor controls. It requires no memory-resident programs and no preboot disks.

The product has 30 keys preprogrammed with functions for Lotus Development Corp.'s 1-2-3, Visicalc and Micropro International Corp.'s Wordstar, according to T.S. Microtech.

The price of the Dreamer is listed as $259.

T.S. Microtech, 12565 Crenshaw Blvd., Hawthorne, Calif. 90250.

Shoshin U.S.A., Inc. has announced the addition of the **CP-804GV** single-pass, thermal-transfer color printer to its family of products.

The CP-804GV reproduces alphanumeric and graphic images on regular, Z-fold or roll paper as well as transparencies.

It is capable of printing up to seven colors in a single pass. Density is 101 dot/in., according to the vendor.

The printer interfaces with an IBM Personal Computer or compatible, red-green-blue video CRT display or a 640- by 400-pixel resolution image and prints the screen image dot for dot.

The price for one CP-804GV unit is $3,500.

Shoshin U.S.A., Suite 115, 1700 E. Garry Ave., Santa Ana, Calif. 92705.

■

Zenith Data Systems Corp. has introduced its **Z-39** VDT offering compatibility with a variety of terminals and microcomputers including the Zenith Z-200 and IBM Personal Computer AT and compatibles.

The Z-39 features a 12-in. diagonal green phosphor display and a 91-key keyboard that includes a 15-key numeric keypad. It is compatible with the ANSI 3.64; Digital Equipment Corp. VT-52 and VT-100; Lear Siegler, Inc. ADM 3A; and Zenith Z-19, Z-29 and Z-29A.

The Z-39 costs $749.

Zenith Data Systems, 1000 Milwaukee Ave., Glenview, Ill. 60025.

Board-level devices

STB Systems, Inc. has announced **EGA Plus**, a video adapter compatible with IBM's Enhanced Graphics Adapter.

The EGA Plus adapter operates in 16 different text and graphics modes. It saves expansion slots by providing 256K bytes of standard display memory and offers a parallel printer port. EGA Plus also features soft scrolling, panning and windowing.

The EGA Plus costs $595.

STB Systems, Suite 125, 601 N. Glenville Drive, Richardson, Texas 75081.

■

Dux is offering the **Dice** series of 8- and 16-bit emulators for hardware development.

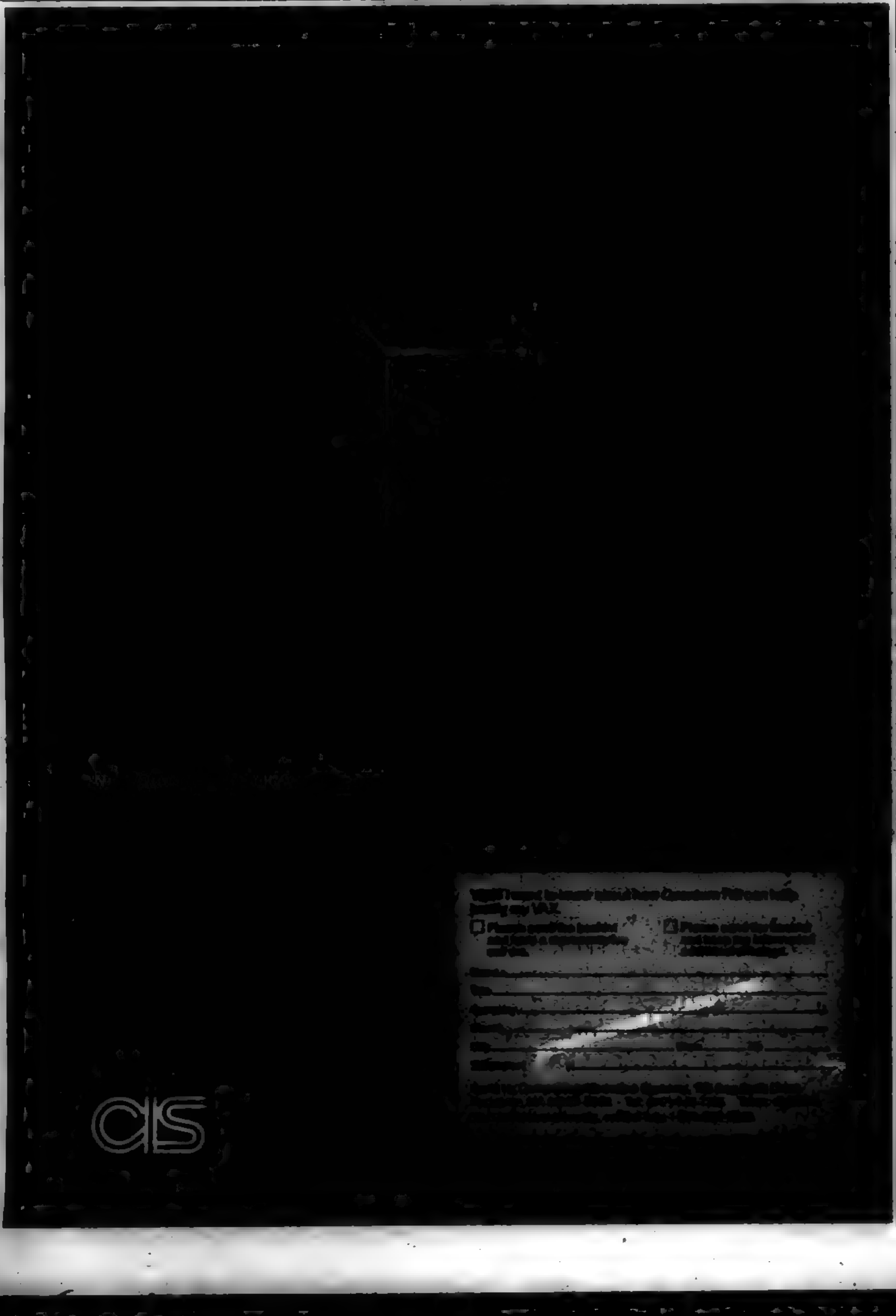
The Dice series supports 8- and 16-bit microprocessors. It can connect to most development systems and computers, including the IBM Personal Computer; Digital Equipment Corp. VAX, CP/M and PDP computers; Intel Corp. MDS/PDS; and AT&T Unix-based operating systems.

The emulators come standard with a maximum memory capacity for 8-bit microprocessors using high-speed static random-access memory; 16-bit emulators include 128K bytes of memory, expandable to 384K bytes. Other features include a real-time trace-history display, break points and logic analyzer capability.

Two RS-232 ports, one with automatic bit/sec. rate selection, allow Dice units to operate in transparent mode for connecting and downloading code and symbol tables from the host development system.

Prices range from $4,595 to $7,795.

Dux, 1850 E. 17th St., Santa Ana, Calif. 92701.



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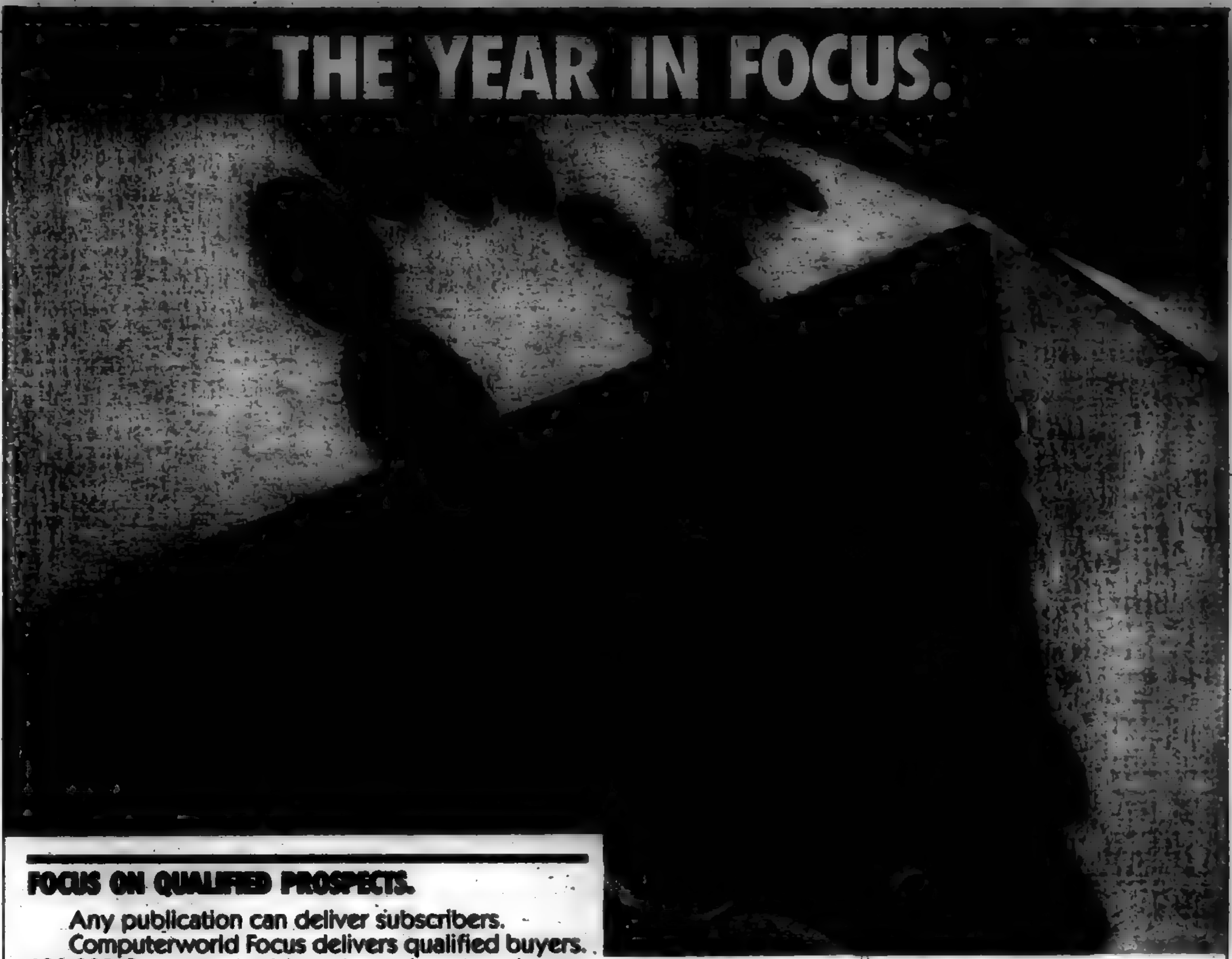

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For more information, contact Ed Marecki, Vice President/Sales, Computerworld Focus, 375 Cochituate Road, Framingham, MA 01701. Or call (617) 879-0700.

But hurry, the closing for the January 15th Communications issue is December 6th.

Computerworld Focus Topic	Issue Date	Closing Date*	Show Distribution
Communications	January 15**	December 6	Comnet
Software	February 19	January 10	
Manufacturing	March 19	February 7	Advanced Manufacturing
Microcomputing	April 16	March 7	Comdex/Spring '86
Office Automation	May 14	April 4	NCGA, NCC
Software	July 9**	May 30	PC Expo, Software Expo
Unix™	August 20**	July 11	Unix™ Expo
Communications	September 17	August 8	TCA
Office Automation	October 8	August 29	Info '86
Microcomputing	November 12	October 3	Comdex/Fall '86

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NEW PRODUCTS/COMMUNICATIONS

Voice/data communications

Phalo Corp.'s Optical Systems Division has announced a **Voice Channel Option** for its 9.6K bit/sec. series asynchronous/synchronous multiplexers.

The Voice Channel Option provides voice transmission capability. It enables private branch exchanges to telephone communication with fiber-optic point-to-point multiplexing.

The Voice Channel Option consists of one PBX module, one station module and a ring generator located at the station multiplexer. The price of the total system is $8,695.

Phalo, Optical Systems Division, 65 Moreland Road, Simi Valley, Calif. 93065.

Protocol converters

Signal Solver, a bidirectional interface converter for converting data between RS-232 serial format and parallel format is available from **Devoke Data Products.**

With Signal Solver, users can interface incompatible computer equipment. For example, the converter would allow a parallel printer to be connected to the serial port of a host computer, the vendor said.

Signal Solver costs $139.95.

Devoke Data Products, 1500 Martin Ave., Santa Clara, Calif. 95050.

■

Telebyte Technology, Inc. has unwrapped **Model 63-2**, an RS-232-to-RS-422 converter.

It supports full-duplex transmission from an RS-232 port and provides conversion circuitry to accommodate the differential I/O required by RS-422. It can transmit data over 4,000 ft of twisted-pair wiring at 38.4K bit/sec.

Transmission cabling connecting the RS-422 ports can exhibit different impedances.

Model 63-2 sells for $110 in single quantities or $88 each in quantities of 100.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

Software

Systems Strategies, Inc. has announced **MSNA/3270**, an IBM Systems Network Architecture (SNA) emulation software package.

MSNA/3270 allows an Intel Corp. Multibus-based host to connect to an IBM mainframe by emulating a remote 3274 cluster controller. Terminals and printers connected to the host can exchange data with the IBM mainframe as if they were IBM 3278 terminals and 3287 printers.

MSNA/3270 runs on Multibus communications processor boards. It comes in configurations using standard Intel IRMX, AT&T Unix or Microsoft Corp. Xenix operating systems. Prices, depending on quantity, range from $200 to $5,000.

Systems Strategies, 225 W. 34th St., New York, N.Y. 10001.

■

Intel Corp. has announced **MAP-Net**, a software module that conforms to the specifications for the upper three layers of General Motor Corp.'s Manufacturing Automation Protocol (MAP) local-area network.

MAP-Net completes Intel's board-level product family that implements all seven layers of the MAP networking model for Multibus systems. MAP-Net is preconfigured for the Intel ISXM 554 Multibus MAP board.

MAP-Net will be available in April. It is priced at $2,000 for an eight-user development license.

Intel, 2402 W. Beardsley Road, Phoenix, Ariz. 85027.

■

Teleplan, a communications planning package for traffic engineers and network designers that runs on IBM Personal Computers, Personal Computer XTs, ATs and compatible processors, is available from **Systems & Software Development, Inc.**

With Teleplan, users can calculate Grade of Service; the minimum number of trunks needed for a given Grade of Service and data communications queue and line performance.

It costs $195 and requires 128K bytes of random-access memory.

Systems Software & Development, Suite 302, 7633 E. 63rd Place, Tulsa, Okla. 74133.

Multiplexers/modems

Astrocom Corp. has introduced the **ATDM**, a six-port time-division multiplexer.

The microprocessor-based ATDM can multiplex data from up to six synchronous devices onto a single 56K-byte transmission link. It is designed to work with either AT&T Dataphone Digital Service or private circuits.

It supports eight selectable speed formats for the six user ports. The ATDM costs $1,395.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55107.

■

Raycom Systems, Inc. has announced **Models 2600, 2601** and **2602**, three fiber-optic modems that transmit data at T1 speed over 2.5-, 5- or 16-km fiber-optic links.

Models 2600 and 2601 are for installations of 2.5-km or 5-km links, respectively, using multimode fiber-optic cable and transmitting at 830 nanometers. Model 2602, the 16-km version, transmits at 1,300 nanometers.

Pricing for the 2600, the 2601 and the 2602 is $900, $1,400 and $7,500, respectively.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.

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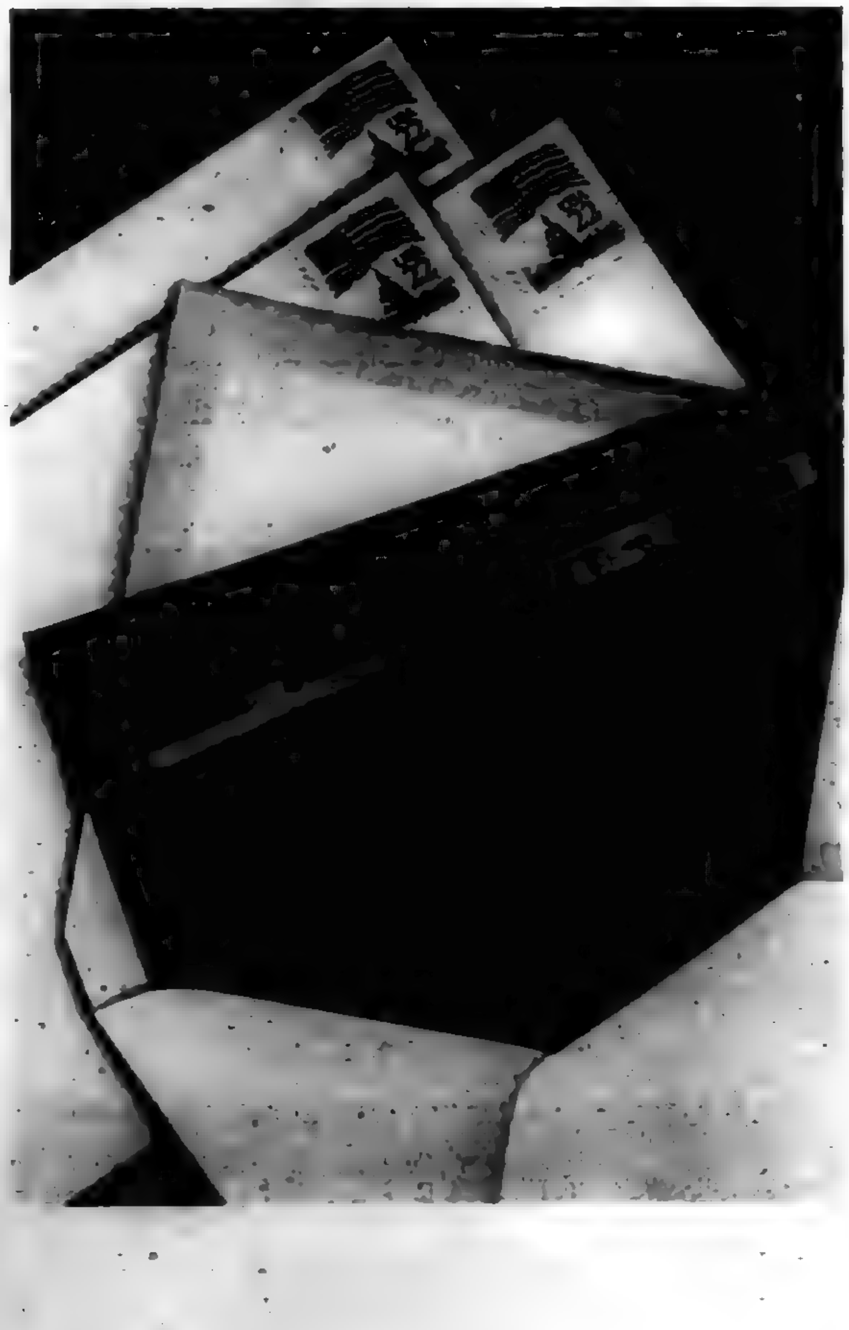

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Everyone knows the old adage, "there's strength in numbers." That holds true only if the various elements, however numerous, are working together.

The Networking function of System 85 and System 75 from AT&T Information Systems unites all the elements of our business communications systems so everything works together. Whether you have offices spread throughout a building or throughout the country, they can all be linked productively into one network.

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A network should be looked at not simply as a communications tool, but as a business asset. Like any other asset your business holds, it too can be controlled and managed and made to work for you.

All our networks let you incorporate new applications, making your system more powerful than ever. And thanks to our integrated digital T-carrier interface, you can speed up and control the flow of not only voice, but data transmissions as well.

In a small area, like a campus, or even nationwide, look into our Distributed Communications System. With it, multiple systems serving up to 100,000 lines can function as one. It also offers extensive voice and data terminal transparency and attendant transparency, so attendants can control the entire system from one location.

Remote Groups let you extend System 85 capabilities to small locations via DS-1 facilities. Remote Modules serve larger locations, up to 2½ miles away, over fiber optics. Voice communications and data from host computers are transmitted with complete user transparency.

An Electronic Tandem Network can also be used to link locations anywhere in the country. Through a mix of analog, high-capacity digital, and public facilities, virtually any number of voice and data terminals can be connected.

CONTROL AND ECONOMY

Once you've linked your communications into one network, you'll have a host of powerful features working to increase productivity, reduce costs and give you more control over your communications. Automatic Route Selection, Automatic Alternate Routing, and Queuing choose the least expensive path for all network calls. And "Authorization Codes" grant calling privileges to appropriate employees.

With all your offices under the umbrella of one system, networking can help create another business asset—a single, consistent corporate identity for every branch of your organization.

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System 85 and System 75 are designed according to the guidelines of Information Systems Architecture. This ensures that any upgrades or future generations of the system will be compatible with the current one. So your investment is protected.

There are over 350 ETN's and DCS's already in place. More than half of the *Fortune 500* companies have chosen private networks from AT&T Information Systems. Besides our features, function and investment protection, there's one more compelling reason why—our service.

Our systems are backed by the largest sales and service staff in the industry. Network support includes predesign, cutover coordination, post-cutover administration, and ongoing maintenance. Add to that a century of communications experience and leadership, and your decision is easy. Of all your alternatives, only one is the right choice—AT&T.

To find out more about the Networking capabilities of System 85 and System 75, call your AT&T Information Systems Account Executive or 1-800-247-1212.

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NEW PRODUCTS/COMMUNICATIONS

Telenetics Corp. announced the **Ponyexpress modem** at Comdex/Fall '85.

Ponyexpress is an external minimodem housed in a case that measures 5 in. wide by 6 in. deep and 1¼ in. high. It includes a power supply, all circuitry, switches, indicators, direct connect circuitry and an RS-232C interface.

Model 12A has a 1,200/300 bit/sec. data transfer rate, and Model 24A communicates at 2,400, 1,200 and 300 bit/sec. Model 12A costs $395, and Model 24A costs $495, the company said.

Telenetics, 895 E. Yorba Linda Blvd., Placentia, Calif. 92670.

■

Codex Corp. has announced the **Codex 2200 series** of AT&T-compatible modems.

The series is made up of three modems: the Codex 2215, 2216 and 2217. The 2215 and 2217 are two-wire, half-duplex synchronous dial modems that operate at 1,200 and 2,400 bit/sec., respectively. The Codex 2216 is a four-wire, full-duplex asynchronous leased-line modem that operates at 1,200 bit/sec.

The Codex 2215 features both pulse and tone dialing. The 2216 features antistreaming.

Single-unit prices for the Codex 2215, 2216 and 2217 are $495, $425 and $685, respectively.

Codex, 20 Cabot Blvd., Mansfield, Mass. 02048.

■

Microcom, Inc. has announced the **AX family** of five modems for use over two-wire dial-up lines.

Each product also represents the announcement of three new classes of Microcom Networking Protocol (MNP) technology. The AX/1200 and AX/2400 are MNP Class 4 modems.

The AX/2400C is an MNP Class 5 modem. According to the vendor, it compresses transmissions so that typical throughput on text files is 4.8K bit/sec.

The MNP Class 6 products are AX/9612C and AX/9624C modems. Both operate at 9.6K bit/sec. They offer statistical duplexing and universal link negotiation.

The AX/1200 and AX/2400 cost $499 and $749, respectively. The AX/2400C costs $899. The AX/9612C and the AX/9624C cost $1,599 and $1,799, respectively.

Microcom, 1400A Providence Highway, Norwood, Mass. 02062.

Half-Pak 12, a 1,200 bit/sec. half-card internal modem for IBM Personal Computers, Personal Computer XTs, ATs or compatibles, is available from **CTS Fabri-Tek, Inc.**

The Hayes Microcomputer Products, Inc.-compatible modem can also work with AT&T 212A and AT&T 103/113 data sets. It operates asynchronously at 1,200, 300 and 110 bit/sec. speeds. Features include autodial, autoanswer, on-board speaker, call-progress monitoring plus remote and local diagnostics.

Half-Pak 12 costs $395.

CTS Fabri-Tek, 6900 Shady Oak Road, Eden Prairie, Minn. 55344.

■

Able Computer Co. has announced a **host interface board** that allows its Mux Master multiplexer to operate with Digital Equipment Corp. Microvax II processors.

The quad-size Q-bus host board installs in the Microvax II and is joined by a distribution panel for up to eight Mux Master cluster controllers located along a twisted-pair link. Each controller can handle between eight and 16 terminals.

Priced at $4,800, a typical package consists of the Q-bus host board, one 16-line cluster controller, a power supply, the distribution panel and a 25-ft composite link. The eight-line controller costs $2,000; the 16-line controller sells for $3,200.

Able Computer, 3080 Airway Ave., Costa Mesa, Calif. 92626.

Auxiliary equipment

Teleprocessing Products, Inc. has introduced the **TP-1544**, a T1 customer service unit for 1.544M bit/sec. services.

The device is compatible with all T1 communications equipment to 1.544M bit/sec. It has an integral loop-back generator. The unit permits connection of T1 equipment as much as 6,000 feet from the T1 customer service unit. It has both line and station powering, allowing 64K bit/sec. clear-channel operation.

The TP-1544 costs $1,195.

Teleprocessing Products, Building 7K, 4565 E. Industrial St., Simi Valley, Calif. 93063.

■

Wall Industries, Inc. has added **Model TS5** two- and four-position coaxial switches as well as the **Model TS6-1** dual coaxial switch and the **Model TS7-1** twin axial switch to its product line.

The switches enable users to share computers or peripheral devices without having to connect and disconnect cables for each change.

Pricing for Models TS5 two-position, TS5 four-position, TS6-1 and TS7-1 switches is $102.95, $129.95, $127.95 and $149.95, respectively.

Wall Industries, 2 Franklin St., Lawrence, Mass. 01840.

■

Com II, a communications board with two serial channels that can transmit and receive data at up to 3M bit/sec. has bowed from **SBE, Inc.**

The Motorola, Inc. 68000-based Multibus-compatible single-board computer includes a four-channel direct memory access controller that provides full-duplex operation on

Continued on page 96

Important Announcement for All U.S. Computer Products Manufacturers!

The Japanese computer buyer is targeting U.S.-made products!

Japan, the world's largest computer market outside of the U.S., will eliminate all import tariffs on computers, peripherals and parts early next year. The Japanese Prime Minister and government trade ministries have instructed Japanese companies to substantially increase their purchasing of U.S. goods to lower the Japan-U.S. trade deficit.

And, you can reach the MIS/DP directors and key technical staff at virtually all the major computer-using sites in Japan, when you advertise your products in Computerworld Japan—Japan's leading computer news publication. Computerworld Japan's readers account for over 75% of the Japanese end-user computer market.

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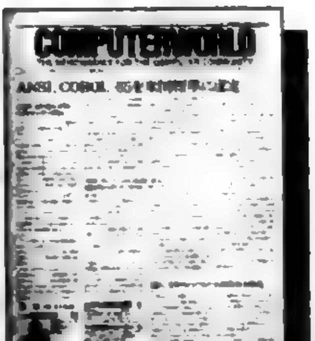

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More And More Printers Are Seeing The Light.

Every day, more and more IBM 3270 users are saving money and increasing productivity by attaching ASCII printers instead of IBM 3287s to their networks.

And one company is providing these users with more protocol converters than all others combined.

Avatar.

The reason is simple. The Avatar PA1500 goes well beyond simple 3287 emulation. It opens the entire spectrum of ASCII printers to the 3270 user, because it can be used with laser printers, ink jet printers, line printers, other dot matrix printers and plotters – virtually *any* ASCII printing device.

The PA1500 is also easy to install, requiring nothing more than a simple coax connection to IBM 3274/3276 controllers. And, because it provides all the important front panel controls of the 3287, it's easier to use than other converters.

If there are 3270 systems in your company still operating in the dark, help them see the light. Call us now at (617) 435-6872.

Avatar manufactures a complete line of protocol converters for terminals, personal computers and printers, micro-to-mainframe links, network gateways and other data communications products.

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 94

both serial ports, according to the vendor.

A standard Com II has 128K or 512K bytes of dual-ported hardware.

Com II costs $1,395 in quantities of 100.

SBE, 2400 Bisso Lane, Concord, Calif. 94520.

Turnkey systems

Infomed Corp. has announced the **Medical Data Collection Workstation** for industrial, clinical/medical screening and analysis.

The product provides medical practitioners in occupational health facilities with pulmonary diagnostic measurements and reports. Each workstation comprises a series of modules configured to suit users' needs. The Infomed pulmonary data collection software provides diagnostic information.

The basic system consists of an Intel Corp. 16-byte microprocessor with 256K bytes of random-access memory, one 5¼-in. floppy disk drive, one 10M-byte hard disk drive, a graphics module and a 12-in. monochrome screen. It costs $9,995.

Infomed, 13 Inverness Way S., Englewood, Colo. 80112.

■

Agena Corp. has introduced **Agena/Microvax II**, a multiuser computer system for independent insurance agencies, based on Digital Equipment Corp.'s Microvax II.

The system offers policy information, accounting, automatic pending, a versatile and fully integrated marketing program, word processing, claims history and communications. The basic Agena/Microvax II configuration will support 15 workstations and is expandable.

Prices start at $50,000.

Agena, 9707 Third Ave. N.E., Seattle, Wash. 98115.

■

The **Prosource Medical Management System** has bowed from **Professional Computer Technologies, Inc.**

The system, consisting of software, a transporter computer board, a Texas Instruments, Inc. TI-860 wide-carriage printer and IBM monochrome monitor, enables the IBM Personal Computer AT to run minicomputer software for medical applications with no modifications.

Prosource Medical Management System costs $14,995 or can be leased for less than $400 per month over five years.

Professional Computer Technologies, 4255 Balloon Park Road N.E., Albuquerque, N.M. 87109.

Processors

Force Computers, Inc. has announced the CPU-5, a Motorola, Inc. 68000-based CPU for VMEbus.

The CPU-5 card uses a 12.5- or 16.7-MHz 68000 16-bit microprocessor and 128K bytes of zero-wait-state static random-access memory. It also offers two multiprotocol serial I/O channels, 256K-byte erasable programmable read-only memory capacity, a single-level VMEbus arbiter, a parallel interface/timer and a full VMEbus interface.

Single-quantity pricing for the CPU-5 starts at $2,495.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

■

Plexus Computers, Inc. has announced a job processor field-upgrade kit for its **P/35** and **P/60** AT&T Unix-based computer systems.

The kit will upgrade the system's job processor from a Motorola, Inc. 68000 to a 68020, thereby increasing processing speed. The kit also contains an 8K-byte memory cache and optional floating-point support based on the Motorola 68881 coprocessor.

The 68020-based board will be available for field upgrade in the

Continued on page 98

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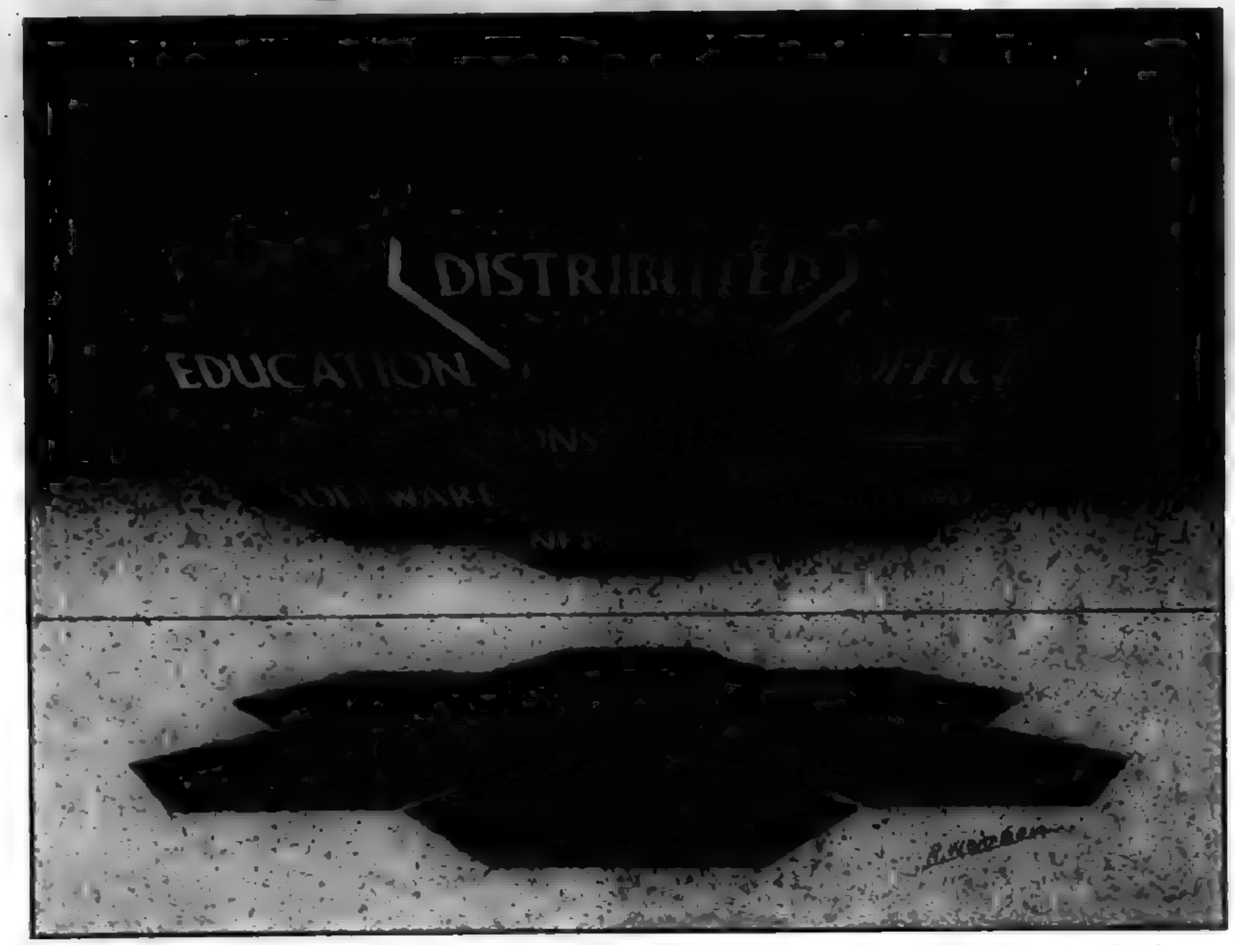

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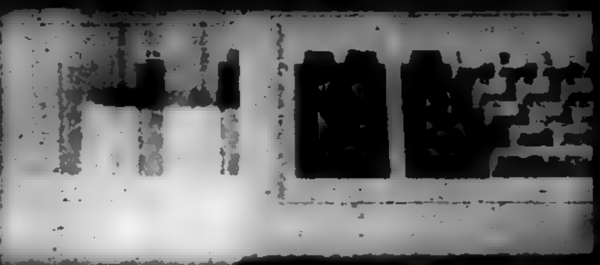

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 93

first quarter of 1986, priced at $8,060 with a $1,000 discount for the return of the old board. The 68881 floating-point coprocessor costs $1,500.

Plexus, 3833 N. First St., San Jose, Calif. 95134.

Data storage

Dataram Corp. has announced an increase in the storage capacity of its **Wide Word** bulk memory system to 160M bytes.

The increased capacity makes possible longer collection times for data acquisition systems, storage of larger data sets for simulation problems or more common memory for distributed processing configurations. The higher memory will also assist in lowering power consumption, according to the vendor.

A complete 160M-byte Wide Word system costs $263,870.

Dataram, Princeton Road, Cranbury, N.J. 08512.

■

Pertec Peripherals Corp. introduced four disk and tape storage products, the **DX548**, **DX368**, **DP Series Data Package** and **FS2000**, at the Comdex/Fall '85 show last week.

Two products, the DX548 and the DX368, are 8-in. Winchester disk drives that have capacities of 548M bytes and 368M bytes, respectively.

The DP Series Data Package incorporates one or two Pertec Peripherals DX series 8-in. Winchester disk drives and a power supply. It is configured in capacities from 199M bytes up to 1.1G bytes, and access to data is 18, 20 or 22 msec at a data transfer rate of 9.67 to 14.52 MHz, depending on the configuration.

The FS2000 is a quad-density, automatic-loading ½-in. streaming tape drive that provides data capacities from 23M to 270M bytes.

In quantities of 250, the DX548 costs $5,300, the DX368 costs $4,300, and the FS2000 costs $6,500. The DP Series Data Package varies in price depending on the configuration.

Pertec Peripherals, 9600 Irondale Ave., Chatsworth, Calif. 91311.

■

MDB Systems, Inc. has introduced the **MLSI-2322** and **MLSI-2333**, two disk subsystems for Digital Equipment Corp.'s Q-bus computers.

Both have a rack-mountable chassis that contains the disk drive, power supply, control panel, appropriate disk controller and 10-ft interconnection cable. The MLSI-2322 unit contains a Fujitsu America, Inc. M2322K drive and offers 134M bytes of disk storage space.

The MLSI-2333 unit uses a Fujitsu M2333K drive and has a data transfer rate of 2.4M bit/sec. It offers 256K bytes of storage space.

The MLSI-2322 costs $9,640, and the MLSI-2333 costs $12,850.

MDB Systems, 1995 N. Batavia St., Orange, Calif. 92665.

■

Emulex Corp. has introduced the **QD32** dual-wide disk controller designed to connect storage module disk drives to Digital Equipment Corp.'s Q-bus-based processors while emulating DEC's KDA50.

The QD32 has an adaptive direct memory access feature that transfers data in 16-, 18- and 22-bit addressing modes as well as block mode. It buffers up to 13 commands and offers seek ordering. It is capable of handling Q-bus direct memory access speeds of up to 2.5M byte/sec. It has a 32K-byte buffer.

The QD32 costs $2,200.

Emulex, P.O. Box 6725, 3543 Harbor Blvd., Costa Mesa, Calif. 92626.

■

AMF Logic Sciences, Inc. has announced the **Turbograph DDS-11 Disk Storage System** designed to relieve the host computer of unnecessary participation in graphics processing tasks.

Data enters the system through AMF's HSRCOL applications software to a front-end processor as a compressed metafile. The processor then routes data to an HSR-11B graphics processor, included with the DDS-11, for rasterization.

Rastered data is stored on the disk system, which can be configured with up to 1G byte of memory. The DDS-11 includes built-in interfaces that support multipass and control requirements of individual plotters. Simultaneous four-color raster generation is supported to allow multiple copies to be plotted without registration by the host CPU.

The Turbograph DDS-11 Disk Storage System lists for $33,000 in single quantities.

AMF Logic Sciences, 10808 Fallstone Road, Houston, Texas 77099.

Terminals

Plexus Computers, Inc. has introduced a **terminal, dot matrix** and **daisywheel printers, a tractor feed** and **two sheet feeders.**

The terminal includes a 14-in., 24-line green phosphor screen, a detachable keyboard and two asynchronous serial ports.

The dot matrix printer is a 24-wire impact type with bidirectional, single-pass printing at speeds of 80 char./sec. in the letter-quality mode and 240 char./sec. in the draft mode. The daisywheel printer features bidirectional operation at 48 char./sec.

The terminal costs $795. The dot matrix and daisywheel printers cost $1,990 and $1,500, respectively. A single-bin sheet feeder costs $520, and a dual-tray model costs $960. A tractor feed for the daisywheel costs $335.

Plexus Computers, 3833 N. First St., San Jose, Calif. 95134.

Your network is much more than the sum of its parts. So Teltone offers you more than just parts of networks.

Multiplexers are rapidly becoming indispensable in today's data networks, so it's no wonder there are so many on the market. How does a network designer or manager decide which mux is best for what job? It's not easy—especially since the more powerful ones can be difficult to configure and install. May we offer our assistance? When you do business with Teltone, you'll get top quality products plus the applications assistance and service support you need. We don't just sell multiplexers, we engineer systems to work in your environment by providing hardware and software configuration, solutions to interfacing problems and more. We'll help you take full advantage of products like our M-861 packet switching mux, for example. Designed for use in both local and distributed networks, the M-861 is an economical and flexible way to link multiple terminals with multiple hosts at multiple sites. With an aggregate input rate of 307.2 Kbps, it works over voice grade lines, satellite and DDS circuits. Features include user-directed host selection, individual or group port contention, switched or permanent virtual circuits, BISYNC and SDLC/HDLC support and authorized access via any network connection. Used in combination with our M-860 statistical multiplexers and DCS-2 data/voice distribution system for local concentration, the M-861 can do a great deal to drive down the cost of communications. Want to hear more? Teltone has offices with applications support nationwide, and we'd welcome a chance to communicate with you.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT
Clinton Wilder
and Rosemary Hamilton
CW Senior Writers

Masi weathers Wang hurdles

J. Carl Masi has marketing in his blood. Little wonder he has earned the title of executive vice-president of sales and marketing at Wang Laboratories, Inc. He can blend honesty with just the right amount of hype to paint a very nice picture — even after his company suffered the worst year in its history.

Masi showed his stuff at a recent gathering of MIS executives at a Wang-sponsored conference in Boston. His brief, unscheduled talk at the seminar, called "Future Trends II: Software Development," focused on Wang's marketing, product and service strategy.

He worked hard to befriend his audience. Posing the question, "You're never happy, are you?" the marketing man answered for them, "Well, you shouldn't be."

Masi was at his best when referring to the recent troubled times at Wang as a "period of transition." No specific mention was made about the company's severe losses, its layoff of more than 1,500 employees or its loss of No. 2 man John Cunningham.

But his indirectness on that subject was balanced by candor in other areas, specifically when he outlined the company's various strategies.

On Wang's product strategy, Masi said the company will concentrate on base technology with added unique capabilities. The reason: "Otherwise, there will be no reason to buy Wang instead of IBM," Masi said. "We are recognizing that we can only be better

See MASI page 104

IBM at Rolm: More than blue suits and sneakers

By Maura McEnaney
and Peggy Watt

SANTA CLARA, Calif. — In late October 1984, one of the most creative entries in Rolm Corp.'s spirited Halloween costume contest was an employee robed in the the blue jeans uniform of Silicon Valley start-ups. But he topped his attire with the white shirt, tie and blue suit jacket that are synonymous with the company's equity partner, industry giant IBM.

A few weeks later, all Rolm employees found themselves with a merged corporate identity when the 15-year-old maverick telecommunications company was acquired by IBM for $1.25 billion. The board of directors gave its blessing, and champagne corks popped in celebration a year ago this week.

Speculation was rampant that the unique Rolm culture, credited by many with driving the company to revenue of more than $600 million, would give way to more traditional working conditions.

> *'Rolm is a creative but loose group. . . . It's been a little looser about products. But when you're IBM, you have to do it perfect the first time.'*
>
> — Rolm employee

Although the company's culture appears unchanged — sportswear-clad employees still work out at the company's recreation center, the name tags still say "Rolm" and workers in blue jeans can still be spotted ambling across the Rolm grounds — observers said they believe IBM is putting its mark on Rolm in a much more subtle manner.

IBM employees are on the job at Rolm, working as liaisons at each management level. Steven Schwartz, IBM vice-president and telecommunications specialist who was IBM's liaison to Satellite Business Systems until IBM traded it for a share of MCI Communications Corp., handles day-to-day interaction with Rolm. Though Rolm cofounder Kenneth Oshman now reports to Jack Kuehler, IBM senior vice-president for manufacturing and development, he remains president at Rolm.

The most obvious area of IBM influence is in the Rolm marketing strategy, considered before the acquisition to be weak domestically and virtually nonexistent internationally.

Customers today talk of joint sales calls and Rolm's newfound influence within large systems shops.

"In our most recent dealings with Rolm, IBM has had its account people present," said Glen MacKenzie, manager of communications technology at Chevron Corp., which houses one of Rolm's largest CBX II private branch exchange (PBX) installations.

But the joint missions have apparently not noticeably diverted the marketing thrust that made Rolm so appealing to IBM. "We're quite pleased — surprised, actually," MacKenzie said.

In large IBM shops, the Big Blue sales force points to the CBX II as the switching system of its choice, even over its own system.

"We are beginning to witness an integration of the marketing force," said Al Pross, vice-president of the Eastern Management Group, a consulting firm. "The IBM people are staying close to the Rolm people. They are leveraging their sales and gaining exposure in both roles."

The merger has also spawned Rolm Europe. IBM handles the marketing while Rolm Europe does development and manu-

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INSIDE

The Reagan administration has recommended filing unfair trade actions against Japanese semiconductor manufacturers/**103**

A decline in revenue, along with financial adjustments, produced a net loss at Intelligent Systems Corp., the parent company of Quadram and Princeton Graphic Systems/**105**

INSTANT ANALYSIS

"Virtually the rest of the electronics industry has stayed with the single-chip module approach until now."

— Paul McEnroe, president of Trilogy Systems, on the company's plans to develop a multichip module for nonmainframe systems

Cullinet cites sales progress but analysts see difficulties

By Rosemary Hamilton

WESTWOOD, Mass. — With its release of second-quarter results, Cullinet Software, Inc. has distanced itself even more from its super growth days of 29 consecutive quarters.

Results for the second quarter ending Oct. 31 of the software company's fiscal year 1986 were less prosperous than those reported in the same quarter a year ago. But second-quarter revenue did inch ahead of first-quarter revenue, prompting John Cullinane, president of Cullinet, to remark, "We're pleased with the progress we're making."

Revenue for the second quarter was $43.1 million, down from revenue of $43.6 million reported in the same quarter a year ago. Net income was $3.6 million, down from the net income of $5.9 million reported in the fiscal 1985 comparable quarter.

Although Cullinane noted the improvement over first-quarter revenue of $42.3 million — several industry analysts did not react so positively.

"My concern is that this kind of performance may last a while longer," according to Terence Quinn, an analyst with Dean Witter Reynolds, Inc. in New York. "These trends don't abate in one or two quarters."

Cullinane, however, said he sees the quarter as a success because "our goal was to do better than the first quarter, which was pretty much on target."

Yet Kenneth Burke, an analyst with Alex Brown & Sons, Inc. in Baltimore, said he believes Cullinet will "continue to experience some difficulties." Burke added, "They've had modest growth in sales of their data

See CULLINET page 105

Disappointing fourth quarter ends HP's lean fiscal year

By Clinton Wilder

PALO ALTO, Calif. — Seeing a continued decline in its overseas business and little pickup in domestic sales, Hewlett-Packard Co. reported a 23% decline last week in its fourth-quarter earnings on virtually flat revenue.

The disappointing quarter ended one of HP's leanest years ever, as the veteran minicomputer and scientific instruments vendor posted a 10% drop in profits for fiscal year 1985, ended Oct. 31. Sales increased just 8% from 1984.

Fourth-quarter earnings were $127 million, or 50 cents per share, compared with $167 million, or 65 cents per share, a year earlier. Revenue dipped slightly from $1.688 billion to $1.685 billion.

HP President and Chief Executive Officer John A. Young said domestic order levels were "somewhat stronger" during the period, while overseas orders, accounting for 45% of HP's revenue, remained sluggish. U.S. orders totaled $966 million, up 9% from the year-earlier quarter, but international orders declined 9% to $629 million.

"Overall, we remain cautious," Young said. "We have been lowering our prices as the dollar has weakened against local currencies . . . but this action comes in a period of economic uncertainty in some markets."

Young said HP would continue its cost-reduction measures of reducing its work force of 84,000 people by attrition, cutting salaries and instituting unpaid furloughs. But the firm "expects to ease required unpaid time off as allowed by improving business conditions," he added.

See HP page 105

E-A

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CW 1130

Influence of IBM style at Rolm

From page 99

facturing in the UK. IBM also lends a hand in Rolm's international telecommunications division.

Aside from marketing, analysts examining Big Blue's influence on the telecommunications company are quick to point to the October announcement of the Token-Ring as IBM's choice of local-area networks. A commitment to Rolm's CBX products and adaption of twisted-pair wiring to the IBM Cabling System was a significant sidelight to the long-awaited announcement.

"It was the first IBM-Rolm announcement, but IBM ran the show," said Ian Angus, president of Angus Telecommunications Group. In fact, most Rolm divisions have an IBM liaison assigned to them, according to Rolm spokesman Kenneth Rowe.

The liaison "helps Rolm deal with the IBM organization," a far larger entity than Rolm's entrepreneurial bureaucracy, Rowe said. Liaisons report to the Rolm division head but are on the IBM payroll.

Beyond the product presentation, October's Token-Ring announcement revealed some significant strategies for Rolm.

"IBM has come up with the architecture that shows how the CBX will fit into the IBM environment," Angus said. "[IBM] is making the CBX the core to linking together all the ASCII devices."

Complete integration way off

Despite the direction toward the CBX II, some analysts said they believe complete integration with the IBM product line still appears way off.

"The CBX II is an IBM-recommended PBX option, but it is still a separate product. There will be no real integration of the IBM and Rolm product line in the next three or four years," predicted Brian Jeffery of the International Technology Group in Palo Alto, Calif.

However, it is not that Rolm has ignored IBM in the past; its Cypress family of integrated voice/data systems features the Cedar, an IBM-compatible microcomputer with built-in telephone, and the Juniper, a telecommunications unit designed to attach to the IBM Personal Computer and compatible micros.

In the past year, Rolm has introduced several enhancements to existing products as well as broadened current product lines with new models. The capacity of Rolm's PhoneMail voice message service line, introduced in 1982, was increased to handle as many as 8,000 users on 128 channels. Later, a new version to serve non-Rolm PBXs or Centrex systems was released.

The CBX II line was enhanced to accommodate better the least-cost, long-distance call switching popular in many businesses upon the advent of equal access. And this fall, Juniper was upgraded with personal computer-resident communications packages to operate with IBM's host-based Distributed Office Support System. The next version, of course, is the promised local-area network link.

However, employees working on those upcoming products said Rolm seems to be adopting the IBM slow-but-sure philosophy — not going out on a limb — of introducing a product only after the market is clearly demonstrated.

"Rolm is a creative but loose group. There's a lot of Indians and few chiefs," one employee said. "Maybe it's been a little looser about products. But when you're IBM, you have to do it perfect the first time." Observers said that caution underscores Rolm's role in the foreseen head-to-head battle between IBM and AT&T.

International Technology Group's Jeffery said he expects increasing emphasis on the CBX II, even to the point of taking on the electronic mail/voice traffic functions of the Cypress line.

"In the future, we can expect to see the CBX II as a distinct product line, a CBX II attachment option for all IBM products, with emphasis on" IBM Personal Computers and the System/36, he said.

Frose of Eastern Management Group said he expects Rolm applications products will proliferate in the next few years to pair with upcoming IBM products.

Whether Rolm will keep the products coming to market on time will depend on the company's research and development efforts, other analysts said. And that is just the area that has been noticeably beefed up since IBM took the reins.

Approximately 10,000 employees now

Rolm has a total of approximately 10,000 employees now, up some 2,000 from a year ago, but would not specify how many transferred from IBM divisions.

"IBM has thrown R&D people into Rolm. Rolm is much faster now than it was about a year ago," according to Angus.

The employee count increased even with the loss of about 1,000 employees in the Mil-Spec military computer division that was sold at the order of the U.S. Department of Justice to satisfy antitrust laws. The division accounted for about 15% of Rolm sales.

Loral Corp. of New York picked up the division in April for $100 million after a conditional agreement fell through for a leaveraged buyout by Mil-Spec employees.

But while Rolm employees' former colleagues at Mil-Spec are getting used to a new boss, much of the average worker's life goes on the same.

"There've been no take aways" of benefits, Rowe said. Among those

The Cipher

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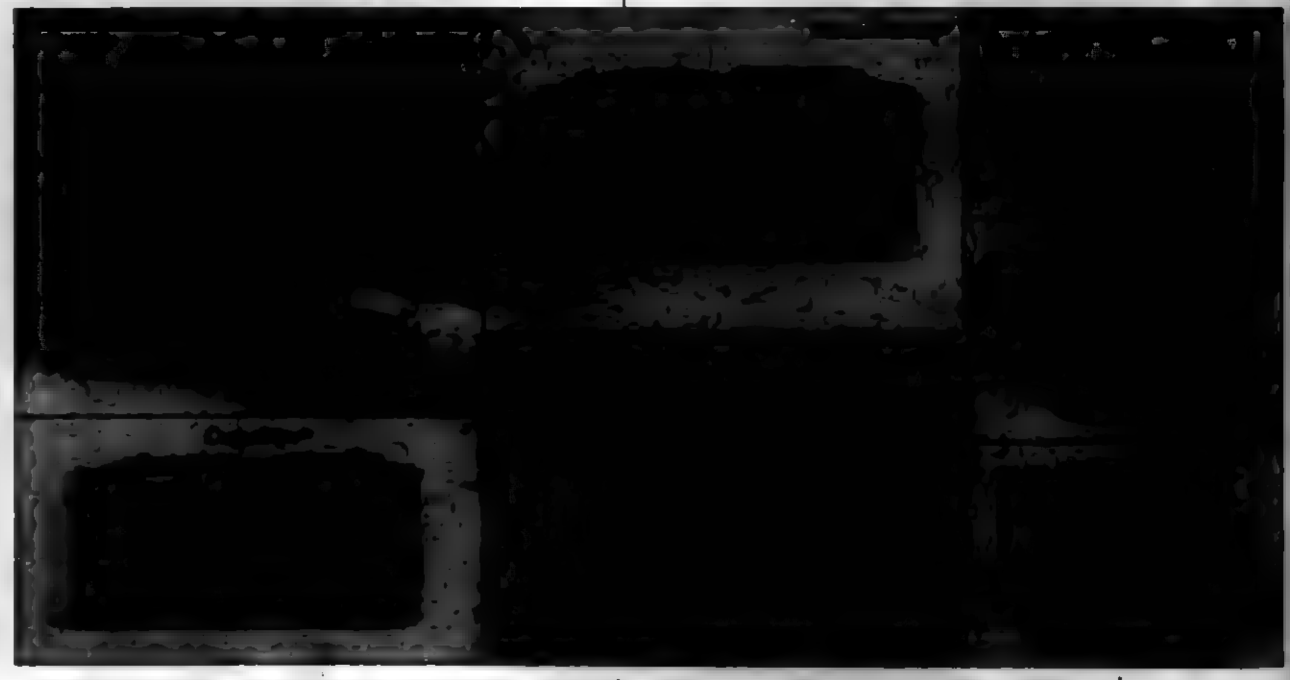

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COMPUTER INDUSTRY

much-publicized benefits — many unmatched at IBM divisions — are flex time that allows employees the opportunity to use the company's extensive recreational facilities and a paid, three-month sabbatical available to all employees after six years at Rolm. The sole exception is a change in the stock-option plan to conform with the IBM equivalent, a tax-deferred savings plan that is no slouch.

The accounting department probably had the biggest adjustment, a change in Rolm's fiscal year from the June/July schedule to conform with IBM's calendar year budgeting.

"I didn't even know [until] I'd been there a month and a half that they were an IBM company," said a temporary agency employee who is often assigned to Rolm. "I've yet to see an IBM memo."

Though IBM is newly in charge, it is not a newcomer to Rolm. IBM's buyout last year picked up the remaining 77% of Rolm stock available, following an intial 15% purchase of Rolm stock in 1982 and another 8% after that.

Even then, there were nervous jokes about the giant moving in. Rolm cofounder Oshman once joked that anyone caught wearing a white shirt three days in a row would risk dismissal for trying to subvert Rolm culture.

He later tested IBM representatives' sincerity about retaining the Rolm lifestyle by offering them suds at the regular Friday beer bash, despite IBM's iron-clad no-drinking rules.

Those beer bashes aren't as frequent, perhaps, but they still occur when the occasion warrants.

When Rolm landed a $14.3 million installation at the University of Rochester, New York, earlier this month, Oshman called for a toast to celebrate the sale of Rolm's third largest CBX II system, serving 13,000 voice and 5,400 data lines.

IBM liaison Bill McDonnal, of IBM's systems development group, in IBM casual — sweater over white shirt — approached the microphone to lead the festivities. Members of the crowd passed a sudsy mug to him and cheered when he took it.

Oshman then told McDonnal, according to employees, "I hope you realize that with us being here, it puts to rest those rumors about the death of the beer bash." McDonnal, Oshman continued, had a mug in his hand before his speech, "and I'm glad to see he's got one in his hand again." The crowd cheered.

U.S. lodges trade gripes

By Bryan Wilkins

WASHINGTON, D.C. — The Reagan administration, making good on its campaign to take action against trade injustices it said are hurting U.S. industry, has completed two separate investigations of Japanese electronics exports and has recommended that unfair trade charges be filed against Japan.

A Cabinet-level strike force investigating alleged Japanese dumping of 256K-byte random-access memory chips in this country has recommended that President Reagan initiate unfair trade complaints with the Japanese government for selling the 256K-byte semiconductors in the U.S. below manufacturing cost.

At the same time, the strike force urged speedier government efforts to open Japanese semiconductor markets following a complaint filed by the U.S.-based Semiconductor Industry Association (SIA), which charged that U.S. companies are barred from penetrating the lucrative Japanese market by Japanese buying practices.

The charges have been strongly denied by Japanese industry and government officials, who have lobbied heavily to thwart the allegations in Washington, D.C. The SIA complaint requires the U.S. government to investigate the charges and, if proven to be true, to impose tariffs on Japanese electronics exports to the U.S.

In a related move, the International Trade Commission has ruled that three U.S. manufacturers — Advanced Micro Devices, Inc., Intel Corp. and National Semiconductor Corp. — have been subjected to below-cost pricing by Japanese chip manufacturers in the U.S. The International Trade Commission action did not go any further in recommending retaliation.

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COMPUTER INDUSTRY

Masi weathers Wang hurdles

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by degree." Target areas for product development include telephone and computer integration, imaging systems and proprietary application software.

The future marketing strategy will focus on Wang's installed base, Masi said, noting that it has not been the top priority in the past. "When you're growing at 41%, there's only one focus — growth," he said. In the future, Wang will concentrate on "keeping users happy," as they hopefully migrate or upgrade to Wang's VS systems.

Masi prefaced his comments about Wang's service strategy with a second reference to the company's rapid growth. "At 41% [growth] you don't have much time to think. Now we see profitability in oversupporting our customers," he said. To achieve this, Wang must become "its own best user to better serve our customers," Masi said.

Masi said he believes Wang is more capable of putting those strategies in place now because it is a mature company. "We went through our infancy, our rebel teen years and our 20s when we thought we were the center of the universe," he said. "Now we see ourselves as an adult."

He then went on to expound on how Wang will reach new successful heights. And just when the picture he was painting got too rosy, he said, "We're not there yet, that's for darn sure."

■

Whether or not you're a fan of Apollo Computer, Inc., you can't accuse the company of sitting on its hands. Fresh from its third-quarter losses and layoffs, Apollo kept the business wires buzzing recently with a major OEM agreement with Alliant Computer Systems Corp., $3.8 million worth of joint venture work with Spectragraphics Corp. and the dramatic resignation of founder and Chairman J. William Poduska to start a new company.

> ❞
>
> *You can't accuse Apollo Computer of sitting on its hands.*

The last development, which raised eyebrows from Chelmsford, Mass., to Cupertino, Calif., bears watching. The dynamic Poduska said he followed the entrepreneurial "call of the wilderness" this time to develop workstations that Poduska envisions will place high-end mainframe power on the desktop. A 20 million to 30 million instructions per second machine by early 1987 sounds awfully ambitious for a company that doesn't yet have a name, but time will tell.

As for Apollo, it is clear that management is pulling out all the stops to restore its former standing as one of the computer-aided design and engineering market's notable success stories.

Apollo's recent gloomy financial news proved how far the high flyers could fall in the industry this year. But by reaching out to the IBM mainframe environment with Spectragraphics and adopting Alliant's parallel processors for CPU power, Apollo served notice that it won't mind strategic partners in its attempted return to the top.

■

While Cliff Robertson attempts to do for long-distance telecommunications what Lorne Greene did for dog food, two other high-tech companies recently joined the personality parade. The clear voice of network sports announcer Dick Enberg will be hawking wares for GTE Corp., while Sperry Corp. has enlisted veteran actor Kirk Douglas as a corporate spokesman. Douglas is part of Sperry's most extensive (and doubtless most expensive) advertising campaign ever.

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Intelligent Systems posts $2.5 million second-quarter loss

Company blames industry slump

By James A. Martin

NORCROSS, Ga. — Intelligent Systems Corp. recently said it lost $2.5 million in the second quarter ended Sept. 30, compared with a net income of $2.5 million, or 23 cents per share, for the same period in 1984. Second-quarter revenue declined from $29.6 million to $26.8 million.

For the first half of its fiscal year 1986, also ended Sept. 30, the company said that its revenue was $55.2 million, compared with $59.8 million for the year-earlier period.

Net income for the first six months was $1.7 million, compared with $6.3 million in fiscal 1985.

Losses for the second quarter and first six months are a result of an industry slowdown on personal computer enhancement board products and terminals, a spokesman said. The company said an inventory adjustment of more than $2 million for printers and hard disks purchased for resale last year was included in cost of goods sold.

An undisclosed reserve for long-term notes receivable "was also provided due to the uncertainty of future collections," the spokesman added.

Intelligent Systems said that it is anticipating a stronger third-quarter performance due to increased monitor sales from its Princeton Graphic Systems division and the unveiling of new products such as an IBM Personal Computer AT enhancement that was announced by its Quadram Corp. division at Comdex/Fall 1985 in Las Vegas.

HP declining quarter ends

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For the year, HP's domestic sales grew just 5% to $3.69 billion, while revenue from overseas sales increased 12% to $2.81 billion. Year-end net earnings dropped by $58 million to $489 million. Earnings per share for the year were $1.91, down from $2.13 per share a year ago.

The 1984 amounts did not reflect a one-time tax benefit of $118 million, or 46 cents per share. The tax benefit came from a tax law change related to the company's Domestic International Sales Corp.

Orders for the year increased by only 1% to approximately $6.4 billion.

Cullinet cites sales progress

From page 99

base management systems. [Sales in] both their applications and information center products have actually declined, and those two pieces were what fueled the overall growth."

Burke, who said he was "not surprised to see [Cullinet] coming in where it did," said he doubts the software company will return to the whopping growth it experienced in the past. In fiscal year 1985, for instance, Cullinet reported a 53% increase in revenue to $184 million and a 50% increase in net income to $24.7 million from the previous year.

In a separate matter, both Burke and Quinn said they had trouble getting a handle on Cullinet's performance for the second quarter because the company refused to comment.

Cullinane acknowledged that his company had invoked a quiet period two weeks prior to and two weeks following the end of the quarter. "It was the most restful period we've ever had," Cullinane said.

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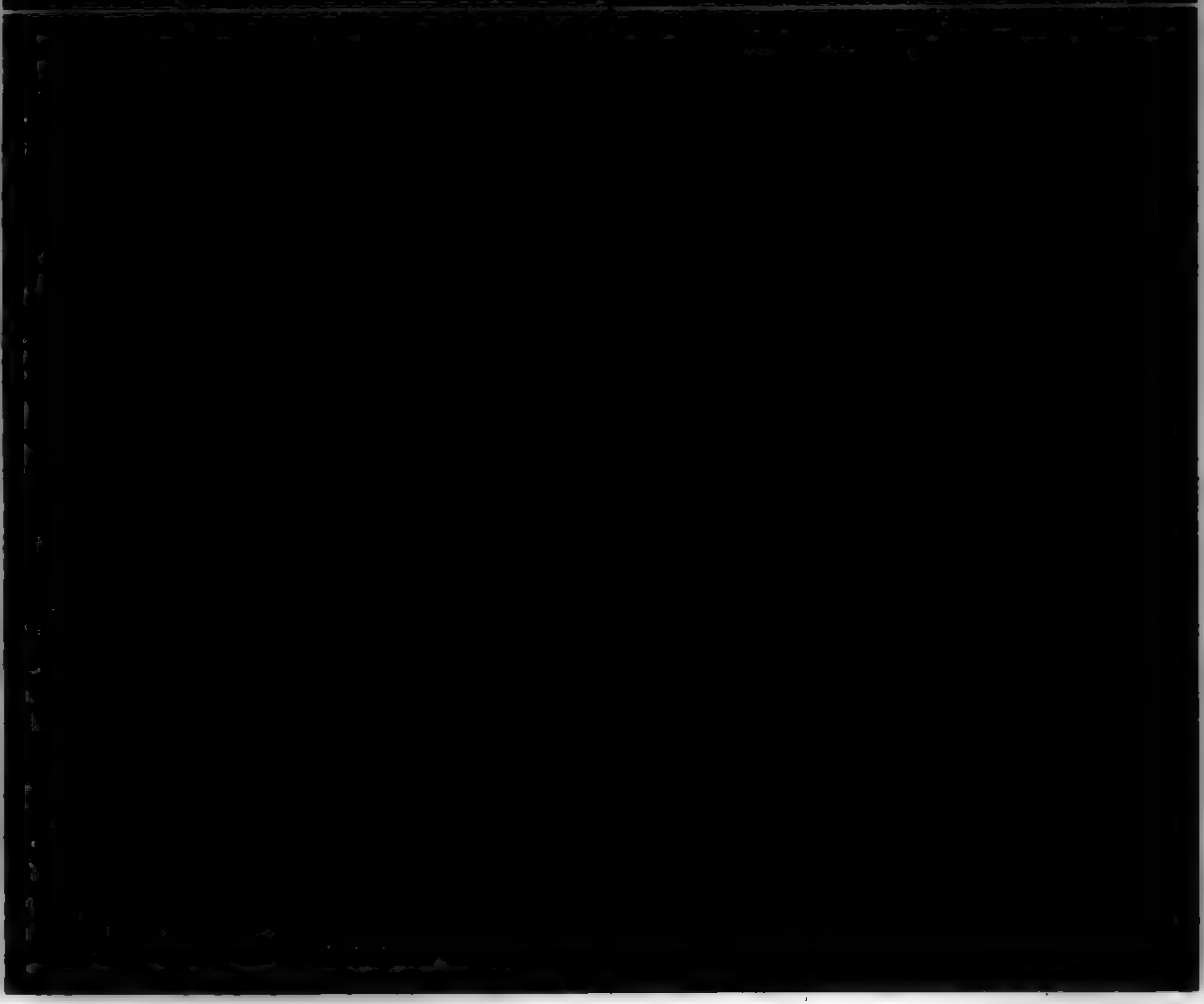

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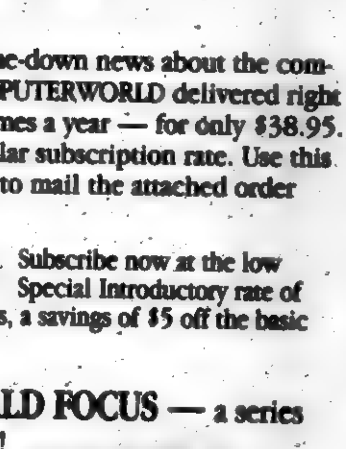

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If you're seeking a high lvl. internal consult. role w/diverse projs. incl VOICE & DATA, call to discuss this position! Our client is a prominent BOSTON fin'l. inst. who seeks talented HW configuration design & planning specialist. Desirable bkgrd. incl. IBM MVS SNA, DEC VAX, LANS, PBX's & nat. network design & support. Salary to $50,000.

BOSTON
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Emerging distributor seeks tech. astute proj. ldr. for on-line devel. State-of-the-art VAX/VMS, COBOL, BASIC, FMS & DCL environ. incl. expanding multi-plant locations. Hi visibility in growing MIS shop. $35,000.

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S/38 — Direct & guide major proj. for CT mfr. Should have 5+ yrs. exp. designing & programming mfg. sys. in user-oriented environ. Good proj. control skills req'd. IBM S/38 bkgrd. pref. Salary $45,000.

HARTFORD
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2+ yrs. HP-3000, COBOL bkgrd. w/fin'l. app. qualifies for SUBURBAN area oppty. Indiv. will have extensive user contact interface & design respon. Salary to $33,000.

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Direct the D.P. activities in a lge IBM 4300 MVS facility. Min. 10+ yrs. progressive sys. mgmt. exp. Health care sys. bkgrd. desired. B.S. degree req., MBA desired. $40,000 - $50,000.

ROBERT HALF

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Contact the Manager of any office listed below.

100 Summer St., Boston, MA 02110
(617) 423-1200
111 Pearl St., Hartford, CT 06103
(203) 278-7170
906 Turks Head Bldg., Providence, RI 02903
(401) 274-8700

Client Companies Assume All Fees.

ASSISTANT DATA PROCESSING MANAGER

Life General Security Insurance Company, primarily a Group Life & Health carrier located in Coral Gables, Florida has an excellent career opportunity in its data processing division for an assistant manager (number two position within the department). Solid experience working with a variety of health insurance applications in a mainframe environment, solid COBOL coding background, supervisory experience and excellent communication skills are absolute requirements.

If you'd like to be considered for this opportunity, please send your resume with salary history to:

LIFE GENERAL SECURITY

Attn: Linda Samano
1666 Madruga Avenue
Coral Gables, Florida 33146

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PROJECT LEADERS/ PROGRAMMERS/SYSTEMS ANALYSTS

The Christian Broadcasting Network, Inc., located in Virginia Beach, Virginia, has current openings for Project Leaders/-Programmers/Systems Analysts to support the data processing needs of CBN University. We are currently in the process of development, design and implementation of computer systems for the areas of administration, for student and financial systems, automated library systems, office automation and academic support systems. CBN University currently awards Master's degrees in the Schools of Biblical Studies, Business Administration, Communications, Education, Public Policy and Journalism. If you are a Data Processing professional with experience in university computing systems and desire to apply, send resume and salary requirements, in confidence, to:

The Christian Broadcasting Network, Inc.

Employment Department - Box CC
CBN Center
Virginia Beach, VA 23463

PROGRAMMER/SYSTEMS SANTA CLARA COUNTY MVS SYSTEMS PROJECT LEADER

Opportunities for experienced Systems Programmers to assume key responsibilities for MVS system generation and tuning, staff supervision, project management and application development support.

Your professional profile must include 3+ years generation/maintenance for an MVS operating system, including performance tuning. CICS, IDMS, VTAM or MVS/XA background desired. Knowledge of IBM 308X or 308X required. Salary [illegible] effective [illegible].

Write or call Santa Clara County, Data Processing Center, 1555 Berger Drive, Bldg. 2, 3rd Floor, San Jose, CA 95112. Jackie McPherson (408) 299-4301. Inquiries should reference Sr. Programming Analyst Systems Position. Equal Opportunity Employer.

COMPUTER ANALYST WANG SYSTEMS EXPERIENCE

Exciting opportunities exist for Systems Analyst developing Navy Logistics Software Systems with locations in either Alexandria or Norfolk Virginia areas. Successful candidates will plan, design, and develop large scale systems in COBOL using WANG/VS-100 hardware. Applicants should possess verbal and written skills, strong leadership qualities, US citizenship and the following credentials:

- 5 + years COBOL Application Experience
- B. S. in Bus. or Technical Field or Equivalent
- Structured sys. Design and Implementation
- 1 + years exp. Using WANG/VS Systems

Send resume to:

CW-84719
Computerworld
Box 880
Framingham, MA 01701

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SENIOR BIPOLAR PROCESS ENGINEER

Development and characterization of ADB-II process and enhancements, responsible for process optimization and integration of silicon-on-insulator technology, and the development of technical consultation activities.

Ph.D. degree in Metallurgical (or Mineral) Engineering. Requires 3 years experience in metallurgical process development and process integration. Requires experience or educational background in surface chemistry, metallurgical processing and surface analysis, electronic materials processing, electron microscopy, and thin film technology. Salary: $3180 per month.

Submit resumes to:

Mr. Bob [illegible]
#S-121
Minnesota Job Service
390 Second Avenue South
Minneapolis, MN 55401

SALES REPRESENTATIVE

Duties: Analyze needs of customers in area of Quebec Canada; confer with, and recommend to, French-Canadian customers computer software and systems that best meet requirements. Promote computer software sales in Quebec area. Experience Required: 2 years in sales or business management, including 1 year sales experience in Quebec area. At least 1 year's sales experience in Quebec area essential. Must speak, read and write English and Canadian-French. Must travel to Canada 3-4 times per year for periods of up to 2-3 weeks. Salary: $18,000 per year plus commission. 40 hours per week, 9 a.m. to 5 p.m. Send resume to 7310 Woodward Ave. Room 415, Detroit, MI 48202, Ref. #[illegible]. "Employer Paid Ad" DOT 275.357-010.

PROGRAMMER/ANALYST

IDMS, CICS, ADSO

Training and consulting. Flexible work schedule. Excellent potential for personal development. Excellent salary and benefits. Send resume to:

Personnel Department
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New York, NY 10010
(212) 777-8040

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Salary: $34,992 - $42,528 annually. (Plus 5.5% effective 1/86 and excellent management benefits). To administer city data processing services. Degree in Computer Science or related field and 3 years of increasingly responsible experience in computer operation and systems development and design including 1 year in a supervisory capacity. Apply City of Fairfield Personnel, 1000 Webster Street, Fairfield, CA 94533. 707-428-6500, ext. 2098. Closing date December 30, 1985. EOE/AA Employer.

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The Computerworld Bulletin Board – This is a low-cost way to buy or sell individual pieces of hardware or software. Sell below for details on sizes and cost.

Here's the data you need to know to place your ad:

The deadline for classified advertising is ten days prior to the issue desired. (That's six working days prior to the issue date). Ads may be sent in by mail. For camera-ready ads, a velox or negative is required. For ads to be typeset by us, enclose a layout if needed, along with any logs or artwork you would like to include in the ad. These must be dark and clear for reproduction purposes.

Our ad takers will be happy to take smaller sized ads over the phone. We can provide simple line borders for you, if desired.

We also provide telecopier service at extensions 410 and 451.

The open line rate is $10.35 per line and there is a minimum size ad of 2 column inches (28 lines) at a cost of $289.80. Column inches are calculated by multiplying the number of columns wide by the number of inches deep that your ad is. Depth increases in half-inch increments and we accomodate up to 5 columns. Column widths are as follows:

1 column. . –. 1 13/16" or 11 picas
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If you wish a box number to be assigned to your ad, it will cost an additional $15.00.

First-time advertisers must send either payment or a purchase order along with their ad.

For the **Computerworld Bulletin Board**, ads may be sent by mail, by telecopier or given over the phone. Space is available in one column by one inch deep units only. They are set up using a simple format with standard typefaces and no borders or logos are allowed. The cost of one standard unit is $140.00. These units may be combined to form deeper ads.

So, whatever the problem, simply supply us with the data we need to help you on your way to a solution, quickly and efficiently.

If you wish to reserve space, or would like more information, call us at 1-800-343-6474 or (in Mass.) 617-879-0700. All materials should be sent to:

COMPUTERWORLD Classifieds

375 Cochituate Road, Box 880, Framingham, Mass. 01701

Operating System Specialist

The Lawrence Livermore National Laboratory has a challenging opportunity for a Computer Scientist to support an IBM or equivalent processor which is currently being acquired. Install, maintain and consult on VM/CMS operating system and related packages. Participate in the specification and selection of the ASSIST (Administrative Support System for Information Storage and Transfer) project.

Requires BS/MS in Computer Science, Math or related field, or equivalent experience. Minimum of one year direct experience responsible for VM/CMS installation. Working knowledge of related IBM productivity aids and other packages such as PROFS. Familiarity with Fourth Generation Languages, especially NOMAD, is desirable. Knowledge of data and terminal communications equipment and protocols a strong plus.

To apply for this position please send your resume in confidence to: **Sue Porter, Professional Employment, Lawrence Livermore National Laboratory, P.O. Box 5510, Dept. [illegible], Livermore, CA 94550.**

U.S. Citizenship required. An equal opportunity employer m/f/h/v

University of California
Lawrence Livermore National Laboratory

National Life
of Vermont

a Fortune 50 life insurer, established in 1848, with a home office in the heart of the Green Mountain ski country, has openings for the following:

IDMS/R Data Base Administrator
Support Person for ADS/O and ADS/B
Support Person for OLQ and AFS

Our rapidly expanding MIS Department is seeking highly motivated individuals with financial/business backgrounds for our systems programming area. Our environment includes two IBM 3083 mainframes operating under MVS with CICS and TSO/ISPF. We use state-of-the-art development tools and have recently installed Cullinet's IDMS/R, ADS/O, ADS/B, OLQ and ASF.

Qualified candidates will have a minimum of 3 years of programming experience including some Assembly and knowledge of our Cullinet products. Systems programming experience on a large scale IBM system utilizing OS/MVS is required. Life insurance experience desirable. Candidates must demonstrate good communication skills and ability to assume project leadership roles.

Starting salary commensurate with experience. Comprehensive benefits package available, including incentive bonus and relocation expenses.

Send detailed resume to:

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Systems Analyst
(Int'l Consulting Specialist)

- To provide consulting support & direction to [illegible] [illegible] [illegible] FORTRAN, COBOL, BASIC [illegible] [illegible] Send resume to: NYS Job Service, [illegible] Church St., White Plains, NY [illegible]. Indicate J.O. [illegible]. D.O.T. Code [illegible].

SYSTEM 38 — RPG III PROGRAMMER

Outstanding Central NY distributor has dramatic S/38 expansion plans. Need programmer/analyst w/min. 2 yrs. S/38 exp. Pref. BA/BS degree & telecomm. bkgrd. Excellent oppty. w/great firm in upstate city. Salary to $34,000.

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(716) 842-[illegible]
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PROGRAMMER ANALYST

CPS is [illegible] [illegible] [illegible] [illegible] if you have experience in any of the following:

- DATA BASES: [illegible] with ADSO, [illegible], ADABAS, ORACLE, FOCUS.
- APPLICATIONS: [illegible] [illegible]
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- LANGUAGES: COBOL, PASCAL, PL/1, ADA.

All positions are full time salaried with top compensation [illegible] benefits. Excellent growth opportunity for qualified individuals.

Call today or send your resume to:

cps
Consolidated Programming Systems
[illegible]
Los Angeles, CA [illegible]
(213) [illegible]
EOE, M/F/H

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S/38 - UNIX-C

[illegible]

UNIX-C TRAINING SUPERVISOR [illegible]

A division of a multi-national Fortune 20 corporation, a leader in the information systems industry, is seeking a unique individual to head up its UNIX-C training group. To qualify, a strong technical background in UNIX and C as well as experience as a platform [illegible] is mandatory. Suburban location.

S/38 positions, in a variety of environments, are available for individuals with 6 months or more experience. Below are some examples:

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[illegible] - MGMT. .... Open

For these and other opportunities, please call or send resume to:

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HELP WANTED: Senior Software Engineer

PLEASE SEND RESUME TO:

EMPLOYMENT SECURITY DEPARTMENT
[illegible] DIVISION, ATT: AEC # [illegible]
OLYMPIA, WASHINGTON [illegible]

JOB DESCRIPTION: Senior Software Engineer, Systems Language Group. Designs, implements, and tests complex and high level systems and software for mini and micro computers and processors. Assumes lead responsibility for design of Computer system software for the [illegible] family ([illegible]) and the 68000/[illegible] (Motorola) processors utilizing FORTRAN, Assembly and Pascal languages. Assumes major project responsibility including: 1) requirements and analysis of project specifications; 2) product design; and 3) implementation schedules.

REQUIREMENTS: M.A. OR M.S. IN COMPUTER SCIENCE, MATHEMATICS, ELECTRICAL ENGINEERING OR PHYSICS. COMPUTER SOFTWARE DESIGN OR PROGRAMMING: 6 MONTHS' EMPLOYMENT EXPERIENCE UTILIZING PASCAL, FORTRAN AND ASSEMBLY LANGUAGES AND UTILIZING 8086 (INTEL) AND 6800 OR 68000 (MOTOROLA) PROCESSORS. [illegible] COURSE HOURS IN COMPILER DESIGN INVOLVING FORMAL PARSING TECHNIQUES.

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SYSTEMS SOFTWARE SPECIALISTS

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The New Mexico Information Systems Division is recruiting professional **SOFTWARE SPECIALISTS** to support its rapidly expanding multiple processors environment. Openings currently exist for systems programming personnel in the MVS, VM, and Teleprocessing areas.

The operating environment of the State of New Mexico's central computer installation includes two IBM processors running MVS and VM. Both SNA and non-SNA communications support CICS and VM/CMS.

APPLICANTS should have extensive knowledge of IBM software and assembler. MVS applicants must possess extensive knowledge of MVS, JES2, and TSO; VM applicants should have similar backgrounds in VM/CMS, preferably utilizing VCNA and VRNA; and teleprocessing applicants should possess extensive knowledge of SNA communications in MVS and VM environments.

Depending on the position and your qualifications, salaries range from $24,000 to $36,000. A comprehensive benefit package is included, and a four-day workweek and flextime are also offered.

For **IMMEDIATE** and **CONFIDENTIAL** consideration, please submit your resume to:

JOHN BOYD, General Services Department, ISD
715 Alta Vista
Santa Fe, New Mexico 87503

EQUAL OPPORTUNITY EMPLOYER M/F/H/V

[illegible]

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United is looking to integrate state-of-the-art labeling/encoding/reading capabilities into new and existing systems. We seek an individual to analyze the best possible technologies to accomplish this goal, develop systems specifications and lead the implementation effort.

This individual will review current parts tracking/labor data collection systems, survey current technologies related to optical or magnetic encoding/scanning/reporting systems, and make recommendations to management regarding long-term implementation and benefits. Several years of systems analysis and design experience within a large-scale manufacturing, service or retail organization with hands-on knowledge of encoding systems technology essential.

If you're looking for the opportunity to contribute to a vital new inventory and production control system, the nation's largest airline invites you to learn more about our Maintenance Operations Center. We provide an outstanding salary and benefits package. Pass/reduced fare air travel privileges and relocation assistance package available. Send your resume with salary history to: Professional Employment/SFOPX-117, United Airlines, San Francisco International Airport, San Francisco, CA 94128. *Equal Opportunity Employer.*

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[illegible]

PROGRAMMER/ANALYST II

City of Overland Park, Kansas

If you desire to work in a stable and progressive working environment, and you meet the job specifications listed below, we invite you to apply for the position. Overland Park has an IBM 4381 supporting over 100 local and remote terminals.

The successful candidate must have a minimum of 2 years COBOL programming experience in an IBM DOS/VSE environment, including experience writing on-line applications, and a four year college education. In addition you must have strong interpersonal communication skills and the ability to work well with user personnel.

Overland Park is located in the Kansas City, Missouri metropolitan area. Overland Park is known internationally for its innovative data processing applications, and has a reputation as one of the most progressive cities in the nation. We offer an excellent benefit package and an outstanding working environment in a pleasant suburban location. Salary range is $[illegible] to $[illegible] annually. Qualified candidates should send a complete resume by December [illegible], 1985 to:

Mr. Joseph P. [illegible]
Human Resources Director
CITY OF OVERLAND PARK
8500 Santa Fe Drive,
Overland Park, KS 66212

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PROGRAMMER: In charge of structuring, coding & debugging syst. programs for application rel. to fin. institutions. B.A. in Engr. or Comp. Sci., 2 yrs exp. or 2 yrs rel exp. Programming. Must know COBOL, OS/MVS, George-3, ROSCOE, PANVALENT, IMS DB/DC, MFS, BTS, EASYREV, FILETAB & SPSS. Hardware - IBM 370/158, 168, AMDAHL V8 & ICL. $32,300/yr to work 40 hrs/wk. Mail resume to: NYS Job Service J.O. #NY8019300, 175 Remsen St., Brooklyn, NY 11201, D.O.T. 030.162.014.

COMPUTER SYSTEMS ANALYST wanted to plan and design software programs for government records and function applications using COBOL and BASIC languages and OXFORD, Easytrieve, Panasophic, SYNCSORT and DOS software for use on 4381 IBM; confer with users to review results and participate in problem determination and program debugging. Requires M.S. degree in Computer Science. $21,282.00 per year. 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #[illegible] "Employer Paid Ad"

New Data Center North Carolina

Now staffing 600- man data center. Openings exist for: MVS, VTAM/NCP & CICS Systems Programmers. Also, need IMS & IDMS DBA's & Sys. Progs. Work in State-of-the-Art IBM dual 3083's MVS/XA. Immediate interviews/hires. Start now or in 1986. Excellent salaries and accelerated career paths. No resume necessary. Call Camille Hantuna collect at (704) 375-[illegible] or send resume to:

212 S. Tryon Street, Suite [illegible]
Charlotte, NC 28281

FOX-MORRIS

SYSTEM MANAGER MEDICAL RESEARCH

Emory University Atlanta, GA

Manager of Clinical Research info system using DEC VAX 11/750 computer. Solid educational and communication/teaching skills essential. Prior experience with 11/750 computer, research study design/statistics desirable. Permanent, non-tenure faculty position at rank of Research Associate with opportunity to participate in original research. Send resume and names of 3 references no later than Dec. 15, 1985, to:

[illegible], M.D., Director
Clinical Research Facility, [illegible]
Emory University
Atlanta, GA 30322

Director,

Test Head Development responsible for supervising two teams designing a revised test head assembly for VLSI test systems, and related duties. Requires BSCS/BSEE and 5 years' experience in high-speed systems design (computer or similar). Also requires strong background in ECL and CMOS gate arrays, subsystem specification (interfaces, test requirements, etc.), and use of CAD systems. Salary: 72K per year. Job site: Milpitas, CA. Send ad with letter of application to: Job # 3796, P.O. Box 9560, Sacramento, CA 95823-0560. EOE.

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One Research Engineer position for Construction Management engineers with FORTRAN and C programming experience. The position requires an MS in Civil Engineering with an emphasis on construction management and advanced training or experience in computer science including computer graphics. Salary is commensurate with qualifications. Send resume, references, current salary and availability information to:

Dr. Kenneth Will
SITCES Systems Lab
School of Civil Engineering
Georgia Institute of Technology
Atlanta, GA 30332

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Plan, develop and direct sales of the company products such as CAI/CBT (Computer Aided Instruction/Computer Based Training) hardware and software to Taiwan, Hong Kong, and People's Republic of China. Travel about 30% of the year to develop foreign markets, negotiate sales, and approve sales contracts. Require at least 2 years of college education, 2 years experience in the job being offered, or 2 years experience as a Sales Manager or General Manager involving Computer Aided Instruction/Computer Based Training. Candidate must be able to speak, read and write Mandarin Chinese. $[illegible] per year. 40 hours per week, 8 a.m.- 5 p.m. Send resume to Illinois Job Service, [illegible] N. [illegible] Street, Champaign, Illinois 61820, Attn: Wanda Byrd. An Employer paid Ad.

SENIOR SOFTWARE ENGINEER/ANALYST: Must possess MS Degree in Computer Science and have 4 years experience as systems analyst. Design and development of real-time multi-tasking process control systems for food, dairy and other related industries. Responsibilities include design and development of applications software packages using "C", Pascal and Macro-11M, Assembler Languages for DEC, DSC-11, PDP-11 Computer Systems. Knowledge of DEC's RSX-11M operating system required. Position requires good understanding of computer and I/O interface hardware and demonstrated experience in real-time, multi-tasking software development. Requires knowledge of process control programming and data communications. Salary $28,000 per year, 40 hours per week, 8:30 a.m. to 5:30 p.m. Travel required. Send resume to: Tech-Con Inc., 1111 Northshore Drive, Suite [illegible], Knoxville, TN 37919.

SYSTEMS PROGRAMMER

We have an opportunity available for an experienced systems programmer to join our staff. Our current environment consists of: 16 Meg 4381/VM/CMS/DOS/CICS/VTAM/NCP/OLT. We are currently in the process of converting from DOS to MVS. If you have experience in any of the systems software we use and/or MVS/JES2/[illegible], we would be interested in talking to you. Please submit a current resume including your salary in confidence to:

[illegible]
Personnel Dept.
[illegible]
[illegible]
EOE M/F

COMPUTERWORLD 1986

Every week, we deliver more of your target audience than anyone else. Over 600,000 computer-involved professionals. We have listed for you all pertinent information for placing an ad in computerworld, along with our 1986 price increase. Please contact us regarding contracts for 1986 or for further information.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy-/Sell/Swap. (Available upon request: Software Wanted, Real Estate, and others).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines. Any special artwork should be enclosed with your ad also. Logos must be submitted on white bond paper for best reproduction.

Cost: Our rates are *$161.70 per column inch. (Each column is 1 13/16") Minimum size is two column inches (1 13/16" wide by 2" deep) and costs *$323.40 per insertion. Extra space is available in half-inch increments and costs *$80.85. Box numbers are *$15.00 extra per insertion.

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1 column x 2" = *$ 323.40
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Telecopier extensions:

451 *410*

* Reflects 1986 price increase as of December 30th edition of Computerworld.

SYSTEMS ANALYST

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We offer a competitive salary, relocation assistance and an outstanding benefits package. The work is challenging and offers the opportunity for professional and personal growth. For consideration, please send your resume including SALARY HISTORY to:

Employment Manager

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[illegible] Consultants, Inc.
1777 S. Harrison St., Suite [illegible]
Denver, CO 80210
or call ([illegible]) [illegible]

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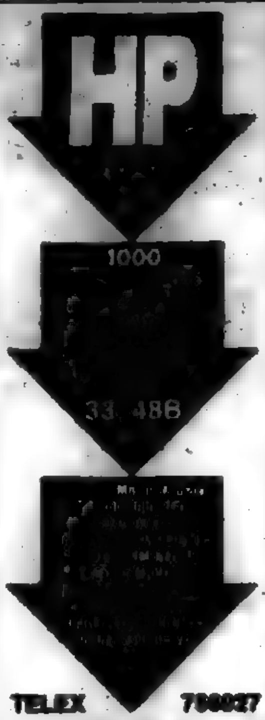

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ORDER FORM
COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday. The Bulletin Board is only for the buying and selling of computer equipment.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Basic Four, Burroughs, Control Data, Disk Drives and Tapes, Amdahl, Prime, Modems, Perkin Elmer, Printers, TI, Tapes, Wang, Qantel, Desk Top Computers, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be cleanly typewritten. Ads must be given over the phone to our team of ad takers, or sent in writing, no camera ready material will be accepted. The standard size is 1 column by 1 inch deep. These units may be combined to form larger size ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $140.00 (One unit minimum and no fractional units allowed.) There are no agency commisions or quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Issue Date(s): ____________________

Classification: ____________________

Name: ____________________

Title: ____________________

Company: ____________________

Address: ____________________

Telephone: ____________________

Send this form to:

COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

The Bulletin Board

Buy • Sell • Lease   Buy • Sell • Lease   Buy • Sell • Lease   Buy • Sell • Lease

BASIC FOUR | CONTROL DATA | WANG | QANTEL | BURROUGHS | TERMINALS | PRINTERS

The Bulletin Board

Our Low-Cost Way to Sell Your Equipment in Computerworld

What is The Bulletin Board?

We have a classified section designed to help you buy or sell individual software and hardware. It's especially suited to companies with a piece of used equipment for sale. For one low price, you can advertise to over half a million **Computerworld** readers nationwide.

How Does The Bulletin Board Work?

- The Bulletin Board is designed to advertise only one piece of equipment or software per unit.
- Units are one column wide by one inch deep at a cost of $160.00 per column inch. Although several units may be purchased for one advertisement, there will be no quantity discount.
- All ads are standard in format and typeface. No special typeface, borders or logos are allowed. Copy may be up to 25 words per unit.
- The Bulletin Board ads are listed by manufacturer or by product type under appropriate headlines.
- Ads are set on a six-column page in our classified section under "The Bulletin Board".

How to Place an Ad in the Bulletin Board:

- We suggest you prepare your ad before contacting us. Here are some guidelines:
  The first line is set in larger, bold type and should contain standard equipment identification.
  The body copy should describe the equipment and state the price.
  The closing should supply the seller's name and telephone number.
  This is all the information an interested buyer needs for follow up.
- Ads are accepted by mail, phone or by telecopier.
- Deadline is 7 days in advance of Monday issue.
- If you have never advertised with **Computerworld**, we request a check with your order.
- The Bulletin Board ads are not agency commissionable nor may they be applied to contract advertisers inch count.
- We assume no liability for errors beyond the price of the ad.

Here's the Address and Phone.

The Bulletin Board
Classified Advertising
Computerworld
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Framingham, MA 01701
Toll-free (800) 343-6474
(In Mass., call 617-879-0700)

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(000)000-0000

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IN
STOCK SALE
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[illegible]
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8809-2
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[illegible]
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2501 B1 3340 A2 S/3 D06
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Call John Doe

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370 115-168
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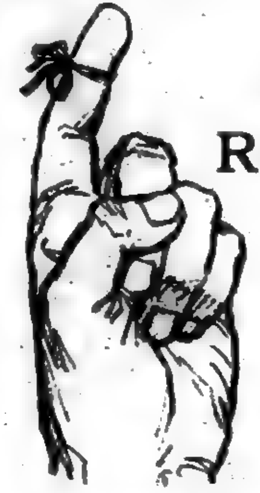

Just A Reminder!

COMPUTERWORLD DECEMBER 9th issue

This is to remind you that Computerworld will be closing for the December 9th issue on November 27th, due to the holiday. Please get your advertising materials or space reservations in early!

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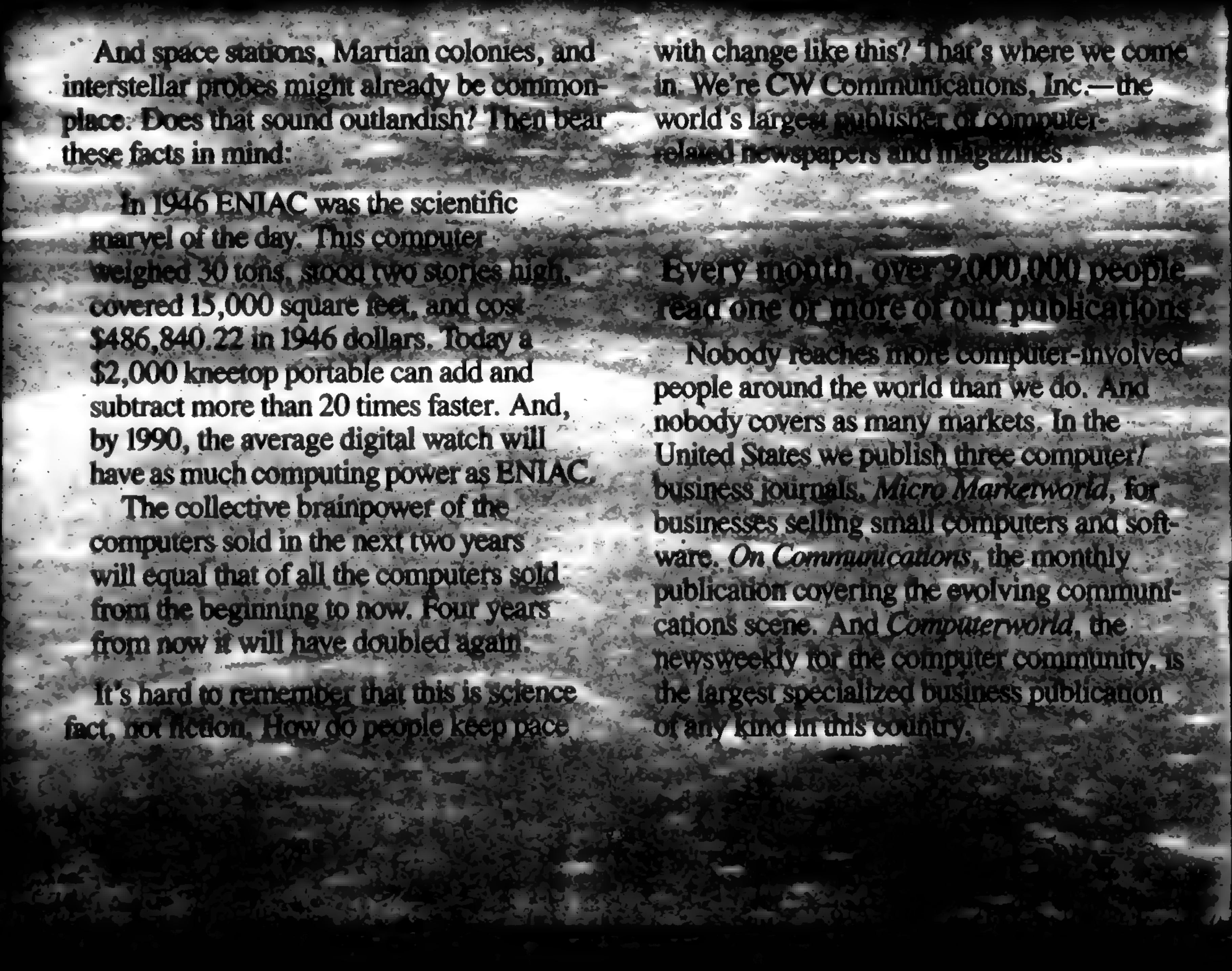

And space stations, Martian colonies, and interstellar probes might already be commonplace. Does that sound outlandish? Then bear these facts in mind:

In 1946 ENIAC was the scientific marvel of the day. This computer weighed 30 tons, stood two stories high, covered 15,000 square feet, and cost $486,840.22 in 1946 dollars. Today a $2,000 kneetop portable can add and subtract more than 20 times faster. And, by 1990, the average digital watch will have as much computing power as ENIAC.

The collective brainpower of the computers sold in the next two years will equal that of all the computers sold from the beginning to now. Four years from now it will have doubled again.

It's hard to remember that this is science fact, not fiction. How do people keep pace with change like this? That's where we come in. We're CW Communications, Inc.—the world's largest publisher of computer-related newspapers and magazines.

Every month, over 9,000,000 people read one or more of our publications.

Nobody reaches more computer-involved people around the world than we do. And nobody covers as many markets. In the United States we publish three computer/business journals. *Micro Marketworld*, for businesses selling small computers and software. *On Communications*, the monthly publication covering the evolving communications scene. And *Computerworld*, the newsweekly for the computer community, is the largest specialized business publication of any kind in this country.

We also offer seven personal computer publications. *InfoWorld*, the personal computer weekly, is a general interest magazine for all personal computer users.

The other six are monthly magazines that concentrate on specific microcomputer systems: *PC World*, the comprehensive guide to IBM personal computers and compatibles. *inCider*, the Apple II journal. *Macworld*, the Macintosh magazine. *80 Micro*, the magazine for TRS-80 users. *HOT CoCo*, the magazine for TRS-80 Color Computer and MC-10 users. And *RUN*, the Commodore 64 & VIC-20 magazine.

And we have similar publications in every major computer market in the world. Our network of more than 55 periodicals serves 25 countries: Argentina, Australia, Brazil, Canada, Chile, Denmark, Finland, France, Greece, India, Italy, Japan, Korea, Mexico, The Netherlands, Norway, People's Republic of China, Saudi Arabia, Southeast Asia, South Africa, Spain, Sweden, United Kingdom, United States, and West Germany.

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Simply put, we'll make it easy for you to reach your target audience—and for them to reach you. Call today for more information. You'll find the number below.

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(617) 879-0700

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Real Estate, and others).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines. Any special artwork should be enclosed with your ad also. Logos must be submitted on white bond paper for best reproduction.

Cost: Our rates are $144.90 per column inch. (Each column is 1 13/16") Minimum size is two column inches (1 13/16" wide by 2" deep) and costs $289.80 per insertion. Extra space is available in half-inch increments and costs $72.45. Box numbers are $15.00 extra per insertion.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE, or a Purchase Order Number. Any extensions on this policy must be made through our Credit Department.

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Section: ____________________

Signature: ____________________

Name: ____________________

Company: ____________________

Title: ____________________

Address: ____________________

Telephone: ____________________

Send this form to:

COMPUTERWORLD
CLASSIFIED ADVERTISING,
375 Cochituate Road, Box 880,
Framingham, MA 01701

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Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

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England: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London WCI 8UT. Phone: 01-831-9252, Telex: 262346.

Euan Rose, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

France: Axel Leblois, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 747.12.72. Telex: 613234 F.

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Saudi Arabia: Mr. Omar Dusuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6519690. Telex: (928) 401205.

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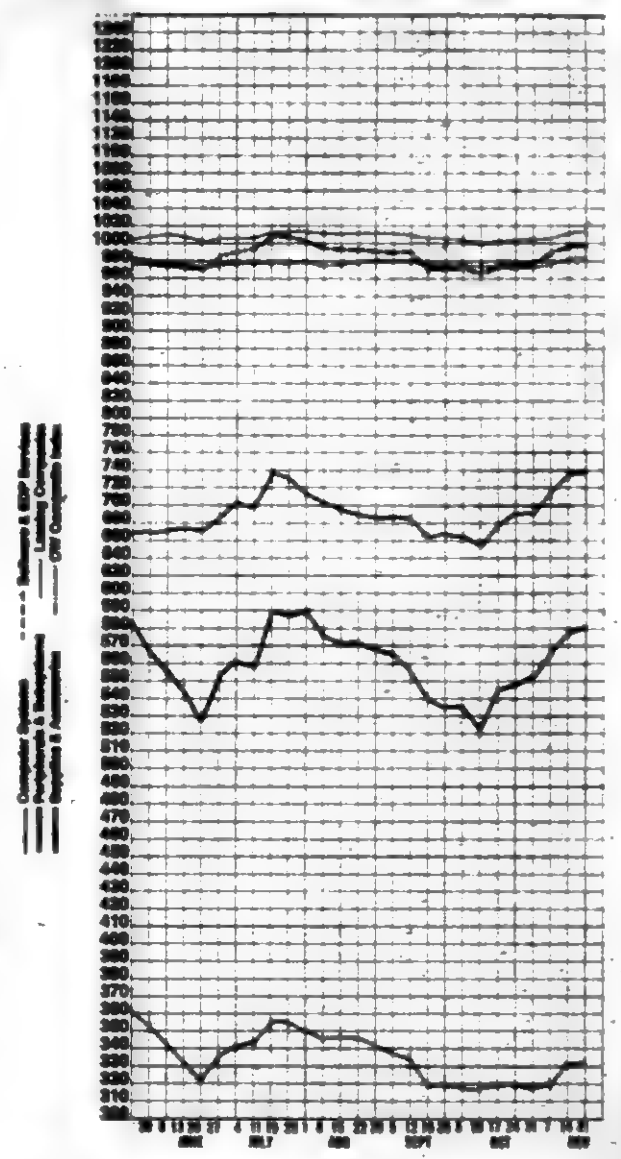
Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 20, 1985

All statistics compiled, computed and formatted by TRADE QUOTES INC. Cambridge, Mass. 02139

EXCH		PRICE 1985 RANGE (1)	CLOSE NOV 20 1985	WEEK NET CHNGE	WEEK PCT CHNGE
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	LEASING COMPANIES				
	SOFTWARE & EDP SERVICES				
	PERIPHERALS & SUBSYSTEMS				
	SUPPLIES & ACCESSORIES				

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ISSUE 48
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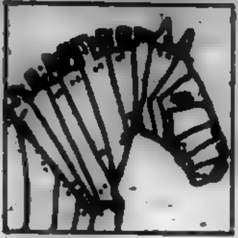

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One-third of surveyed DP shops expect declining or no budget growth, but 20% expect hefty increases. Page 2.

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Micro software vendors respond to corporate user demands. Page 12.

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General Motors is spending $250 million to switch from analog communications to a three-tier digital network. Page 4.

■

Market share pressures give users influence over communications equipment vendors. Page 19.

■

CRI, Inc. unveiled an Ada-based relational DBMS. Page 37.

■

Uccel moved to unload its time-sharing services. Page 93.

■

Sperry will terminate 827 commercial manufacturing jobs at its Salt Lake City facilities, where it makes UTS 20 and other computer terminals and data communications products. The terminations, which include administrative and technical positions as well as production jobs, will not start until the end of January and will continue through the end of April, according to a Sperry spokesman at company headquarters in New York.

The terminal and communications products manufacturing will be shifted to an undetermined Sperry site in six months, depending on market demand for the products, company spokesmen said.

■

Now that Ashton-Tate has successfully met user demands for a multiuser version of its popular Dbase III, company President Ed Esber hinted that a mainframe link might be next. Ashton-Tate "has a lot to learn from mainframe software companies," according to Esber, and a joint development agreement with such a company "would make good sense."

■

There has been a shotgun blast

See NEWS page 7

Convergent, 3Com merge

Systems house, net vendor to plot integrated strategy

By Maura McEnaney

SAN JOSE, Calif. — Workstation and systems manufacturer Convergent Technologies, Inc. last week announced a $133.6 million merger with network products vendor 3Com Corp. The move will enable the two firms to offer networked systems through the retail channel, as well as to systems integrators.

The merger, if approved by shareholders of the two corporations, offers new growth opportunities for each firm. Convergent, which manufactures products to be integrated and resold by its OEM customers, will have access to the retail outlets that 3Com has signed up. Conversely,

See CONVERGENT page 8

DP nightmare hits N.Y. bank

By Edy Goldberg

NEW YORK — A computer failure in the Bank of New York's government securities system may end up costing the bank more than $4 million. As a result of the failure, the bank continued to receive Treasury notes and bonds from securities dealers but was unable to transmit them to its customers.

The computer failure at the bank, reputedly New York's largest broker of government securities, left the bank in the position of having to pay sellers, despite its inability to deliver the securities and collect from the buyers. In order to pay the sellers for the billions of dollars in securi-

See DP page 7

Crunch time for software independents

By John Gallant

The year's final quarter — always a hectic time for software vendors — has taken on the importance of sudden-death overtime as many large-systems software companies struggle to shake off the effects of an industry slump.

Financial results for early 1985 indicated that the software industry would remain largely unaffected by the slowdown plaguing hardware manufacturers. Cullinet Software, Inc., for example, closed its 1985 fiscal year April 31 with an increase of more than 50% in revenue and profits. Applied Data Research, Inc.'s first-quarter revenue leaped nearly 60%, compared with the same period in 1984.

But the outlook for most segments of the software marketplace has changed drastically since spring. Analysts now contend that if financial results in the last quarter of 1985 are not strong, some vendors will be forced to take painful steps to trim costs in early 1986. Management Science America, Inc. and Oracle Corp. have already begun to trim work forces, and others may be forced to follow suit if sales do not increase dramatically.

"For the industry in general, this quarter is very important," according to Robert Grandhi, vice-president with E. F. Hutton & Co. "Unless the economy comes back very robust, there may be some trouble. If demand does not come through, software companies will have to make some hard choices. They will have to address costs, and most of the costs of a software company are people."

The short-term impact of these de-

See CRUNCH page 10

CW EXCLUSIVE

Yankee thrift: Publisher steps down to System/38

By John Desmond

PETERBOROUGH, N.H. — Like the quaint New England town where its headquarters are located, Yankee Publishing, Inc. is a company that has been growing slowly and quietly.

The company's expanding data processing requirements are due not only to the services required for the one million subscribers to the monthly *Yankee* magazine and two other company publications but also to the demands of seven independent publications served by the company's fulfillment operation.

Thus, it may seem strange that Yankee's DP department recently reverse-migrated from an IBM 4300 mainframe to what technically is a smaller machine — the IBM System/38. But, according to Yankee MIS director Paul Schlieben, the company was straddling the ever-changing boundary between a processing volume appropriate for a 4300-class machine and a volume fit for the smaller System/38, which itself straddles the line between mainframe and minicomputer. When the new high-end System/38s were announced a year ago [CW, Sept. 17, 1984], Yankee was pushed decisively to the System/38 side.

Power was not the only consideration. After projecting the cost of alternatives, ranging from doing nothing to getting into an independent vendor's data base management system and high-level language tools, Yankee decided the System/38 was the best performer for its price. The microcoded System/38 relational DBMS saved Yankee the cost of getting an independent vendor's DBMS, which would have

See PUBLISHER page 6

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NEWSPAPER

DP spending to rise in 1986, four of 10 by more than 10%

By James Connolly

NEW ORLEANS — Even at a time when four out of 10 companies are hiking their DP managers' budgets by more than 10%, another three of 10 managers will enter 1986 with budgets equal to or lower than those they had in 1985.

In addition, the average data processing budget will increase by 6% in 1986.

Those findings were among the results of a recent poll conducted by International Data Corp. (IDC), a Framingham, Mass., market research firm, at the 1985 IDC Fall Executive Conference attended by commercial DP/MIS managers, government computer users and computer vendors. The IDC survey, which drew 180 responses, addressed a variety of questions, including 1986 spending plans, the role of specific products and technologies in each manager's DP shop and trends in data center management.

One-third with no growth

"The spending results were interesting. A third of these people will have no growth or will even have a decline in their budgets for 1986. We've never seen that before. But we still had almost 20% saying they will increase their budgets by more than 15%," IDC analyst Hank Janson said.

In a separate survey conducted at the same New Orleans conference, IDC asked more detailed questions about line items in corporate DP managers' 1986 budgets. Most of those 29 managers — with 1985 budgets totaling $4.96 billion and DP spending averaging 4.5% of corporate revenue — said their DP budgets will increase in 1986.

In the more general poll, some of the key trends included the following:

■ Control of DP operations, data communications and large system selection remains centralized, although there are signs of a greater desire to make users more independent and to give them more input on application development.

■ Ada and AT&T Unix were rated only "so-so" in importance, with government users giving them only slightly higher ratings than commercial users.

■ Data base machines will become vital, while relational data base management systems, data administration functions, data dictionaries and high-level, end-user query languages are considered important.

■ There is a strong future for integrated voice, data and image systems, although integrated office systems are "more smoke than real value."

■ There is a feeling that the IBM Token-Ring local-area network will surpass Ethernet.

■ Most companies will bring in more personal computers than terminals during the next few years, and the need for more powerful standalone personal computers will peak in 1988.

■ There is a feeling that AT&T may become a leader in networked computer solutions, but few managers said they feel AT&T will become a leader in computers.

■ IBM's System/36 received a "so-so" rating as a departmental system, while 80% of the attendees said Apple Computer, Inc. will never be part of an office solution.

■ A core of about a third of the attendees said they never will standardize on IBM's Systems Network Architecture (SNA) and LU6.2, although the overwhelming majority hope SNA and International Standards Organization (ISO) standards can be merged.

IDC's communications industry analyst Kim Myhre speculated that the opponents of SNA were mostly long-time SNA critics who haven't recognized improvements that have been made in the architecture. He noted that most vendors of intermediate systems are moving to SNA compatibility, not to ISO compatibility.

Myhre also speculated that while feelings about the IBM Token-Ring were favorable, there would have been even more support had the survey been done before the announcement in October of the network, which doesn't support most intermediate systems.

He added that the respondents' feelings that integrated voice/data systems are critical is curious. He said DP/MIS managers seldom have expressed that view.

1 Standardize on SNA[1] for communications.	36%	11%	17%	4%	32%
2 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3 Bring in more personal computers than terminals.	20%	39%	14%	14%	11%
4 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5 Apple Computer, Inc. part of office solution.	7%	2%	7%	4%	80%
6 [illegible]	[illegible]	[illegible]	[illegible]	4%	[illegible]
7 Control all data through a dictionary.	4%	9%	45%	23%	20%
8 Install a corporatewide information center.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9 Completely trust a computer file system like Disoss[2].	10%	5%	25%	22%	38%
10 [illegible] terminals.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[1] IBM's Systems Network Architecture.

[2] IBM's Distributed Office Support System.

Source: International Data Corp.

Attendees at the 1985 International Data Corp. Fall Executive Conference look at where they are headed in the next several years.

■

Most increases in communications

Most DP managers will increase their spending on hardware, software and communications in 1986, but growth is less sure in areas such as office automation, factory automation, services and operations, according to a poll of attendees at the recent 1985 International Data Corp. (IDC) Fall Executive Conference.

Searching for trends among a small group of corporate DP/MIS managers, IDC found that 23 of 27 plan to increase their spending in 1986, with only one expecting a budget cut.

Asked which line items are increasing, 81.5% said communications, 80.8% said hardware, 73.1% said software, 66.7% said office automation, 54.2% said operations, 50% said factory automation, and 36.4% said services.

Managing costs and systems planning and acquisition were most commonly cited as key concerns among the managers.

Other concerns mentioned frequently were integrating systems, personal computer management, end-user computing and information systems strategy.

For salaries, most companies — 20 — expect to issue raises in the 5% to 9% range. However, the remaining eight managers answering that question said raises would average less than 5%.

Breaking down their spending by quarter, 38.9% of the managers said their first-quarter 1986 spending will exceed their fourth-quarter 1985 spending, while 55.6% of the managers said they expected no change.

— James Connolly

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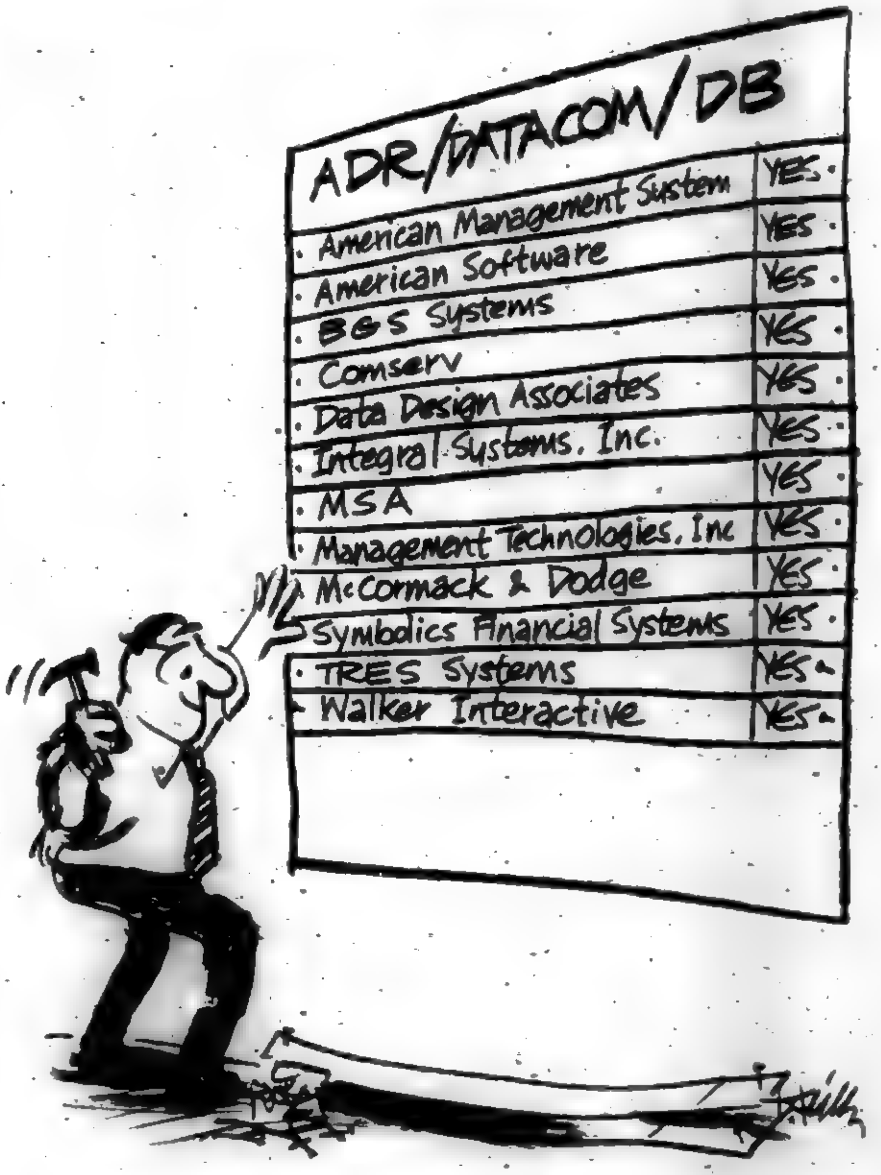
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GM assembling its own digital telephone net

Transformed net will support 250,000 lines, least-cost call routing

By Paul Korzeniowski

DETROIT — The world's largest automotive company, which is also one of the world's largest users of data processing equipment, could not maintain its preeminent positions with anything less than leading-edge technology.

Yet, that was the situation General Motors Corp. faced in 1982. A task force of GM executives sat down to evaluate the impact of the breakup of AT&T on the company's telecommunications requirements and to determine how well its telecommunications system could meet those needs. What the group discovered was that the system, constructed in a piecemeal fashion since the mid-1960s, could not economically incorporate necessary changes.

Because the network had basically outlived its usefulness, the task force outlined a plan that would transform the decaying network into one of the world's largest and most sophisticated private networks. The migration could not take place overnight, and a 10-year time frame was given to complete it.

As the task force firmed up the migration plan in 1984, GM acquired Electronic Data Systems, Corp. (EDS), a software and services firm. EDS officials were asked their candid impressions of the infant plan. The company stamped its approval on the plan but pared the implementation timetable down to a three- to six-year span. EDS' Communications Services Division, a mix of GM and EDS employees, was given responsiblity for installing the network.

Currently, GM supports 170,000 telephones and 70 million calls each year. When GM's latest attempt to walk the edge is completed, those numbers will rise to 250,000 phone sets and 90 million phone calls. Approximately 40% of the calls will be between GM offices, the rest will be passed on to the public telephone net.

The new network relieves the automobile company of its reliance on AT&T services, including AT&T Enhanced Private Switched Communications Service (EPSCS), a shared central office switched service; Common Control Switching Arrangements, the predecessor of EPSCS; and electronic tandem networks of private branch exchanges. The old network connected more than 600 GM offices and provided call-routing capabilities and an eight-number corporate numbering plan.

The analog network was not very cost-efficient, according to James Sutton, the EDS manager responsible for the network's implementation, and less efficient than digital transmission options.

The new system will consist of a hierarchical, digital network connecting more than 600 PBXs divided into three tiers. The lowest level — Level 3 — will consist of approximately 500 office PBXs.

> 'We keep learning with each Level 2 switch we install.'
>
> — James Sutton
> Electronic Data Systems Corp.

The second level will consist of area PBXs that will support a number of functions. First, they will supply office telephone connections for the building where they are located. In addition, they will route calls from one GM office to a second GM office and thus bypass the local telephone company.

A third function is support for least-cost call routing within its specified area. "We plan to install area PBXs wherever there is enough local traffic to cost-justify routing a call through two switches rather than one," noted Charles B. Jiggetts, director of marketing and public relations at EDS' Communications Services Division.

Level 1, the highest level, will consist of nine hub central office switches that will serve the twofold purpose of supplying office PBX functions and routing long-distance calls through the network. These hubs are equipped with large central office switches like those used by local telephone companies. The nine central offices will be placed in Van Nuys, Calif.; Plainville, Texas; Atlanta; either Bethesda, Md. or Washington, D.C.; Edison, N.J.; Oshawa, Ont.; Warren, Mich.; Chicago; and Detroit.

Much of the installation work completed in 1985 has concerned the Level 3 switches. Currently, 170 Level 3 PBXs have been installed, and the number is increasing by approximately five systems per week. As each office moves to the new network, an EDS task force evaluates the office's voice needs and chooses the proper PBX. "We are installing the Level 3 switches on a case-by-case basis," Jiggetts noted. The primary vendors have been Northern Telecom, Inc., Rolm Corp. and AT&T.

Approximately 10 Level 2 switches have been installed, with the largest being an AT&T Dimension 85 switch in Flint, Mich., that routes calls from a number of Level 3 switches. "We made some mistakes when we put in the first Level 2 switch, but we keep learning with each Level 2 switch we install," Sutton noted. The present plan calls for the installation of 46 Level 2 switches from the same vendors as the Level 1 switches.

Switches for the lower two levels will be connected in two ways: leased line or microwave. Most of the outlying offices will be connected by leased lines. In Michigan, Ohio and Indiana, GM has a large concentration of offices, so a number of these facilities will be connected by microwave. "By the end of this year, we will have more than 500 miles of microwave links," Jiggetts said.

The installation of the larger switches will be handled by Michigan Bell, a subsidiary of Ameritech, one of the seven regional holding companies. "We opened the bidding up to every vendor, and Michigan Bell gave us the best price and promised to help us install the large switches," Jiggetts noted.

The nine hubs will be connected by T1 1.54M bit/sec. digital links, according to Sutton. GM has not chosen a vendor to supply these links and is examining microwave, satellite and fiber-optic options, according to Jiggetts.

Jiggetts estimated that the network will cost GM about $250 million. "We estimated that the network would save us $300 million in the first 10 years of operation," he added. Savings will come from bypassing the local exchange and from the economics of moving from an analog to a digital network, Sutton said.

A large increase in staff has coincided with the network installation. The original task force consisted of half a dozen people; currently, there are 400 EDS employees working on the network and approximately 1,600 either evaluating or maintaining the network. Further staff increases were forecast as the company migrates from its AT&T network to its digital network.

Many large corporations have cursed divestiture, but Jiggetts claimed it has been a boon to GM. "We weren't getting the service we needed," he noted. "AT&T was only interested in supplying services to its central offices and was not concerned with helping its large-volume customers. With so much competition today, it has become much easier for us to get the services we require."

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed: write to Circulation Dept. for subscription information.

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Subscriber rates: $2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year. all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six for new subscription service to begin.

POSTMASTER: Send Change of Address to Computerworld, Circulation Department, P.O. Box 1016, Southeastern, PA 19398-9984.

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Vault files under Chapter 11

Renegotiating debt with major creditor

WESTLAKE VILLAGE, Calif. — Vault Corp., a leading vendor of copy-protection programs, has filed for reorganization under Chapter 11 of the Federal Bankruptcy Code to deal with $1.2 million in debts, including some $300,000 owed to shareholders.

Vault founder and Chairman W. Krag Brotby said that the company is still operating while in reorganization and has gone to court mainly to renegotiate a contract with its major creditor, 3M Corp. of St. Paul, Minn. Vault said that it owes about half its outstanding debt to the firm.

3M handles the duplication of disks with Vault's Prolok copy-protection scheme, which involves a key disk, fingerprinted by laser, that must be inserted to boot a protected program.

Brotby said the nearly 3-year-old company has not lost any of its major accounts but he added that the general software industry slump has affected it.

"A lot of our customers in the second and third quarters experienced their own slowdown, which left us with a humongous receivable," Brotby said. "Our business actually started picking up in the third quarter.

"We expect [bankruptcy] to be a fairly short-term thing," he said, adding that the company plans to emerge from Chapter 11 shortly after the first of the year.

Brotby said he does not believe his company's financial problems indicate a backlash in copy protection in general, although several leading software developers have recently opted not to copy protect their products.

Vault took some criticism earlier this year when it developed Prolok Plus, a copy-protection scheme that, after several warnings, released a data-eating worm in illegal copies of programs. Prolok Plus was made available but never used, and Vault eventually shelved the product. But Brotby said developers still occasionally ask about it.

"We decided the proper approach to protection is not retribution," Brotby said.

However, Vault competitor Softguard Systems Co. of Santa Clara, Calif., has observed some copy-protection backlash, said Joe Diodati, Softguard's vice-president of marketing.

"It's one of those things we as an industry have to realize," he said. Criticism of Vault's proposed worm program may have hurt copy protection in general, he added.

Vault has had no layoffs in its staff of about 35, but three vice-presidents left when the company filed for bankruptcy status in October.

Only one

Third party computer maintenance company provides quality service for more than 400 product types (the nearest competitor services a mere 50).

So

Publisher goes to System/38

From page 1

been required for the 4300. The System/38's CPF Release 7 operating system containing the DBMS costs $22,000, while independent vendors' DBMS products typically cost more than $100,000. And when it became clear that the increased capacity of the new System/38 Models 20 and 40 would provide for Yankee's future growth, Yankee decided it could afford to give up the IBM mainframe.

In addition, Yankee was a multivendor shop, using Nixdorf Computer Corp. hardware for data entry, a System/36 as a controller and 45 IBM Personal Computers or compatibles for various purposes.

"Our data was fragmented. Our major objective was to go from several different technologies and the problem of disintegrated information to an integrated environment of sharing information," Yankee's Schlieben said. "We wanted to pull it all together into one DBMS and set of tools."

> *'At the 4300 users group meeting, you get managers who send whoever wasn't busy that day. You feel like you're in a room full of deadheads.'*
>
> — Paul Schlieben
> Yankee Publishing

The company considered four alternatives. It could move more responsibilities onto the micros by putting the Personal Computers into a network. It could move all the work onto the 4361 using CICS, DOS/VSE and Cobol. It could bring in a DBMS on top of the IBM 4300, along with the apropriate language and implementation tools. Or it could bring in the System/38.

Until the introduction of the high-end models, the System/38 seemed unfit for the task. But Schlieben said the introductions of the new models "really told the user community that IBM is committed to System/38." It also eliminated any concern over the machine's capacity to handle Yankee's processing needs. In Schlieben's view, "The issue of minicomputer vs. mainframe just went away."

Schlieben and Ed Phippard, general manager of fulfillment at Yankee, estimated the five-year costs of each alternative. The cost of the Personal Computer alternative was projected to be $4.5 million; the Cobol under CICS alternative, $5.5 million; the independent vendor high-level language and DBMS, $4.5 million; and the System/38 alternative, $4 million.

The overhead of the software, DBMS and high-level language posed by the independent-software vendor alternative would have required Yankee to move up to a 4381 or 3030, 3080 or 3090 series machines, an additional hardware cost the company sought to avoid. But if Yankee now suddenly takes on another one million-account fulfillment job, "we could run it side by side on another 38," Schlieben said.

A most persuasive feature for Yankee was the System/38's promise of improved productivity. Productivity was a primary concern to Schlieben. As former director of information systems at Boston University, with an IBM 3090 shop and a staff of 120 people during his tenure, he learned about the issue. "I've seen the productivity issue move at a snail's pace now for 20 years," Schlieben said. Systems programmers writing the code necessary to allow separate applications to communicate takes too much time, he added. "System/38 has thought it through and made everything work."

Addressing why he considers System/38 more productive than the 4300 machine, Schlieben said, "On the 4300 side, you're working with an operating system and associated tools, the basic engine of which was developed in 1964." DOS, the 4300 operating system, "has evolved, but it's basically 1964 technology." System/38, developed in the early 1970s, "was built primarily with programmer productivity in mind," Schlieben explained.

The company's homegrown fulfillment system, its primary application, was developed from scratch in Cobol over a five-year period. While the program executes well, its support and maintenance is labor intensive. "We wanted to move away from a typical Cobol environment to a more productive environment," such as System/38's RPG-III programming language, Phippard said. Plans are to convert all existing systems to run on System/38, phase out the Nixdorf equipment and add two programmers.

Since the System/38 Model 6 with 4M bytes of main memory was installed in August, a primary concern has been training. "People have to learn more than they ever had to before with the 4361," Schlieben said. Yankee has enrolled users in a training course and has brought in a System/38 consultant. Yankee plans to upgrade to a System/38 Model 18 in the spring, a Model 20 a year later and a Model 40 in 1988.

IBM was supportive of Yankee's decision to move from a 4300 to System/38, Schlieben said. Also helpful were members of Team 38, a Southern New Hampshire System/38 users group that meets monthly. Schlieben contrasted the atmosphere at System/38 and 4300 users group meetings. "At the 4300 users group meeting, you get managers who send whoever wasn't busy that day. You feel like you're in a room full of deadheads. There's no enthusiasm. At the 38 meeting, managers and decision makers are there, and you can't find a seat. There's an enthusiasm and an understanding of technology. The 38 users I talk to are more professional."

For the future, Schlieben envisions a merging of System/38 and 370 architecture. "It's not a bad thing for IBM to have competition between the Armonk, [N.Y.], old guard and the Rochester innovators," Schlieben said, referring to the respective New York and Minnesota bases of the 4300 and System/38 development teams.

DP nightmare hits N.Y. bank

From page 1

ties it had received, the bank was forced to borrow money at a 7.5% interest rate from the discount window of the Federal Reserve Bank in New York, which serves as the lender of last resort in such situations.

The failure occurred at 10 a.m. EST Thursday, and the snafu was said to be cleared up at 12:30 p.m. EST on Friday. The bank was then able to begin delivering the securities — and begin collecting its money. The loan was repaid Friday afternoon, a bank official said.

The bank is reported to have a fine reputation for its DP operations, and the failure is an embarrassment, according to most sources.

A common practice in the government securities market is for banks receiving securities to be responsible for paying sellers upon receipt of the securities. Also, buyers do not have to pay until the securities are placed in their hands, electronically or otherwise.

Largest discount window

According to Wall Street sources, the bank borrowed an amount in the $20 billion to $22 billion range, which, if true, would be the largest discount window borrowing ever made from the Federal Reserve Bank system.

Borrowing $20 billion overnight could cost the bank about $4 million to $5 million. One Wall Street source said that computer and wire rooms usually are insured against such failures, and the bank may not have to pick up the tab itself. Bank and government officials would neither confirm nor deny any of the figures.

The huge borrowing, which resulted in a surplus of cash for the sellers, is acknowledged to be a major factor in the federal funds rate's weighted daily average dropping from 8.04% on Thursday, Nov. 21, to 7.41% on Friday, Nov. 22. The federal funds rate is the cost of overnight bank-to-bank lending and is watched closely by dealers, whose day-to-day financing rates are often related to this rate. The weighted rate had steadied at 7.94% on Monday, Nov. 25.

No distress

According to one source, word spread throughout the financial community that the Bank of New York's problem was of a technical and not a financial nature, "so no one was overly excited or distressed."

There apparently were errors in the settlement of Wednesday's transactions, but the system did not break down until Thursday morning. According to published reports, a source close to the bank said the malfunction was caused by Wednesday's heavy processing load, and the software "just could not handle the volume."

A bank official confirmed that the cause of the failure was a software problem, and that the malfunction could have been caused by Wednesday's heavy load. Contrary to earlier reports, there was no new software program, but new programs were used in attempts to correct the problem. He gave no explanation for the length of the downtime.

TOP OF THE NEWS

NEWS from page 1

of speculation in the two weeks since Digital Equipment scheduled a product announcement for Wed., Dec. 4. That speculation was fired by DEC's own insinuations that a Microvax III, a dyadic Microvax, an IBM-compatible personal computer, new links to IBM's Systems Network Architecture and a dyadic VAX 8600 would be announced by the end of 1985 — which leaves DEC with less than a month to introduce those products.

This week's announcement may include several products, but the only sure thing appears to be the new 8600. That system could tilt the technology seesaw back to DEC's side only two weeks after Data General took control with its Eclipse MV/20000.

■

Just a couple of weeks after Computer Consoles Chairman and CEO John F. Cunningham was named to the board of Apollo Computer, Cunningham returned the favor with the election of Apollo Chairman and CEO Thomas Vanderslice to the Computer Consoles board last week. The announcement coincided with the resignation of cofounder Jeffrey Tai and venture capitalist Raymond S. Livingstone Jr. from the Computer Consoles board.

■

As a result of new ownership, Mostek Corp., a Carrollton, Texas-based semiconductor manufacturer, has rehired a total of 1,150 employees laid off last month. United Technologies Corp. sold Mostek for $71 million to Thomson Semiconductors of France. United Technologies had layed off some 1,100 employees, and Thomson rehired 1,000 of them at the same salary and positions. In addition, the French firm rehired another 150 employees who lost their jobs in previous layoffs, for a total staff replacement of 1,150.

■

Along with its recent decision to freeze new Personal Computer dealerships, IBM quietly stopped hiring at its 9,500-person Entry Systems Division in Boca Raton, Fla., a spokesman confirmed last week. "IBM hasn't been immune" to the industry slowdown, the spokesman said, and the hiring freeze is a result.

Security at heart of wrongful-termination suit

Integrity of credit union program listings at stake

By Jeffry Beeler

ANCHORAGE, Alaska — A Superior Court jury has awarded a $50,000 judgment to a former systems security officer who was fired by a major credit union for allegedly jeopardizing the confidentiality of an automated teller machine (ATM) network's program listings.

On Nov. 8, the wrongful-termination suit that Rod Carney filed against Alaska U.S.A. Federal Credit Union ended with a ruling in favor of the plaintiff. But although the jurors apparently accepted Carney's contention that his former employer had dismissed him with undue haste, they awarded him only a small fraction of the $350,000 in damages demanded in his civil suit.

Carney formerly worked as a documentation analyst in charge of Alaska U.S.A.'s software security. But two years ago, he lost his job amid disclosures that he slipped copies of the ATM program listings into his briefcase and removed them from the building where they were supposed to stay at all times.

No one in the case seriously challenged the defense's claim that Carney transported the listings from Alaska U.S.A.'s data center to a nearby second building housing the institution's corporate headquarters. But the two sides remain deeply divided over the question of whether the former software security chief's actions endangered his employer's business and warranted his firing.

The credit union views the removal of its program listings as a clear-cut and grievous breach of information security guidelines that Carney himself was instrumental in instituting and enforcing, according to defense attorney Greg Motyka. Alaska U.S.A.'s internal safeguards call for the listings, which describe the layout and content of the institution's ATM software data files, to remain under constant lock and key except during use.

Carney's decision to transport the program listings from safekeeping also drew criticism from SRI International, Inc. senior consultant Donn Parker, a recognized computer security authority who participated in the case as an expert witness for the defense. "This dispute underscores a point I've been trying to make for a long time — that information on paper is still far more dangerous than information stored in any computer system," Parker said during a phone interview.

But Carney and his attorney, Wayne Ross, rejected the defense's argument that removal of the program listings violated the credit union's information security policy. "How could he have breached security when he was the one who was responsible for protecting it?" Ross asked.

Ross further defended his client's actions on the grounds that Carney had uncovered evidence of possible software copyright infringement by a credit union programmer and needed to transport the program listings to explain his suspicions to his superiors.

Carney and his former employer also differed sharply in their assessment of what might have happened had the listings fallen into the wrong hands. "The programs we're talking about are literally the interface between the credit union's computers and its ATMs," Motyka said. "In theory, this guy had the key that would have allowed someone to fraudulently shift funds among more than half of Alaska's accounts."

In addition to containing data on Alaska U.S.A.'s own 200,000 member accounts, the credit union's systems serve as the hub of a statewide network of shared ATMs belonging to nine other financial institutions.

But Ross denied the assertion that the program listings were sensitive and that their unauthorized disclosure would have seriously compromised the credit union's security. To support this, Ross cited the defense's own purported admission in court that the program listings in question corresponded to old software that had lost much of its initial value.

Corvus ousts management

SAN JOSE, Calif. — Local-area network maker Corvus Systems, Inc. underwent an abrupt turnaround last week when its board of directors voted out its top management and hired the president of a small microcomputer firm acquired by Corvus.

The board requested and received the resignations of Chairman and Chief Executive Officer Michael L. D'Addio, Executive Vice-President for Marketing and Sales Herbert J. Martin and Executive Vice-President and Chief Operating Officer Roy A. Wright.

Named president and CEO of Corvus was James L. Siehl, who held the same positions with OEMTEK, Inc., a closely held, San Jose-based vendor of IBM-compatible micros.

Corvus simultaneously announced a stock transaction for the purchase of OEMTEK, which will operate as a wholly owned Corvus subsidiary. Corvus said it will report a loss for the second quarter ended Nov. 30.

Corvus, a local-area network market leader two years ago, had recently diversified into other products such as peripherals for IBM and Apple Computer, Inc. "The company has been rather directionless, and its management has not done the best job in the world," said analyst Aaron Goldberg of International Data Corp.

— Clinton Wilder

Only one

Third party computer maintenance company services more IBMs than anyone, except IBM.

Sorb

Convergent, 3Com merge

From page 1

3Com will have the opportunity to sell its Ethernet-based networking products to Convergent's extensive OEM base. In terms of product development, the two firms are expected to focus efforts on networked office systems.

Users of 3Com products said they were happy with the merger announcement. "Convergent is a fine company, and I'm sure it means a better opportunity to broaden the kind of products and technology that they offer," said Kathy Wilson of the Central Engineering Department at Raychem Corp. in Menlo Park, Calif.

Convergent President Paul Ely will serve as chairman and chief executive officer of the as-yet-unnamed company, and 3Com President L. William Krause will fill the role of president and chief operating officer. Both Ely and Krause are alumni of Hewlett-Packard Co. Robert Metcalfe, chairman of 3Com, will be a senior vice-president.

"Twelve months ago, Bob Metcalfe and myself decided that the computer industry was growing up, and we were moving into a phase where financial strength and economies of scale were becoming more important," Krause told *Computerworld* last week. "We concluded that we would rather be the shakers than the shakees. It did make sense to have a bigger part of just part of the solution. Workstations plus networks equal the solution."

Six-year-old Convergent was one of the fastest growing high-technology firms of the decade, selling its workstations and minicomputers to older firms such as Burroughs Corp., but last year it lost $13.8 million on revenue of $361.8 million. Under Ely's direction, the company this year has shown a profit of $6.4 million on revenue of $295.3 million through the first nine months.

For the three months ended Sept. 30, Convergent earned $3.7 million on approximately $101 million in revenue. 3Com recorded a profit of $5 million on [illegible]6 million in sales in fiscal 1985.

Under the terms of the proposed merger, each outstanding share of 3Com stock will be exchanged for one share of Convergent stock, providing current 3Com shareholders with a total of 27% of the new company.

Indications that the companies planned to link technologies were apparent earlier this month when 3Com announced it would provide Ethernet networking products for Convergent's Ngen modular workstations.

Financial community sources contend that the pairing of companies like Convergent and 3Com is an example of a market trend toward more infusion of hardware and data communications capabilities.

Krause acknowledged Convergent's strength in the OEM market. "They'll be able to introduce us to a whole number of OEMs that we have not been able to crack."

Convergent made headlines last month when founder Allen Michels and three others left the company to form their own venture (CW, Nov. 4). Convergent also announced plans to acquire 40% of Baron Data Systems, a systems integrator in Oakland, Calif.

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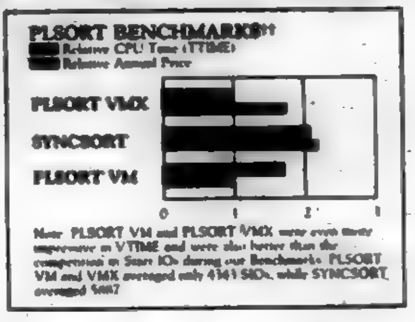

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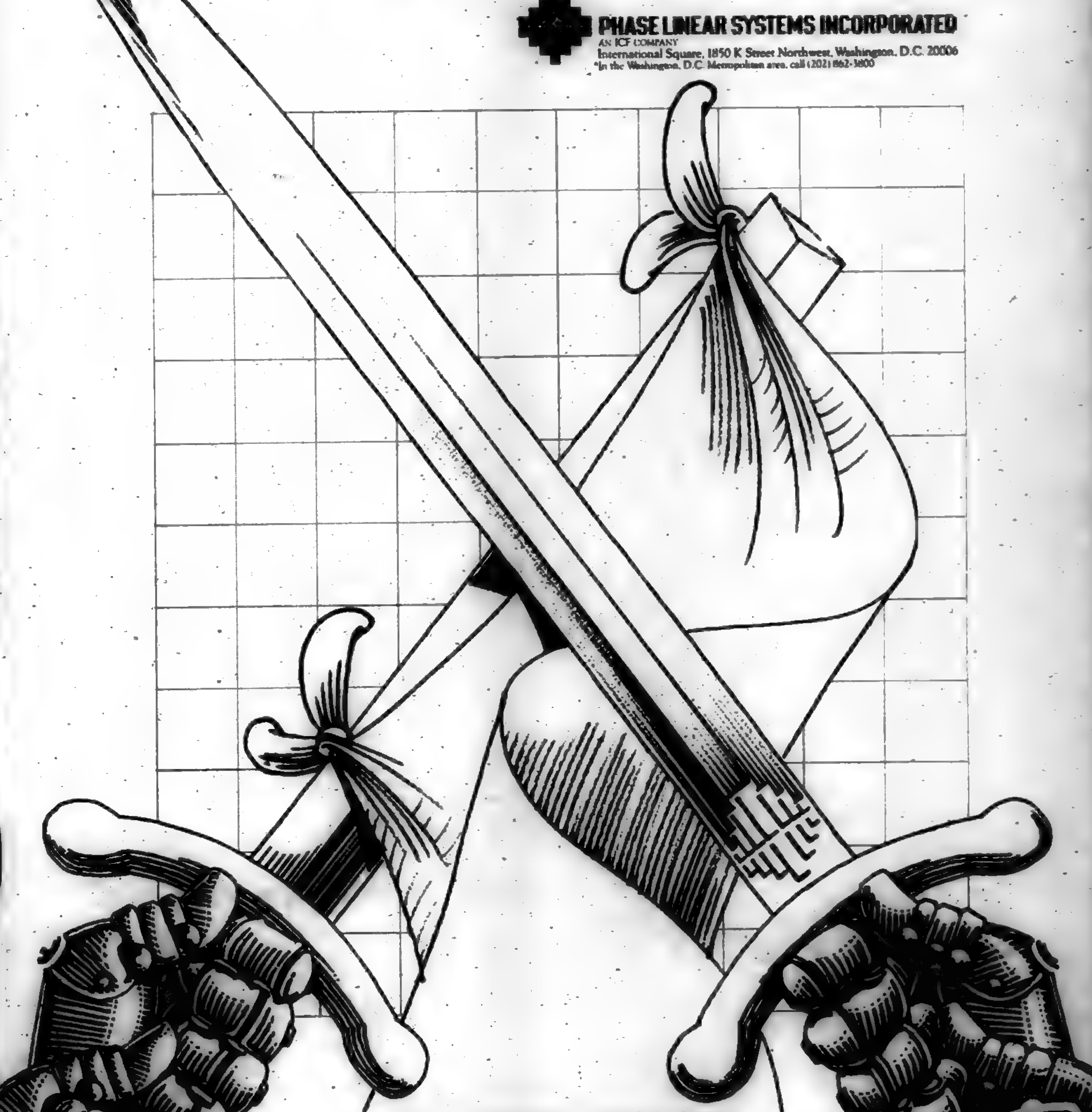

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††Benchmarks based upon average of several cases, ranging from 31,250 records to 1,000,000 records. Prices based upon one year lease price as of October 1, 1985. SYNCSORT is a trademark of Syncsort, Inc. (Release 5.2).

Man charged in IBM fraud

FBI called when payments for Personal Computer ATs missed

By Eddy Goldberg

ASHLAND, Mass. — John W. Barker Jr., 42, was arrested by the Federal Bureau of Investigation at his home recently for allegedly defrauding IBM with a contract to sell his Atlanta-based company 2,800 personal computers at a discount. He was arraigned in the U.S. District Court in Boston and released on a $10,000 unsecured bond.

The federal indictment alleges that Barker misrepresented himself as the owner and president of HMI, Inc., a holding company that he claimed controlled several companies involved in the health care field. According to the indictment, HMI received a total of approximately 350 personal computers from IBM.

The last shipment of 197 Personal Computer ATs, delivered in May 1985, was worth an estimated $532,000 at the 30% discount granted by IBM.

According to federal officials in Atlanta and Boston, Barker is alleged to have entered into agreements to resell the computers at full price, despite his contract with IBM prohibiting such resale.

The indictment further alleges that Barker told IBM representatives in Atlanta that HMI owned a number of hospital and nursing centers; provided medical services for corporate accounts; had more than 1,500 physicians under contract; recorded a net income of $15.6 million for the fiscal year ended June 30, 1984; and had branch offices in Chicago, Virginia Beach, Va., and Las Vegas.

Failed to pay IBM

The scam apparently fell apart when Barker failed to pay IBM for the computers he had received on credit.

The indictment claims that in June 1985 Barker told IBM representatives in Atlanta that HMI had a $20 million line of credit with Citibank NA in New York withdrawn suddenly because of problems with the company's overseas investors. IBM reported the matter to the FBI, which began the investigation that led to Barker's arrest.

Barker, charged in a seven-count indictment returned by a federal grand jury in Atlanta, faces two counts of mail fraud, two counts of wire fraud and three counts of interstate transport of stolen goods.

The mail and wire fraud charges each carry a maximum penalty of $1,000 and/or five years imprisonment, and the three counts of interstate transport of stolen goods each carry a maximum penalty of $10,000 and/or 10 years imprisonment.

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Crunch time for software vendors

From page 1

velopments on users will likely be limited to lower prices for active buyers. The long-term impact, especially should the downward trend continue, is more uncertain and could affect new product development and the availability of support services, analysts said.

One market research firm, Gartner Group, Inc., said that overall revenue growth in the mainframe software industry has slowed from 40% in 1984 to just over 20% this year. That slowdown has been particularly severe in the applications and data base management system (DBMS) markets, which Gartner Group sources said grew at only 7% through the first three quarters of 1985, compared with more than 50% growth last year.

"In the near term, I am pretty tentative about [software companies'] prospects," said Kenneth Burke, vice-president of securities research for Alex Brown & Sons. "I think we'll continue to see pretty moderate revenue growth. Whether the companies can scale back expenses to return to normal profits remains to be seen. That is very uncertain at this point."

Observers blame the software industry doldrums on a number of factors. Among them is the general state of the economy, which has led to budgetary constraints on users. Also, applications and DBMS vendors are facing increasing competition, and purchases of their products now must be approved at higher levels.

"One of the major problems in the market is higher price tags," added Brian Mutert, software analyst with Robertson, Colman & Stephens. "People that I have spoken to say that initial DBMS contracts have increased from $100,000 a few years ago to $250,000. With the capital spending crunch, that has had a significant impact."

The slowdown has also fueled very heavy price cutting on the part of vendors, observers said. According to Rick Sherlund, securities analyst with Goldman, Sachs & Co., "We hear that they are slashing prices. That price cutting will siphon off some of the strength of the quarter."

Because of their relatively lower priced offerings, systems software vendors have weathered the year fairly well. But as companies such as Uccel Corp. and Computer Associates International, Inc. move toward more expensive, integrated product lines — a strategy highlighted by Uccel's introduction of its Synova series and Computer Associate's unveiling of the CAI-Universe system — the systems sector may begin to feel the same pressures as early as the first quarter of 1985.

"One of the best indicators of market conditions will be the performance of the utility software companies, such as Uccel" and Computer Associates, said James Mendelson, securities analyst of software and services with Morgan Stanley & Co. "If there is a meaningful weakening in their revenues, the slump could be deepening."

The following is how analysts assessed the year-end outlook for four of the leading independent software vendors:

- Cullinet is unlikely to improve significantly its sluggish performance in the remaining half of its fiscal 1986 period, analysts said. The company had enjoyed 29 consecutive quarters of growth until this year. But Cullinet is said to be having trouble selling its IDMS/R DBMS into the so-called decision support — or information center — segment of the DBMS market, which is said to be growing far more rapidly than the transaction processing segment. Competitors have attacked IDMS/R, which Cullinet markets as a relational DBMS, as being based on older technology. Cullinet also took some heat for delays in delivering its manufacturing applications.
- ADR has to some extent distanced itself from the fray by being acquired by Ameritech, observers said. For the first nine months of 1985, the company reported a loss of more than $2 million, a turnaround from a $4.5 million profit the year earlier. Analysts lauded the capabilities of ADR's flagship Datacom/DB DBMS, especially for its improved performance, but contended that the company has a severe cost-control problem. ADR has said it anticipates a strong fourth quarter, but observers claimed that unless strict cost containment is exercised, profits may not materialize.
- MSA is not likely to rally strongly from its poor showing in the first three quarters, analysts contended, and will probably show only marginal profits for the year. MSA President William Graves said the fourth quarter this year is no more important than in the past, but recent personnel cuts seem to belie that.
- McCormack & Dodge Corp. is insulated from public scrutiny by its Dun & Bradstreet Corp. parent. President Frank Dodge claimed that M&D is on the track toward its projected 38% to 40% revenue growth for the year. But, analysts said, the company is also struggling to cut expenses.

Contributing to this report were Computerworld *staff members Charles Babcock, Rosemary Hamilton and Clinton Wilder.*

Oracle overprojects profit; lays off 14

MENLO PARK, Calif. — Overoptimistic profit projections recently forced Oracle Corp. to lay off 14 of its 369 employees. The layoffs — the first ever for the 8¼-year-old Oracle — occurred within the company's development, administration and support areas, a company spokesman said.

"We overhired in certain areas," according to Ken Cohen, Oracle's director of product marketing. The company predicted a 20% profit for the year, but profit percentages are now in the teens, he said. "We're trying to get some control in departments that were overbudget."

Oracle recorded sales of $23.5 million for the fiscal year ended June 30. Six-month sales to date are estimated at approximately $17 million. The company is projecting it will double its sales this year to approximately $46 million.

ORACLE now available on the IBM System/88

MENLO PARK, CA, November 4, 1985 -- IBM will be selling and supporting the ORACLE relational database management system (DBMS) on the IBM System/88 line of fault-tolerant computers, it was announced today. ORACLE is compatible with IBM's mainframe database management systems, SQL/DS and DB2. This compatibility allows applications written for SQL/DS or DB2 to run on the System/88 under ORACLE.

Oracle Corporation President Larry Ellison said, "We are very excited about this agreement, and are 100% committed to making our relationship with IBM an enormous success. We have always worked hard to maintain compatibility with IBM's DB2 and SQL/DS products."

Oracle Corporation, founded in 1977, produces and markets the ORACLE relational database management system, fourth generation software tools and decision-support software. In 1979 Oracle introduced the first commercial SQL-language DBMS. Today ORACLE runs on a wide range of computers, including IBM mainframes, DEC, DG, HP, Stratus and most other minicomputers, and a wide variety of microcomputers, including the IBM PC/XT and PC/AT. ORACLE runs under most operating systems, such as MVS, VM/CMS, VMS and AOS, as well as UNIX and MS/DOS, and several others. The System/88 is the latest entry to the list of ORACLE-supported systems.

Oracle Corporation distributes its products through a worldwide network of 30 direct sales offices. In addition, ORACLE is sold by IBM on the System/88, and by other computer manufacturers, including Sperry, Stratus and Honeywell. Today, 39 of the top fifty multi-national corporations use ORACLE.

For further information, contact Oracle Corporation, 2710 Sand Hill Road, Menlo Park, CA 94025.

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Micro software marketing adapts to large-corporation base

Vendors take lessons in licensing policies

By Eric Bender

"Companies like ourselves and Lotus don't empathize well with the needs of corporations," noted Fred Gibbons, president of Software Publishing Corp., in a recent interview. But, he suggested wryly, mainframe software companies have trouble developing microcomputer software capable of being used without professional help.

Both classes of software vendors offer some lessons in meeting the demands of corporate America and the needs of the computer dealers that still sell most micro software, suggested executives at several leading micro software companies in recent interviews.

In product and licensing policies, "we'll learn things from the mainframe people; they'll teach us a few old tricks," said Edward Esber, president of Ashton-Tate. But customers that clamor for site licensing — including on-site duplication — must accept that micro software is sold and serviced differently, Esber said.

"Mainframe software pricing has settled out," he said. "Our customers want to take one piece of that corporate equilibrium — site licensing — and bring it down to micros. I would be glad to take one piece of it if I could bring the rest."

'Just a smoke screen'

"Very few accounts say they want duplication rights," said Jon Shirley, president of Microsoft Corp. "We've got very good disk reproduction facilities. Why should they build their own? That's just a smoke screen to cover economics." However, Shirley underlined Microsoft's efforts to address concerns among large firms.

Microsoft's new — and not yet formally announced — corporate licensing program primarily covers volume purchases, with all sales made through the company's key dealers. Various discounts are available for total annual purchases of $100,000, $250,000 and $500,000 from the company, according to Jerry Ruttenbur, Microsoft's vice-president for retail operations.

Among the benefits offered by the new arrangement, if a firm establishes a solid anticopying policy, liability for a pirated copy is limited to its suggested list price, Ruttenbur said.

Like many other suppliers, "we're looking into site licensing," Software Publishing's Gibbons said. "There are some legitimate issues behind the demand for site licensing," Esber said. He listed maintenance requirements, a desire to minimize payments to retailers and worries about copy protection.

When meeting with Ashton-Tate's large-customer advisory board, "we keep talking about corporate pricing, but the biggest issue for them is copy protection," Esber remarked. "They understand why we want to do that, but they want us to put it aside."

However, "If I ever take off copy protection and let corporate users duplicate software, I will impose even greater responsibility on them for policing," Esber said.

Asked about the Association of Data Processing Service Organizations, Inc.'s proposed hardware copy-protection scheme, Esber responded, "I don't believe in that right now. It's getting simple, and it's possible to implement, but I don't know how to get a user to pay for the box and the keys. It would be nice if the hardware manufacturers would design that into the front of the machine, but that's really not in their economic interest.

"Any form of copy protection will get in the way of a legitimate user," Esber said. "We've been very successful at inconveniencing legitimate users and very unsuccessful at discouraging illegitimate users." While everyone keeps working on this puzzle, "no light has glowed in my room in the middle of the night," he joked.

●

Another major concern for leading microcomputer software vendors is massive discounting, although low street pricing has not hit them directly, Esber said.

However, "Nobody's making money on our products except ourselves" and Lotus Development Corp., he said. "That's not a good position.

"One culprit is volume purchases in the channel," with excess product ending up in the gray market, Esber said. Another is pressure from resellers that continue to try to give higher discounts. Resellers that routinely offer corporations 30% off the list price have built an "artificial barrier, and they can't make money," he said.

Vendors, distributors and dealers now divide the margins on software under a scheme left over from an earlier time. Back then, retailers played a more active role in software sales and support and reaped higher profits, Esber commented. Esber said that if distribution channels were started today, he would give distributors a 30% to 35% margin off list prices and retailers a 15% margin — roughly the reverse of the current setup.

Long-term software industry growth will require other shifts, Esber said. The situation "suggests that we should redo our upgrade pricing," he said.

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YES To current, accurate data.	YES But data may not be current.	YES But must access data via control file.
1 to 2 HOURS	No one can do it as fast as CA. We challenge any vendor to install their products in 2 hours or less.	
3 to 4 MONTHS	By our most conservative estimate, CA can implement any of its products 40%-50% faster than any competitor.	
YES Total integration.	NO Incomplete integration.	NO Incomplete integration.
YES Newest architecture. No redundancies. No layered add-ons.	NO This older architecture with its lack of integration makes many redundant demands on resources. Added layers of complexity require many times the memory space of the newer CA products... sometimes even requires installation of costly, larger capacity hardware to cope with demands.	NO
$55,000 to $70,000	For these companies, many single product General Ledger sales are greater than $100,000. Solutions offered normally require—at extra cost—many additional product utilities such as online and reporting system "modules".	

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Consultants, vendors still negative on site licensing issue

Sellers have much to lose with licenses

By Maura McEnaney

Despite the attention being given to site licensing issues these days, consultants and software vendors suggest that its time has not yet arrived.

The term site licensing refers to the arrangements a software vendor may provide to corporations making volume purchases. Those agreements can range from volume discounts on sales of 25 packages or more to the right to make unlimited copies of the software for a set price.

"I have seen this issue come up and die down three times during the past several years," said Dan Spiner, chairman of Management Information Software, Inc.

Spiner and colleague Ira Weise of 800-Software, whose firms target large corporations, have much to lose should site licensing become the preferred method of purchase among corporate buyers. Corporate software buyers do business with firms like Management Information Software and 800-Software to keep down software costs. Widespread demand for site licensing could mean an end to large-volume buys for these firms.

"Obviously, I'd prefer it if there wasn't site licensing, because if it kicks up, our business would change radically," Weise said.

Future Computing, Inc. President Egil Juliussen recently called site licensing "the hottest topic in the whole software industry." But many issues need to be clarified, and companies should implement a "model plan" to answer some unanswered questions, Juliussen said.

Juliussen outlined points of a plan introduced at a recent Future Computing seminar on software distribution. Among them are the following:

- Vendors should provide volume discounts for a specified number of software copies. Unlimited site licensing "is not good for the long-term health of the industry."
- Limited software duplication rights should be put in place and based on the volume of software purchased.
- Vendors should incorporate a tracking mechanism for user compliance with the site license at the time of software update releases.
- Suppliers should turn to enforceable penalties or fines, rather than litigation, in cases of unreported duplication.
- Dealers should get credit for providing support services.

Businessland's Luther Nussbaum, vice-president of marketing, said he believes the site licensing issue will sort itself out in the next year. It may not even be the answer that companies are looking for, he said.

"When you have low-cost programs from companies like Borland International [currently marketing a $99 program], you don't need a site licensing deal. What users really want is a lower price."

The Buyers Guide reveals some surprising truths: Products from other vendors fail to perform the most important task of all—updating automatically in realtime across all products so that the data you deal with is always current—always accurate. On top of that, they gobble up far more than their share of your precious resources. Their solution to your needs for new products was to retrofit their old products. Their older architecture, now layered with complex modifications, demands so much disk storage and memory space that they can force companies to spend millions on new hardware just to cope.

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Food stamp POS trial continues

By Mitch Betts

WASHINGTON, D.C. — An experimental program that issues food stamp benefits through point-of-sale (POS) terminals at grocery stores will continue in Reading, Pa., for two more years, officials announced recently.

Administration of the pilot program will be turned over to the Pennsylvania state government under an agreement between Gov. Richard Thornburgh and the U.S. Department of Agriculture (USDA).

For the past year in Reading, the USDA has tested the $3 million Electronic Benefit Transfer system, which replaces paper food coupons in an effort to reduce fraud and abuse in the program [CW, Aug. 27, 1984].

Under the system, recipients' food stamp benefits are entered into an electronic account. At the grocery store, participants insert a plastic card with a magnetic stripe carrying identification data into the terminal, which debits their food stamp account and credits the grocer's bank account for the amount.

AT&T hikes rate

WASHINGTON, D.C. — AT&T Communications last week filed tariffs proposing a 7% monthly increase in its end-to-end private-line rates for business customers that would generate $290 million to cover added costs for local service.

The proposed increase, if approved by the Federal Communications Commission, would go into effect Jan. 2.

The increase reflects the actual costs borne by AT&T for the local channel portion it obtains from local telephone companies for end-to-end private-line service, the company said.

— Bryan Wilkins

AT&T escapes circuit waiting charge liability

FCC urges coordination of line installations

By Bryan Wilkins

WASHINGTON, D.C. — The Federal Communications Commission rejected arguments from AT&T's long-distance competitors and large private-line users that AT&T is liable for some local access charges. The charges in question are paid by the competitors and private-line users while they wait for connections to AT&T's long-distance circuits.

The FCC said AT&T is not liable under its tariffs for synchronizing installation of local phone companies' lines with its circuits. However, the FCC said AT&T must make a more reasonable effort to coordinate installation dates under the tariffs.

The FCC said, "Although we do not here define AT&T's obligations in any particular circumstance, AT&T is obligated under its tariffs to do more than initially order the circuits. It would be reasonable in most instances that, once a local exchange carrier notifies AT&T of the availability of the local channel AT&T has ordered, AT&T should determine whether the interexchange channel will also be ready."

The FCC also said AT&T at least must contact the customer or carrier requesting the long-distance circuit and, before accepting use of the local circuit, ascertain whether the customer wants to delay acceptance for 30 days — possibly with a charge — or whether the customer wants to cancel the order, pay a termination charge and risk unavailability of a local channel upon delivery of the long-distance circuit.

The long-distance carriers and the International Communications Association said they incurred charges for unused local circuits while waiting for long-distance circuits. AT&T required these customers to sign agreements authorizing it to request local access connections and stating that the customers would be liable for the access charges upon availability.

Tax reform gets lukewarm industry help

By Mitch Betts

WASHINGTON, D.C. — The tax reform bill that emerged Nov. 23 from the U.S. House of Representatives Ways and Means Committee faces a tough battle on the House floor, but it appears to have at least lukewarm support from the computer industry.

"My initial reaction is that the committee's bill will enable us to remain supportive of the president's tax reform initiative, although we certainly did not get everything we hoped for," Ted A. Heydinger, vice-president of the Computer and Business Equipment Manufacturers Association (CBEMA), told *Computerworld* last week.

A formal CBEMA statement on the tax bill is expected Dec. 5.

Reviving the tax credit

While many business sectors would lose tax credits and deductions in the committee's tax bill, the computer industry and its allies engineered a revival of the expiring tax credit for research and development investments.

Led by Rep. J. J. Pickle (D-Texas), the high-technology coalition won approval for a compromise amendment that extended the R&D credit for three years but cut its percentage from 25% to 20%. Under existing law, the R&D credit will expire Dec. 31.

Pickle's compromise also ensured that R&D expenses will not be counted in the committee's proposed 25% minimum corporate tax. A committee draft of the bill had subjected R&D to the minimum tax, triggering a strong lobbying effort by CBEMA and its allies to kill that provision [CW, Oct. 7].

The committee bill would lower the top corporate income tax rate from 46% to 36%, while trimming several business tax deductions, but it would raise the maximum tax rate on capital gains from 20% to 22%. Both provisions are less favorable than President Reagan's tax proposal, which would cut the corporate rate to 33% and the capital gains rate to 17.5%.

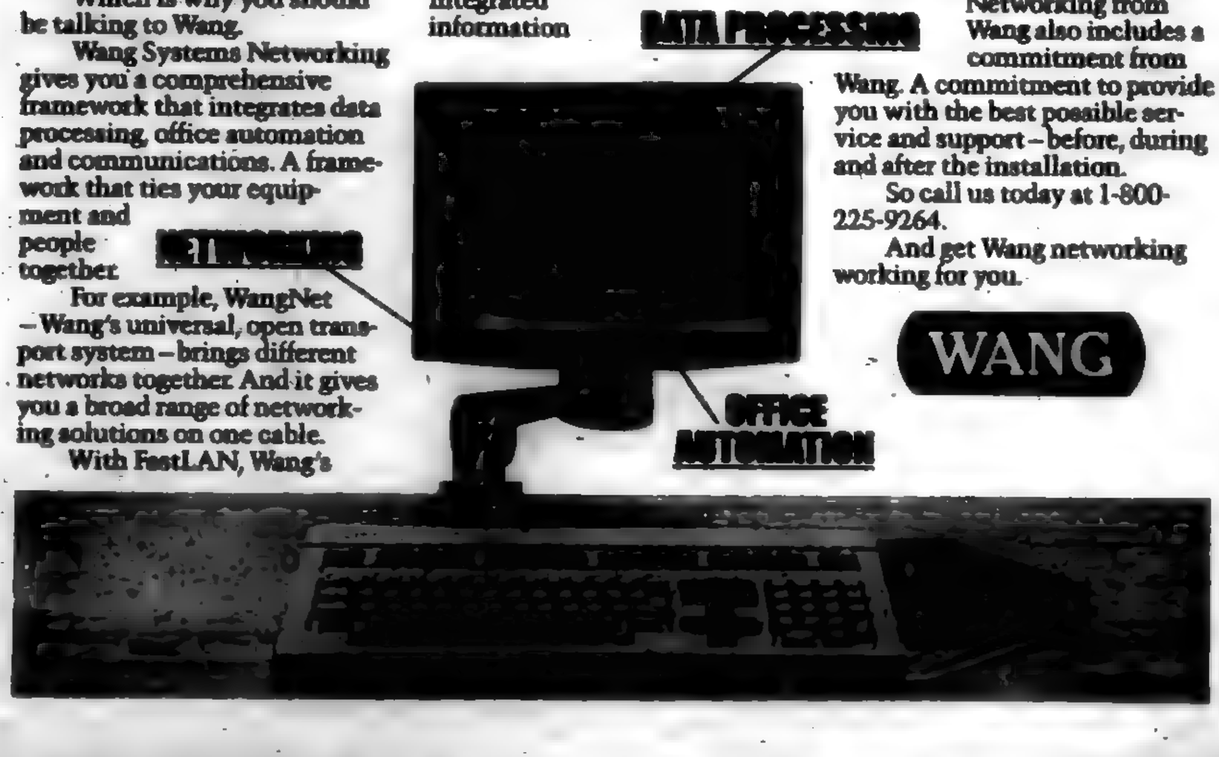
R&D tax credit cut of 20%

The Coalition for the Advancement of Industrial Technology, which supported the Pickle amendment, said the amendment would cut the value of the R&D tax credit by 20%, an improvement over the 60% cut suggested by the committee's draft.

Coalition officials said the compromise was "the best possible tax treatment for R&D costs within the context of the Ways and Means Committee tax reform debate."

According to Joseph E. Rowe, chairman of Gould, Inc. and the coalition, the favorable R&D provisions mean that some coalition members will lobby for passage of the entire tax reform proposal.

However, CBEMA's Heydinger and political analysts said that there is little enthusiasm in the full House of Representatives for the committee bill, and it is uncertain whether President Reagan will support it.



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WORLD DIGEST
Computerworld News Service

LONDON — A survey of spending plans of some 2,000 British companies has revealed that the current explosive growth in computer use among Britain's engineering firms will continue. The survey also indicated, however, that 40% of these firms still do not have any computer at all. The survey predicted the engineering sector will buy $860 million worth of hardware and $360 million of software by year-end 1985.

The survey, conducted annually by the publication *Engineering Computing*, showed that since 1983 the value of Britain's installed base of computers has grown from $1.06 billion to $3 billion. The survey also showed a changing pattern of spending as buyers shift from Commodore, Ltd., the dominant supplier two years ago, to IBM and its Personal Computers. Also found was a greater number of mainframes and minicomputers than in 1983.

AMSTERDAM — An independent advisory board urged the Dutch government last week to help spur supercomputer use in the Netherlands with public funding and other means. The report also recommended that current resource allocation be improved through a scheme similar to that used by the National Science Foundation in the U.S. The panel urged the government to budget about $1.7 million annually in 1986 and 1987 for the program.

TOKYO — Tokyo Electric Power Co.'s plan to enter the Japanese telecommunications business marked the "debut of the most formidable rival in the future." So said Nippon Telegraph and Telephone Corp. President Hisashi Shinto.

Under Tokyo Electric's plan announced earlier this month, the 41,000-employee company, Japan's largest power utility firm, would establish a subsidiary in January 1986 that would operate as what the Japanese call a Type-I carrier. The subsidiary would also own its circuits to provide the national and international services offered by Type-II carriers, such as value-added network operators, according to Tokyo Electric President Sho Nasu.

BEIJING — China's first Digital Equipment Corp. VAX-11/780 clone was introduced recently by the North China Computing Technologies Institute. The NCI-AP2701, an array processor, reportedly can be connected to a VAX-11/780 or the NCI-2780, a 1 million instructions per second machine introduced in July by the institute. In the latter configuration, processing capabilities of a 2780 supermini can reportedly be increased 10 times.

ZURICH — An international, on-line freight forwarding exchange that uses the videotex systems of the national Postal Telephone and Telegraph authorities has been launched. The Transpotel service, established by communications companies from four European countries, permits potential business partners to access information on freight transportation services and their capacities to move freight across international borders.

CHANGSHA, China — China has announced development of its first computer for high-speed computer simulations. The YH-FI computer, announced by the Changsha Science and Technology University, reportedly operates at 170 million instructions per second.

When connected to a superminicomputer, the YH-FI is said to be able to simulate complex, dynamic systems.

Japan, Canada, U.S. to end tariffs

By Mitch Betts

WASHINGTON, D.C. — U.S. Trade Representative Clayton Yeutter recently announced that the U.S., Japan and Canada have agreed to eliminate their trade tariffs on computer parts.

Yeutter said the historic move would reduce costs to U.S. computer systems manufacturers by about $172 million.

Elimination of the tariffs will reduce business operating costs for U.S. computer vendors because each imported component will cost roughly 4% less, according to Oliver Smoot, executive vice-president of the Computer and Business Equipment Manufacturers Association in the U.S.

Smoot said the lower costs could be reflected in lower prices for buyers or, more likely, in higher profit margins for ailing computer firms.

Under the three-way agreement, the U.S. agreed to eliminate its 4.3% tariff on computer parts (except VDTs); Japan agreed to eliminate all tariffs on computer parts, peripherals and CPUs; and Canada agreed to eliminate tariffs on computer parts and semiconductors.

The Japanese tariff on computer parts, peripherals and CPUs varies from 3.2% to 6%. The current Canadian tariff for computer parts is 3.9%, and 6.8% for those semiconductors subject to a duty.

The elimination of duties will be implemented as soon as each government obtains the necessary legislative or executive approvals.

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Madness or Method?

Gil Roeder, president of Retrieval Technology Corporation, dreams up these scenes for a good reason. His customers use the C language for software development because of its power and portability, but have often hit snags getting staff up to speed. C can be hard to learn and tricky to use; and "on the job training" is slow and distracts experienced staff. Seminars and travel eat up a budget fast, and do not always deliver on promises.

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Roeder started his career as a teacher of Computer Science, then founded Retrieval Technology to provide quality training aids to computer users. Over the years, he and his staff have helped thousands to master computers and software. Now they use video to teach in a friendly way that gives remarkable results.

The All Hands On C Video Workshop works so well because the focus is on people. Using proven video teaching techniques - personal presentation, animated graphics, sample programs, computer screens and dramatic scenarios - the workshop relates technical concepts to life experiences. It entertains *and* produces outstanding retention of subject matter.

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The All Hands On C Video Workshop works when and where you need it. And students can review the package any time at no extra cost. It is ideal for self-paced individual study or for groups with a professional trainer. Trainers like it since it helps them focus on students while material is presented by the video.

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VIEWPOINT

EDITORIAL

The long march

Trade shows are not the perfect harbinger of sociocultural trends. In fact, trade shows are not the perfect harbinger of much at all. But the just-concluded Comdex/Fall '85 was markedly different from past editions of the annual industry gathering rite and may well serve as an indicator of a new age of corporate computing.

Call it the Age of the End User. With IBM having blessed token-ring technology, distributed computing power has migrated from a "what-if" stage to a clear and present option for corporate computer managers. Local-area networks used to be fun to talk about and dabble with; now managers can be secure in considering them as the core element in serious, big-league corporate communications strategies. Similarly, the recent proliferation of multiuser software is making other multiple-user systems a more attractive choice for departments and small offices.

All of this was very apparent at Comdex, an erstwhile hotbed of micro romance and breeding ground for Silicon Valley fever that this year was more of a communications show for corporate strategists. The common theme in exhibitors' commentary on the show was "all business," a recognition that the 1985 Comdex/Fall — held, as usual, in Las Vegas — drew fewer tire kickers, junketeers and micro groupies and more serious buyers.

Especially remarkable, exhibitors agreed, was the increased attendance of corporate buyers looking for ways to meet demands from end users and top management for distributed computing power. Local-area network software and hardware, multiuser software, laser printers, new mass-storage technologies: These were the hot attractions outdrawing the stage shows in Vegas during Comdex week.

Sensitivity to end-user issues was not limited to exhibitors' floor comments. In private conversations, microcomputer industry leaders spoke candidly of their responsibility to deal more effectively with MIS/DP departments. Ashton-Tate President Ed Esber spoke of the lessons that micro software companies had to learn from mainframe software companies in terms of "how they market, how they price and how they service their customers." Software Publishing Corp. President Fred Gibbons spoke of his mission "to sell corporate computer managers on the data processing power of the micro."

Even such resolute pioneers of the micro revolution as Apple Computer, Inc. and Microsoft Corp. are grappling directly with the reality that the business computer marketplace is user driven and not technology driven. Microsoft introduced its long-delayed (as in, announced two years ago) Windows operating environment, even while company officials were acknowledging that their marketing challenge is one of user education rather than of fulfilling existing user demand. And Apple, having forsaken the computer-for-the-rest-of-us theme and Mac Office concept, now has high hopes for its Macintosh as a desktop publishing tool, an application for which it is ideally suited.

Small steps all, but small steps in a long march. If the march's goal of distributed computing power is effectively reached and if corporate information policy becomes an effective strategic weapon, then Comdex/Fall '85 will be seen as a milestone.

LETTERS TO THE EDITOR

Easy RJE data transfer overshadowed by method's vulnerability to hackers

The In Depth article "RJE reaches for the upper hand" [CW, Sept. 30] rightly focused on RJE as an easy-to-use bulk data transfer method. However, it neglected a major problem with using RJE in micro-to-mainframe communications — security.

RJE has none of the password protection schemes that the IBM 3270 protocol supports. Nor will some of the most popular IBM mainframe security systems protect RJE transmissions. It is easy for a hacker with an RJE emulation device on a micro to bypass the host's security system and sign on to the mainframe. The hacker can then read all the data in that RJE queue and delete it.

A more sophisticated user could send altered data upstream and corrupt the corporate data base. An RJE hacker could also issue operator commands and disrupt mainframe operation without interfacing with the host's access controls.

As a user, I appreciate the ease and flexibility of RJE communications. But as a security consultant, I would not recommend RJE as a means to transfer sensitive data between IBM mainframes and micros.

Walter P. Opaska
Certified Public Accountant
Raleigh, N.C.

Vendor reinforces OSI commitment in version of systems architecture

Your readers may have been misled by the headline "Honeywell revamps net architecture" [CW, Oct. 7]. The latest release of Distributed Systems Architecture (DSA) adds new functionality and reinforces our long-established strategy of Open Systems Interconnect (OSI) support. Because DSA has been based on OSI since its initial release, our architecture does not require revamping to comply with international standards as they become finalized.

Although your article covered new DSA products and the DSA/SNA gateway, it omitted our strong statement of commitment to OSI.

Dieter Fischer
Director
Distributed Systems Product Marketing
Honeywell, Inc.

Systems tampering, acts of sabotage may be products of DP/MIS stress

The editorial "The stress factor" and the Update "Managing stress in the data center" [CW, Nov. 4] were extremely well done and timely. I would add one further repercussion from job-related stress in data processing: Employees in such stressful environments often tend to compensate for the pressures with bizarre behavior such as systems tampering, file browsing, intentional introduction of random errors and other acts of fraud and sabotage.

Several years ago, I theorised that computer-related crimes and abuses by insiders were attributed to economic, egocentric, ideological or psychotic motivations.

Your research would seem to indicate that data processing and management information systems employees may be vulnerable to at least three of those motivations. If so, we may be in for more security breaches.

Jack Bologna
Assistant Professor of Management
Siena Heights College
Adrian, Mich.

Professional organizations provide mechanism to promote social justice

Thank you for publishing the important ideas expressed in the Reader's Platform, "Information, revolution and social justice" [CW, Nov. 4]. The thoughts on social justice are well taken; however, the article neglects to point out the main stumbling block toward a commitment to social justice. Unfortunately, profits are blind to justice.

The expenses of social injustice are generally externalised by firms. Even the most ethical and idealistic of executives and managers usually find themselves in a losing battle against the bottom line where social considerations are involved.

I resigned from the Data Processing Management Association in protest of its blanket opposition to VDT legislation. Rather than fight city hall, I prefer to work through organizations like the Computer Professionals for Social Responsibility to move toward the just use of DP technology.

Daniel A. Coleman
Chapel Hill, N.C.

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   - 70. Mining/Construction/Petroleum/Refining/Agriculture
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   - 85. Computer Service Bureau/Software/Planning/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
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   - 23. Systems Manager/Systems Analyst
   - 31. Manager/Supervisor Programming
   - 32. Programmer/Methods Analyst
   - 33. OA/WP Director/Manager/Supervisor
   - 38. Data Comm. Network/Systems Mgmt.
   - 41. Engineering/Scientific/ R&D/Technical Mgmt.
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   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems
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VIEWPOINT

Reaching the unreachables through new channels

By Amy Wohl

The computer industry is littered with technologically terrific products that never got sold. Sometimes that is a matter of engineering enthusiasm run amok. Just because your engineers think something is a state-of-the-art wonder doesn't mean that anyone wants to buy it. That is what market research, a tool unknown to many computer companies, is all about.

Sometimes it's a timing issue. Being too early with a product — before market need is established — can be worse than being too late.

But most often the problem is simpler: the product is never offered to the customer through an appropriate distribution channel.

Personal computers, the engine driving both office automation and end-user computing today, are sold to customers through a variety of distribution channels:

- Large customers buy most of their personal computers directly from the vendor. This allows them to integrate these purchases with the rest of their computer plans and permits them to demand negotiated discounted pricing and free support at levels appropriate to their overall business level with their vendor.
- Many customers prefer the local support or the occasional chance of fire sale pricing offered by computer specialty stores. This channel is particularly important to medium- and small-size customers who lack the purchasing clout to get much attention from direct vendor sales forces that seek large orders.
- A smaller number of customers buy hardware and software from mail-order houses and other low- or no-service sources, trading off low prices for much less support.
- Customers who need custom software or vertical market knowledge may look to systems houses and value-added resellers that offer expertise and support, often at premium prices.

There are other choices as well. The problem is this: Large companies are served reasonably well by existing distribution channels. Smaller companies, however, have a tougher time.

WOHL STREET MINIJOURNAL

> ***Value-added resellers not only know the application, but they also know quite a lot about developing software and running a business.***

Could there be other options? Walking around the floor at Comdex, the only show aimed directly at computer sellers, offers an occasion to consider the following possibilities:

One is suggested by an obvious phenomenon of this year's Comdex floor: the increasing numbers of software packages designed for specific vertical markets. We suspect that no matter how well designed these packages are, finding the right one — and a knowledgeable support source — is pretty difficult. So why not recognize this need and organize a distribution channel around it?

This channel could be made up of individual organizations, each devoted to a specific vertical market.

Or it could consist of a much larger business, probably franchised or chain based, in which each store would have employees, systems and software for a variety of vertical markets. Here, it would be important that each vertical market be supported by one or more employees with actual expertise in the application — former shoe salespeople, common at some computer retail establishments, would not be adequate here.

Alternatively, existing computer stores could support concessions, owned and operated by companies with expertise in a particular vertical market. In fact, the first option could fit well into this alternative.

How are such arrangements different from the services of value-added resellers? Basically, the difference lies in the expertise of the one offering it. Value-added resellers not only know the application, but they also know quite a lot about developing software and running a business based on software development.

The vertical marketer needs to know the application but might need to know only how to pick among several good packages in a particular vertical market and to install and customize these offerings. Also, value-added resellers are usually dedicated to a particular package for their vertical market; these new marketers could act as consultants, helping customers choose among the offerings in a particular vertical market.

Another possibility seems to come up regularly in the business plans circulating among venture capitalists: the idea that one could build a network of experienced office equipment or computer sales representatives. Such bright and ambitious people often start computer stores or systems houses on their own but rarely have the capital resources or business skills to succeed.

These business plans have in common that the sales representatives would be agents rather than distributors or dealers. This means that they would not take title to the equipment they sell, and therefore, their needs for initial capital would be quite small.

Each sales representative could be his own boss, free to stay small or grow big — and the overall organization could grow its revenue both by adding new sales representatives and by adding new products. The sales reps could choose to run their operation out of their back pocket — or, with adequate funds, to organise a much more substantial facility.

Funding could be provided in a variety of ways: by computer companies looking for new distribution channels, particularly to smaller customers; by financial intermediaries such as leasing companies; or by investors such as venture capitalists.

Other new distribution channels are probably possible too. The key is to find new ways to reach new or currently unreachable customers at economic levels appropriate to the purchases such customers would likely make.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

MIS mission: Market your services in-house

By Walter F. Cuirle

Many data processing people associate marketing with hype, even with outright lies. The assumption is that marketing and sales are annoyances that others inflict on us, not activities engaged in by sensible corporate MIS people.

That could be a mistake, especially if the mix in your group's work load has not changed materially as your user departments have moved into new areas.

MIS in an established firm is often a monopoly. Fifteen or 20 years ago, if anybody wanted an kind of data processing done at all, they had to go to corporate MIS. No matter who ran MIS, a user could count on continuity.

MIS, for its part, could see to it that there was some uniformity in the way things were implemented. This was often happening behind the scenes — making sure that what accounting got was also something that worked with the package that sales had, for example.

The MIS monopoly within the corporation gave it the control it needed to enforce integration. Users didn't question how things were done and had few, if any, options. There was no need to sell; just write up the orders.

MANAGEMENT MATRIX

But that was when the only computers stood around on raised floors in isolation. These days, the budgets available to individual corporate departments for data processing are often big enough to give them ideas. In some of those departments, the idea is to set up a small internal DP department with minicomputers and software bought from outside vendors. They have options. You have competition.

But even with the monopoly gone, your users are still likely to come to you with the tough problems. If you have competition, then compete. To do that, you need to start actively marketing and selling your services within your own corporation.

The word "marketing" ought to bring to mind "research;" finding out who the clients are, where they are, what they need, and of course, what they can afford to spend. Then let them know that you have what they need at a price they can afford. The function of the sales representative is both to gather information for the vendor and to impart information to the client. The conventional image of a salesperson might be as a pushy glad-hander, but it need not be. A good corporate sales rep is an ombudsman — an essential person who knows the product, the possibilities and the client's needs and can talk about them intelligently.

You have advantages in both of these areas. First of all, an internal MIS department ought to be able to find out the needs of its client departments better than anyone else. After all, even though the clients now have options on where to buy, MIS seldom has options on where to sell.

In many cases, what clients want is information in the form of advice from people, not data in the form of stacks of printout from machines. Change the image of MIS from just a place to get data processed to a place to get management services. A good attitude to cultivate is that MIS is the place to go first for reliable opinions on DP needs.

Your sales representatives are the people who do that for you by listening to the client's problems and offering solutions. The sales rep shows the client what MIS can definitely do, can probably do and cannot do.

A good sales representative is also a good source for new design ideas or modifications. The traditional MIS approach processes requests from users as they occur; a good MIS sales representative can shed light on why a client wants a feature, how many others might want the same thing and what they are likely to ask for.

A big difference between corporate MIS and a third-party vendor is that the vendor is out to make a profit and doesn't forget it; on the other hand, MIS, whether it is supposed to be a profit center or not, often acts like a loss center. And yet, MIS potentially has all of the advantages in this game. Maybe it's time for the sleeping giant to wake.

Cuirle is a senior associate with Nicholas DeMaio Associates in Bryn Mawr, Pa.

U.S. government begins phasing out punched-card checks

By Mitch Betts

WASHINGTON, D.C. — The days of the punched-card check are fast coming to an end. The U.S. Department of the Treasury recently announced plans for nationwide conversion of the familiar green perforated checks — used by the government for the last 40 years — to new multicolored paper checks.

The first major phase of the conversion will take place Dec. 3, when more than 30 million Social Security recipients will get the new check in the mail. The conversion of some 600 million checks will be completed in 1986, officials said.

"We're changing the check because the punched-card technology is obsolete, and punched cards are no longer consistent with modern banking practices," Treasury Secretary James A. Baker said. Replacement of the old equipment cost $5 million, but the thinner paper checks will save the government $6 million per year in lower storage costs, Baker said.

Can you fold, spindle or mutilate the new checks? "I don't know whether you want to mutilate it, but you can fold it," said W. E. Douglas, commissioner of the Treasury's Financial Management Service.

■

WASHINGTON UPDATE

WASHINGTON, D.C. — Common Cause, a self-styled public interest group, has urged the Senate's Select Committee on Ethics to investigate the propriety of Sen. Ted Stevens (R-Alaska) appearing in television advertisements for Honeywell, Inc.

Fred Wertheimer, president of the group, said the senator's actions are an apparent conflict of interest, since Stevens is chairman of the Senate Appropriations Subcommittee on Defense and Honeywell is a major defense contractor.

In the ad, Stevens is shown in his office with Honeywell's office automation equipment but does not speak. Stevens said there was nothing unethical or improper about his appearance, and a Honeywell spokesman said the senator's appearance did not constitute "an endorsement in the classic sense."

Stevens said he donated his $1,000 fee to a charity fund.

■

WASHINGTON, D.C. — U.S. Sen. Albert Gore Jr. (D-Tenn.) continues to campaign for his bill to create a future-oriented Office of Critical Trends Analysis in the White House, despite attacks from critics of the idea.

In a published essay, a National Taxpayers Union official wrote that the move would be "a major step toward greater government control over our economy and society."

But in recent speeches, Gore has said criticism that the office would engage in centralized planning is unfounded since the office proposed by S. 1031 could not force government agencies to do anything. Gore said the office is needed to analyze technological and social trends for the president, much like Congress' Office of Technology Assessment.

One problem with executive agencies is that their computer models are all incompatible, so there can be no swapping or consolidation of forecasts, the senator noted.

Gore's bill has the support of Rep. Newt Gingrich (R-Ga.), who is a leader of the Conservative Opportunity Society faction of the republican party and who rarely agrees with Gore on other issues.

■

WASHINGTON, D.C. — Biographies and digital pictures of fugitives who appear on the Federal Bureau of Investigation's "10 Most Wanted Fugitives" list are now available on the Compuserve Information Service, from Compuserve, Inc. of Columbus, Ohio.

Compuserve and FBI officials worked together to produce the on-line service, hoping it will turn up some clues that will lead to the apprehension of the fugitives.

"Many of our subscribers are professionals such as doctors, lawyers and dentists. Like everyone else, the fugitives require the use of their services. In addition, many of these fugitives have distinct scars, tatoos and limps ... so alert subscribers may spot one of them," according to a Compuserve spokesman.

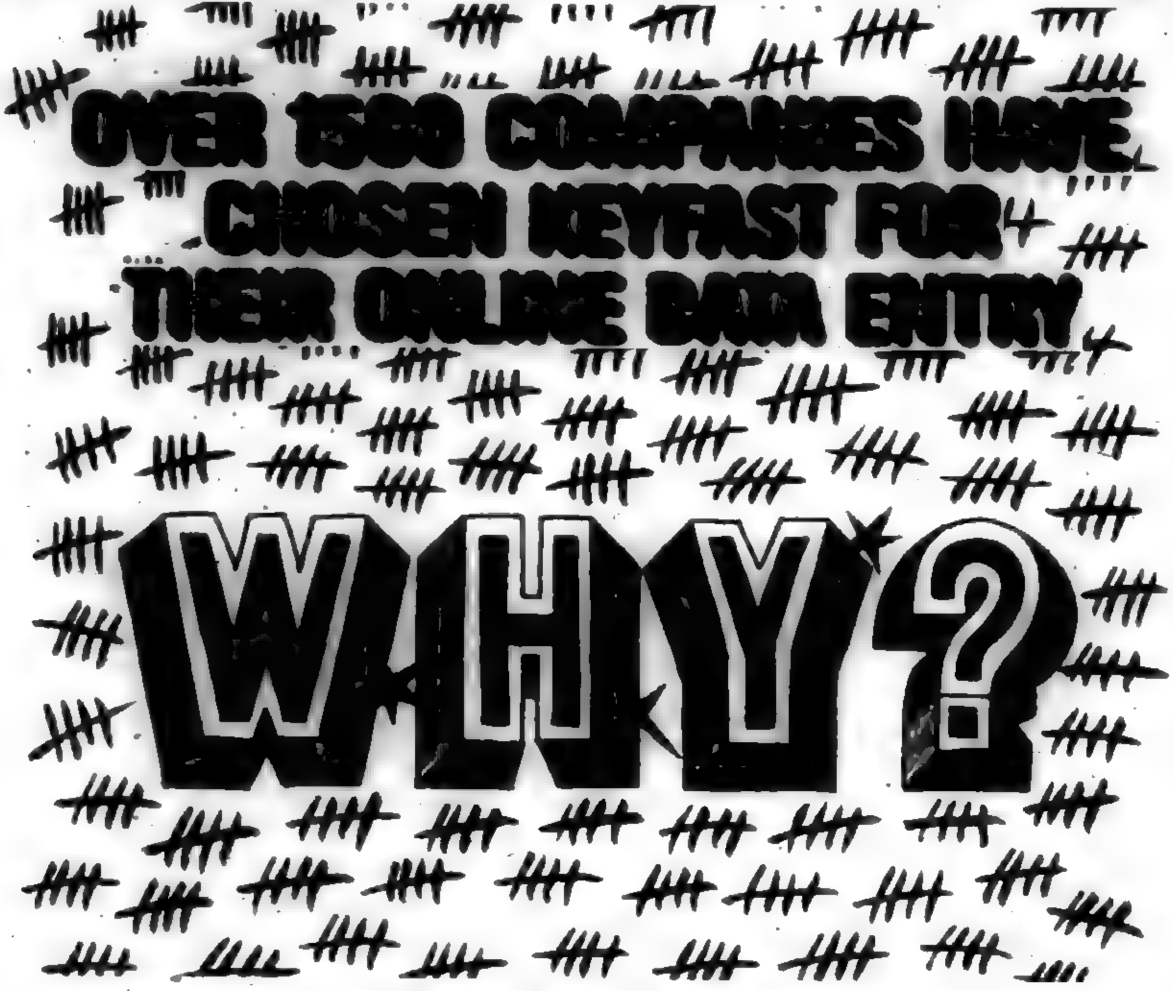
■

WASHINGTON, D.C. — The negotiations went on for about a year, but in the end, the Videotex Industry Association (VIA) and the Information Industry Association (IIA) just could not agree on a proposed merger. Consequently, the status quo remains, with the VIA representing some videotex vendors and the IIA's Videotex Division representing others.

The IIA proposed that the VIA become the IIA's Videotex Division, while the VIA proposed that IIA recognize itself as a federation of separate associations, including the VIA.

After face-to-face negotiations in Boston failed, a joint statement was issued announcing that a merger agreement could not be reached.

"The feeling was that this exchange brought the curtain down on this phase of the discussions, but the door remains open to new approaches," according to an IIA report.



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COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

'Value added' the net byword

While retail outlets are an important channel of distribution for vendors of personal computer local networks, many manufacturers rely primarily on value-added resellers and distributors plus more traditional end-user sales.

The "box-pushing retail computer store" is disappearing, according to one network vendor. "Value added" is now the byword.

There are two types of companies in the value-added category: value-added resellers and value-added distributors. As their name implies, resellers buy local networks, enhance the products — typically through software tailored to a certain application — and resell the networks directly to end users.

Value-added distributors also enhance net products but sell them to computer stores and sometimes to end users and small resellers. Distributors maintain warehouses of products and often provide local product support. Vendor products sold to distributors may very well end up on retailers' shelves.

A quick survey of three network vendors at the recent Comdex/Fall '85 show in Las Vegas uncovered an interesting disparity in the manner micro network vendors hawk their products.

Corvus Systems, Inc. of San Jose, Calif., for example, does 40% to 45% of its business through retail outlets, according to William A. Lanfri, director of marketing. Another 30% to 35% of its business is through value-added resellers and distributors. A few major accounts make up the remaining 15% to 20% of its business.

By comparison, between 85% and 90% of Nestar Systems, Inc.'s revenue

See VALUE page 26

AT&T to offer Accunet T45

Targets large-volume users along fiber-optic routes

By Rosemary Hamilton

BASKING RIDGE, N.J. — AT&T filed a tariff with the Federal Communications Commission late last month for a 45M bit/sec. dedicated digital communications service to be provided on its U.S. fiber-optic routes as early as January 1986.

Accunet T45 — plans for which were originally discussed at last year's Telecommunications Association conference in San Diego — will be marketed to large businesses, government agencies and other telecommunications companies.

The 45M bit/sec. service conforms to the T3 telecommunications industry standard and uses the DS3 signal interface. It can support 672 digitized voice channels or an equal number of 56K bit/sec. digital data channels. The capacity is equivalent to 28 T1 1.54M bit/sec. digital links and can, in fact, be used in trunk applications to support that many T1 spans.

A "small to medium-size company is not really going to be interested" in Accunet T45, a company spokesman said. "It's aimed at very large volume data users." A number of customers have reportedly approached the company about such a high-capacity service, but the spokesman would not specify which customers or what industries have shown strong interest.

AT&T's fiber-optic network used to support the new leased service should extend more than 4,600 miles by year's end. By 1988 it is expected to stretch more than 10,000 miles and connect approximately 120 major cities, according to John Smart, vice-president of business markets and services at AT&T Communications, the AT&T unit in charge of long-distance and international services.

Initially, however, T45 will only be available in three major areas, including major cities along the company's Northeast Boston-to-Richmond, Va., fiber-optic route; major cities in California; and the Dallas-Fort Worth, Texas area.

Customer access to the service must be arranged through local telephone companies. Few of these companies, however, have service offerings or the capacity to

See AT&T page 26

Likelihood of changing long-distance carrier

	Income in Thousands				
Response (%)*	Less Than $15	$15-24.9	$25-29.9	$30-39.9	$40+
Very Likely	5.5	6.4	12.7	5.9	5.7
Likely	6.6	10.6	12.7	9.8	17.0
Not Likely	82.4	80.9	72.7	78.4	69.8
Don't Know	5.5	2.1	1.8	5.9	7.5

Survey size — [illegible] respondents

* Percentages may not total 100 because of rounding.

Source: Link Resources Corp.

The long-term viability of interexchange communications carriers such as AT&T Communications, MCI Communications Corp. and GTE Sprint Communications Corp. [illegible]

INSIDE

Timeplex and Phalo both unveil multiplexers that support voice and data/23

NEW THIS WEEK

- Wizard Computer Products introduces protocol converters
- Telenetics adds two to its Expressdata modem line
- For more on these and other new products, see pp. 71-82.

INSTANT ANALYSIS

"Users can no longer afford to let carriers and the Federal Communication Commission determine tariffs. They have to take an active role in the rate-setting process."

— John [illegible], Santa Fe International Corp., speaking at the 1985 International Data Corp. Fall Executive Conference

Increased market pressure can work to users' advantage

Vendors must adjust to shifting environment

By Paul Korzeniowski

NEW ORLEANS — Recent shifts in the communications equipment market have squeezed vendors and given users the chance to influence product direction and design.

Vendors are trying to increase profits while juggling dynamic market forces that include longer selling cycles, distribution woes, loss of user contact and slimmer margins, according to Kim Myhre, director of communications research at International Data Corp. (IDC), a Framingham, Mass., market research firm.

Myhre, speaking at IDC's conference called "MIS Management Issues and Strategies: Sharpening Your Company's Competitive Weapon," said the industry turmoil can benefit users, such as in the formation of standards. He noted, "For the first time, we are seeing standards developed before products."

Communications vendors are experiencing difficulty maintaining market share and increasing their profits. "The economics of the industry are rapidly changing, and a number of companies are not equipped to cope with these changes," Myhre said.

Besides coping with industry change, vendors must deal with changes in user environments. For example, some companies have given their MIS department control over telecommunications functions. Consequently, communications vendors may have to call on strangers rather than on established customers.

"Manufacturers of private branch exchanges claim there is now an 18-month selling period," Myhre noted. The delays stem from questions MIS asks concerning PBX data support. In addition, distribution concerns are hobbling the market. "Companies no longer know who they are selling to," Myhre said. He presented Micom Systems, Inc., a Chatsworth, Calif., manufacturer, as an example. "Micom used to dominate the low-end [data switch] market through its direct sales force," he said. "The company has now lost touch with its customers because a lot of its products are sold by distributors."

Micom's distribution problems are the rule rather than the exception, according to Myhre. Vendors often step on their own toes. "I had an IBM salesman, a [Rolm Corp.] salesman and a Rolm distributor all trying to sell me a Rolm PBX," noted IDC panelist Lou Sandos, director of corporate telecommunications at McDermott, Inc. in New Orleans. "I told them I was only going to evaluate one offer, and it was up to them to decide what that offer would be."

Distribution confusion has caused price cuts. "Once a company employs multiple lines of distribution, it can no longer set prices because distributors will cut their margins to keep their sales," Myhre said. Users benefit, but vendors' profits are squeezed.

See MARKET page 26

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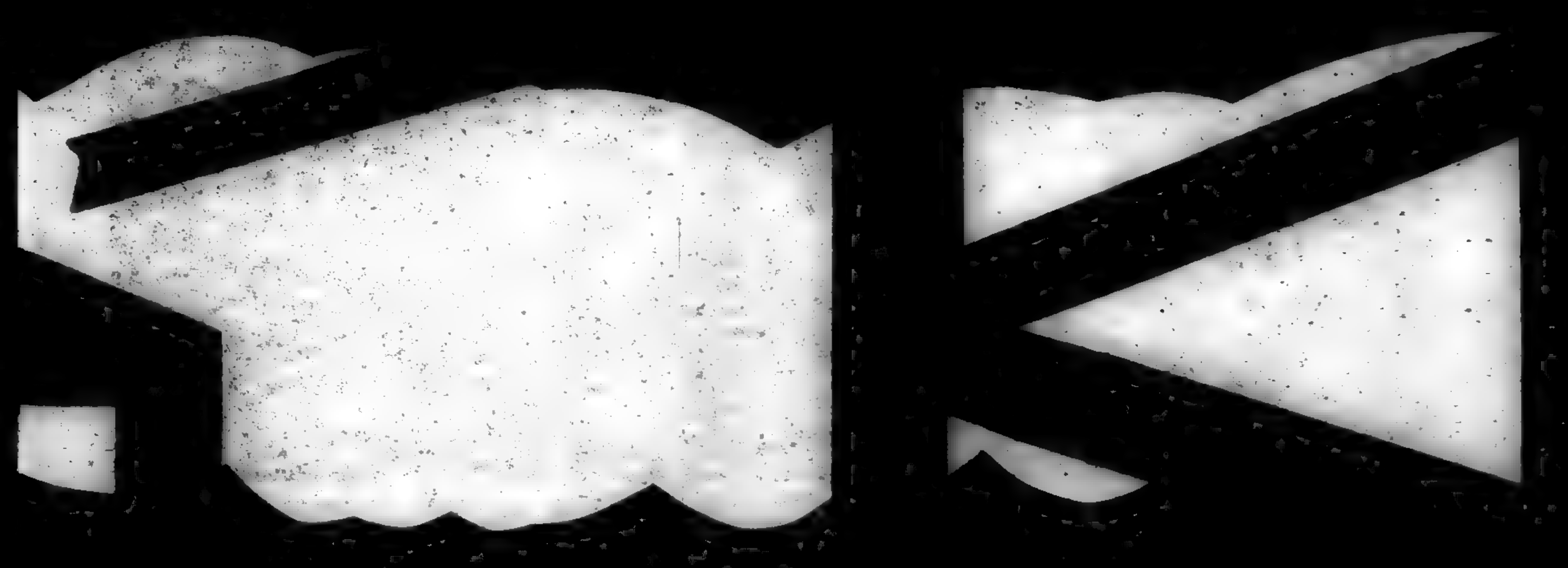

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Timeplex, Phalo unveil muxes for digital, intracompany use

Voice/data units boast high-speed digital, fiber-optic capabilities

By John Dix

Two multiplexers that support voice and data were unveiled recently, one from Timeplex, Inc. — intended for use with high-speed digital communications facilities — and the other, a fiber-optic unit for intracompany use, from Phalo Corp.

Timeplex of Woodcliff Lake, N.J., unveiled the Voplexer 56/64K BPS Voice Data Mulitplexer at the recent Communications Managers Association conference in Uniondale, N.Y.

The time division multiplexer can squeeze one voice channel and up to seven synchronous data channels operating at speeds up to 19.2K bit/sec. over a single 56K or 64K bit/sec. digital link.

Voice is digitized using continuously variable slope, delta modulation at 28K bit/sec. or 32K bit/sec., leaving at least half of the link's capacity for data transmission.

Two types of circuits

The multiplexer can be used on point-to-point circuits or as a voice/data tail circuit feeding a T1 network. In the later application a remote location could be linked to a T1 access point over a 64K bit/sec. circuit and then incorporated into the 1.54M bit/sec. facility and routed accordingly.

Users can thus provide integrated voice/data support to remote spur locations using incremental 64K bit/sec. digital links, reducing the need for parallel voice and data leased circuits.

Voplexer supports four or seven synchronous data ports and an optional port to connect to a private branch exchange. Users select the port configuration at the time of purchase.

The unit can reportedly be upgraded to its full complement of ports by replacing a four-port data module with a seven-port version, with or without a voice port. A combination Digital Service Unit/Customer Service Unit is available as an integral option to interface the multiplexer with digital networks.

The device is programmed using prompts and a menu structure and indicates when parameters entered are not compatible with the network. A statistics selection on the main menu is said to provide the operator with link statistic options, port statistics, function status and link status for local and remote units.

Parameters for two alternate configurations can be maintained to accommodate net changes by time of day or for special events, the company reported.

Users can also create yet another network configuration off-line on a so-called scratch or editing data base. This enables users to experiment with an alternative network configuration and, when needed, down-line load it for actual use to either the primary configuration data base or the secondary, time-of-day/special-event configuration data base.

Diagnostics supported by the device include interal and external loopback and local and remote system tests. The multiplexer has a built-in test pattern generator/detector to test data paths.

Available in January, Voplexer costs $2,195.

Phalo's 9600 series

Phalo of Simi Valley, Calif., recently announced a voice option to its fiber-optic 9600 series, a time division asynchronous/synchronous multiplexer.

Voice support on the 9600 is achieved with the addition of voice channel option modules, but this is usually at the expense of data support.

Modules come with eight or 16 ports, and two of each are required to reach the multiplexer's maximum of 48 voice channels.

The 9600 multiplexer normally supports 24 channels of data at 19.2K bit/sec., or 48 channels at 9.6K bit/sec. or up to 64 channels at 7.2K bit/sec. The multiplexer can support roughly four or five 9.6K bit/sec. data channels if only one voice channel is needed, a company spokesman said.

A single eight-port voice module will, however, eliminate the ability to support any data channels.

In practice the 9600 multiplexer outfitted for voice can be used to connect a private branch exchange with another switch or up to 48 remote telephones over a single fiber-optic cable pair. This eliminates the need to run 48 separate wires between locations.

A proprietary code is used to translate electrical voice signals into an optical signal, which the company said is different from typical voice digitization schemes. Typical of fiber-optic communications, the system is secure from eavesdropping and monitoring.

Telephones are connected to the device through RJ-11 telephone jacks.

The multiplexer is said to terminate calls automatically when either party hangs up or after 60 seconds of silence, a time period that is factory adjustable.

A 9600 multiplexer equipped with the voice channel option sells for $8,695, or $17,390 per pair.

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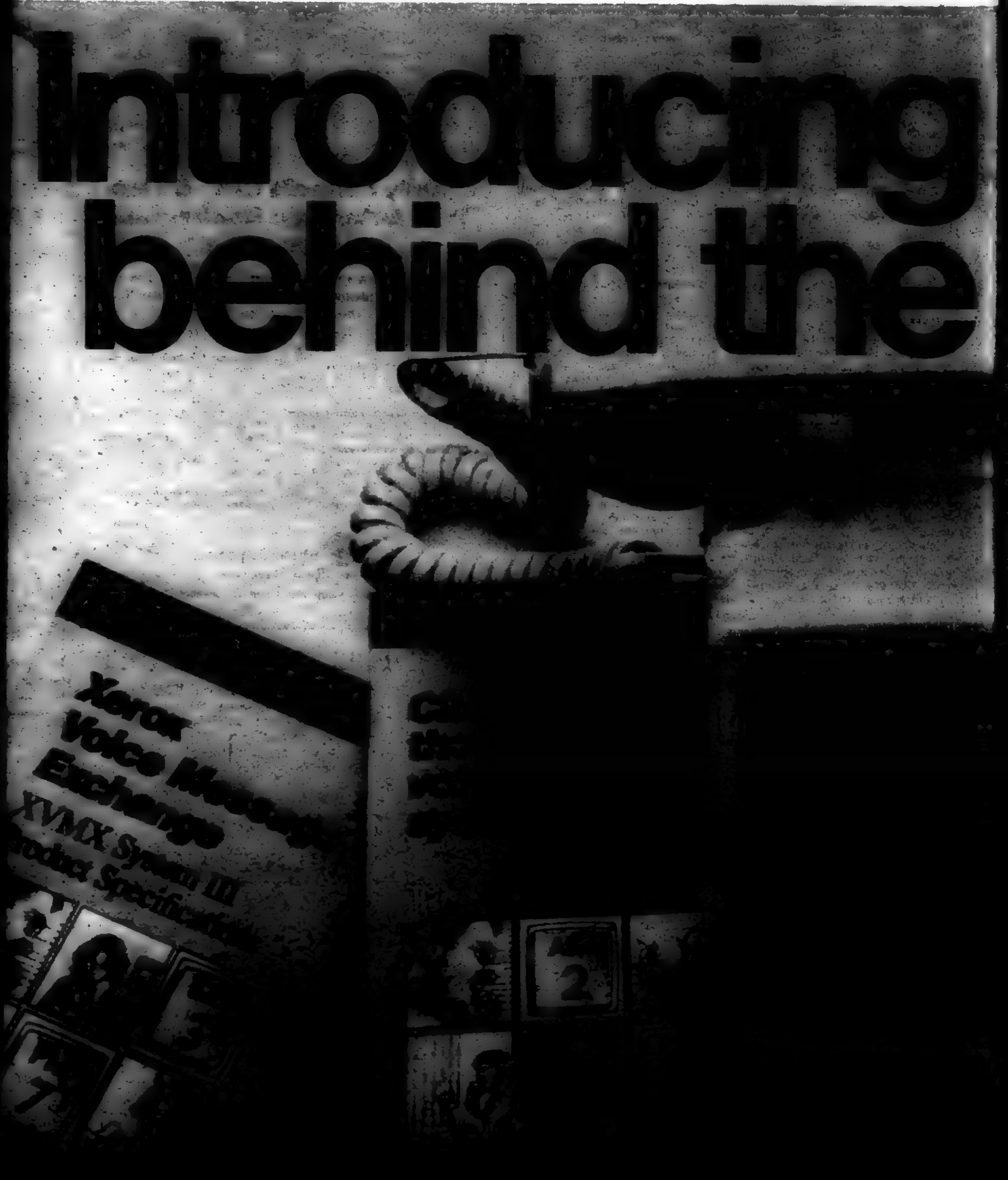

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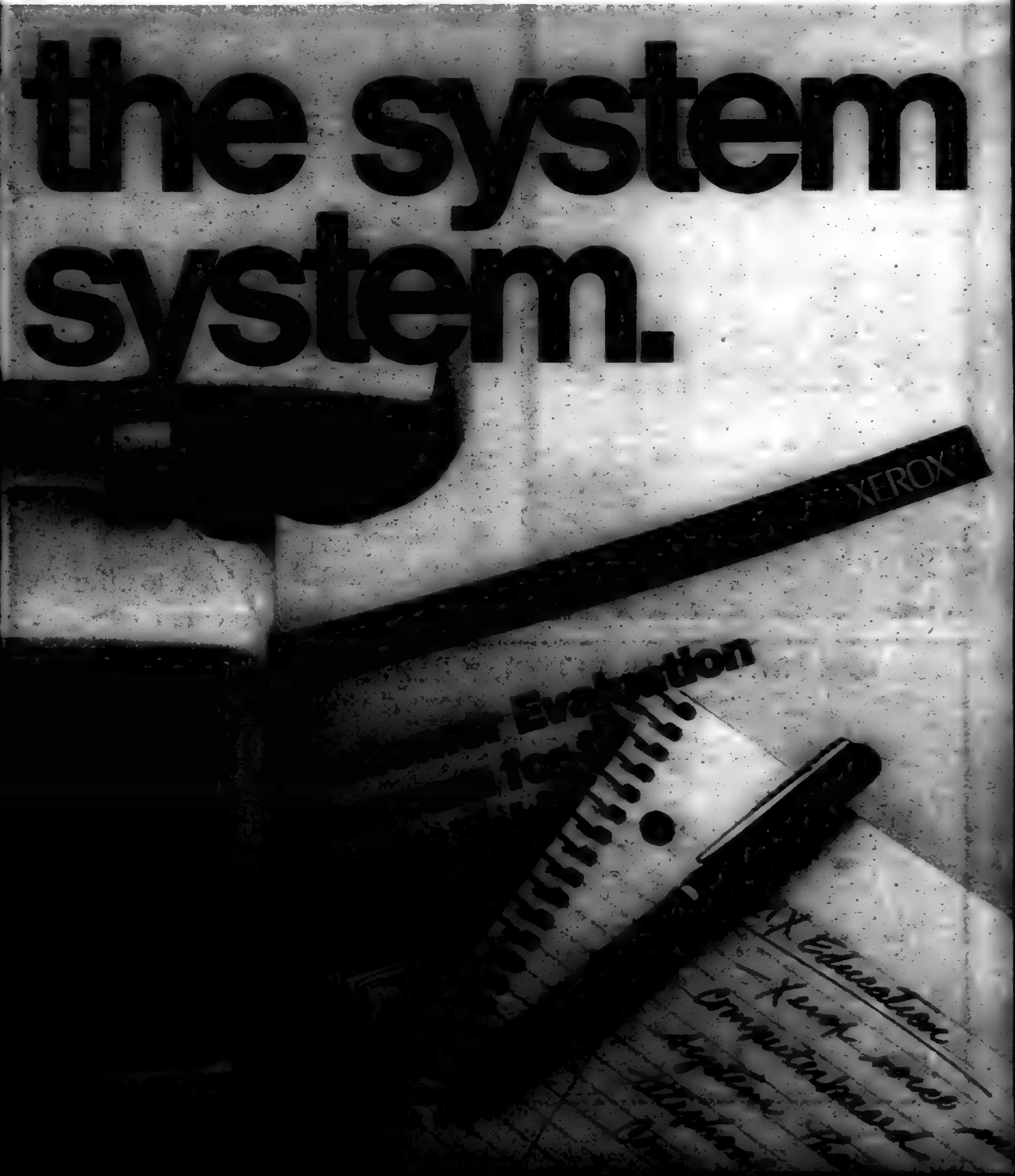

the system system.

Market pressure works for users

From page 19

Communications equipment vendors blame these problems and the general industry slowdown on poor sales. Myhre does not buy that. "Communications vendors were experiencing difficulty before the slowdown," he said.

The analyst added that users were quite willing to spend a lot of money for communications equipment but that vendors have been unable to deliver truly useful systems. Instead, vendors have designed stand-alone systems. "Some systems require users to rewire their buildings," Myhre noted. "For most users, this is not a viable option."

Ideally, users want to connect existing equipment with new devices and increase the productivity of both. To solve the problem, they are taking an active role in forging communication standards. General Motors Corp.'s involvement with the Manufacturing Automation Protocol, the growing acceptance of various IEEE 802 network standards and the emergence of the Integrated Services Digital Network were given as examples of standards in which users are taking an active interest.

> *'For the first time, we are seeing standards developed before products.'*
>
> — **Kim Myhre**
> **IDC**

Manufacturers will be forced to support these standards. Myhre estimated that the communications market will grow from $12 billion in 1984 to $20 billion in 1988, due in large part to the further · definition and acceptance of standards.

Whereas most of the current products sold were designed as stand-alone packages, a majority of the 1988 products will be tied to other equipment.

"Vendors who do not develop products that conform to industry standards will be out of business," he concluded.

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'Value added' the net byword

From page 19

comes from direct end-user sales, according to Charles J. Hart, president and chief executive officer. The remaining 10% to 15% of its business is done through value-added resellers, companies that tailor their products for certain vertical markets.

Nestar does not sell to retailers or through value-added distributors domestically but does exploit these distribution channels overseas. Hart said 40% of the company's revenue is from sales outside the U.S.

Novell, Inc., on the other hand, does 22% of its business directly with end users, 70% with value-added resellers and distributors and 8% with OEMs, according to Jared Blaseer, manager of marketing technical services for the Orem, Utah, company.

Novell's product line differs from both Nestar's and Corvus' offerings in that it sells its own network product, which is a combination of hardware and software; its operating system for use on other types of networks; and its operating system bundled into other vendors' hardware network products.

Novell sales, broken down by product, come out as follows: 45% for Snet, Novell's packaged system; 35% to 40% for OEM deals; and 15% for straight operating system sales to a range of companies, including end users, distributors, value-added resellers and still other OEMs.

While there is no surefire marketing solution for microcomputer networks, it seems that the industry has concluded that networks at least need to be sold by an educated sales force or through vertical marketing channels.

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AT&T to offer Accunet T45

From page 19

offer these links, an AT&T spokesman admitted. This may encourage users to bypass the local companies and install their own fiber-optic connections to AT&T's fiber-optic point of presence.

The cost of T45 will be based on the following components: an interoffice channel for 45M-bit transmission between specified AT&T central offices, a 45M-bit central office connection and an optional multiplexing function that would allow customers to break the capacity into 28 T1 1.5M bit/sec. circuits.

Interoffice channels will be priced at a month-to-month rate, but discounted five-year, fixed rates will also be available. For example, a customer choosing a five-year, fixed-rate plan for a Washington, D.C.-to-New York connection would pay $35,260 per month. The second through ninth continuous interoffice channels provided to the same customer will also be discounted. The multiplexing function and central office connection will be sold on a monthly fee basis.

Other Accunet digital services include Accunet T1.5 and Dataphone Digital Service.

SOFTWARE & SERVICES

SOFTLINE
Steven Pfrenzinger

Building unfit systems faster

The use of productivity tools for applications development has become a hot subject. Nearly every major DP organization has either acquired or is considering the acquisition of such tools. These tools generally fall into two categories: application generators for the programmer-oriented development center and fourth-generation languages for the user-oriented information center.

Both application generators and fourth-generation languages provide major improvements over traditional development methods. But one major issue remains to be solved — how will new applications be designed and documented?

The design and documentation issue remains important because our industry continues to neglect this vital phase of the development life cycle. Just as a builder would never construct a home without a thorough architectural plan, a DP professional should never construct an application without a thorough and well-documented design. Without the design phase, it is possible that productivity tools for development are merely allowing users to build the wrong systems faster.

This issue is not a new one, but many DP organizations have yet to face up to it. While structured design methods appear very popular, one has to wonder

See BUILDING page 32

Pfrenzinger is president of IMS Consulting, Inc., an Encino, Calif.-based firm that specializes in IBM's IMS DB/DC and CICS/DL/1. He has 15 years of data processing experience and is a regular contributor to Softline.

Software slump takes its toll

Tough times for data base, applications vendors

By John Gallant

STAMFORD, Conn. — The slowdown in the computer industry has exacted a heavy toll on large systems software vendors. According to a leading market research firm, the growth rate of the IBM mainframe software market was sliced nearly in half this year, with independent applications and data base management system vendors bearing the brunt of the slump's effect.

During the Gartner Group, Inc.'s recent Software Management Strategies conference, analysts said that growth in the mainframe software industry is expected to be only 23% for 1985 — a drastic decline from the 40% growth the industry enjoyed in 1984. Scott Smith, vice-president of Gartner Securities Corp., said the worldwide revenue of U.S.-based companies that provide mainframe software, including IBM, is expected to grow from $5.3 billion in 1984 to $6.5 billion this year.

The slowdown has been particularly sobering for independent applications and DBMS vendors, Smith said. A recent Gartner Group study showed that, for the first nine months of 1985, the revenue of independent applications and DBMS vendors increased only 7% over third-quarter 1984 results. In contrast, at the end of the third quarter of last year, revenue for the same vendors leaped more than 50% over the similar period in 1983.

The third-quarter figures were even more dismal than the results of the Gartner Group's mid-year research, which showed revenue growth of roughly 14% compared with the first half of 1984. The firm's research has been corroborated by the financial performance to date of leading DBMS and applications vendors like Applied Data Research, Inc., Cullinet Software, Inc. and Management Science America, Inc.

See SOFTWARE page 30

SOFTSCOPE

Much ado about net management

At a forum on network management at the recent Gartner Group, Inc. Software Management Strategies conference, panelists agreed that IBM has not provided the proper tools for the network management job. But they also emphasized that it may be impossible for any one vendor to support the increasingly complex task of maintaining networks.

"I have a real problem talking about *the* network," said Eric Birkeland, director of communications product marketing at NCR Comten, Inc. "In most large organizations, there are a

See SOFTSCOPE page 32

CRI Ada-based DBMS unveiled

By John Gallant

SANTA CLARA, Calif. — CRI, Inc. has introduced what it claims is the first Ada-based relational data base management system.

Paul Fuller, vice-president of CRI, said the company's Relate/3000 was originally developed in 1981 for Hewlett-Packard Co.'s HP 3000 series processors and has been completely rewritten in Ada. He said Relate/3000 will eventually be compatible with any computer system supporting an Ada compiler.

Fuller said CRI has already validated the porting of the system from a Digital Equipment Corp. VAX processor to a Data General Corp. processor. The system's portability, which is made possible by the strict Ada standards enforced by the Department of Defense, will allow users to

See CRI page 30

INSIDE

Nastec widens its CASE 2000 product line/28

NEW THIS WEEK

- IBM introduces CICS/OS/VS Performance Analysis Reporting System
- Tominy announces its Mach 1 applications generator
- For more on these and other new products, see, pp. 71-92.

INSTANT ANALYSIS

"I'm not sure users would know what to do with distributed data bases. They haven't figured out today's data bases yet. The ability to organize data is very limited."

— H. Michael Braude, of the Gartner Group's Software Management Strategies Service, on the rumored introduction by IBM of a distributed DBMS.

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Nastec announces expansion of CASE 2000 product line

Communication, control, design software debuts

By John Gallant

SOUTHFIELD, Mich. — Nastec Corp. has widened its Computer-Aided Software Engineering (CASE) 2000 product line.

A spokeswoman for Nastec told *Computerworld* that the company has unveiled Hostlink, a communications product that supports information sharing among the company's microcomputer packages through the facilities of a mainframe host, an IBM Personal Computer version of its Lifecycle Manager planning and control system and an enhanced release of its design and documentation tool, Designaid.

Nastec's Hostlink communications software reportedly allows users of the CASE 2000 IBM Personal Computer application development system to share data through an IBM mainframe host. Through IBM's TSO teleprocessing monitor, users can transfer Designaid design dictionaries, Lifecycle Manager development data bases and deliverable files between IBM Personal Computers and the mainframe, the vendor said.

> ”
>
> *Both Designaid and Lifecycle Manager will be compatible with the IBM Token-Ring local-area network as well as the PC Network.*

Supports info sharing

The spokeswoman said the facility supports information sharing among development project teams and allows users of Nastec's micro software to take advantage of the mainframe's storage and backup capabilities.

Hostlink is scheduled to be available in the first quarter of 1986 at a cost of $10,000 for the host and $100 per personal computer workstation.

Lifecycle Manager for the IBM Personal Computer supports structured design tools for a design analyst and provides planning and control capabilities for the project manager.

The product features a menu of current assignments and due dates, direct access to the Designaid system for creating and validating deliverables, a Help facility that details standards and procedures, file management capabilities and documentation aids.

Defines project scope

The system also helps project managers define a project and its scope, identify project tasks, estimate resource requirements, assign and track tasks and review work in process.

The spokeswoman said Lifecycle Manager automates all commercial development methodologies and custom in-house standards and procedures.

The Lifecycle Manager tool costs approximately $2,000 per micro. The product is also available for Convergent Technologies, Inc. IWS workstations.

Enhancements featured in Designaid Release 3.5 include an upgraded set of menus to lead users through the creation and validation of programs and design specifications and upgraded graphics capabilities. The system's design dictionary now includes a user sign-on facility for improved security and a selective load and unload system for data transfer between dictionaries, Nastec said.

The Designaid development tool is priced at $6,900 per micro.

The spokeswoman said both Designaid and Lifecycle Manager will be compatible with the IBM Token-Ring local-area network as well as the PC Network.

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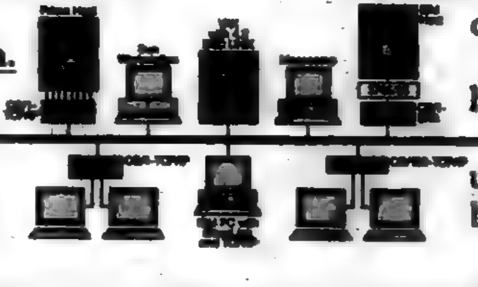

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DEC, Alsys introduce Ada-related products at conference

Compiler versions among software offerings unveiled

By John Gallant

BOSTON — Alsys, Inc. and Digital Equipment Corp. were among the vendors announcing Ada-related products at the Association for Computing Machinery's recent Special Interest Group on Ada conference in Boston.

DEC unveiled a real-time Ada applications development environment, dubbed Vaxeln Ada, for its VAX processors. A spokesman said the system allows users to develop, debug and run Ada-based real-time applications on VAX systems.

Scheduled for spring availability at a cost of between $1,500 to $11,250, Vaxeln Ada features a high-level, fully symbolic remote debugging facility and DEC's Vaxeln Toolkit of programming aids. The spokesman said programs are created for execution on Vaxeln systems by using the company's VAX Ada compiler on a host system.

Supports target processors

Once developed, the program can be sent via Ethernet or DEC's Decnet to target processors. The choice of target system can be made after the application is linked, so applications can be developed that run on either the Vaxeln system or DEC's VAX/VMS operating system.

Vaxeln Ada supports the full VAX family of processors. It has been approved by the U.S. Ada Validation Office.

Alsys introduced four newly validated Ada compiler versions, bringing to 15 the number of validated compilers offered by the Waltham, Mass.-based company.

The firm also announced an Ada-related computer-aided instruction (CAI) course and two Ada programming tools.

Alsys compilers were announced for Hewlett-Packard Co.'s HP 9000 Series 200; Apollo Computer, Inc. Domain systems; Sun Microsystems, Inc. workstations; and DEC's VAX line. The VAX compiler cross-compiles to an Altos Computer Systems, Inc. ACS 68000. The four products were validated by the U.S. Department of Defense in October.

> ”
>
> *Vaxeln Ada allows users to develop, debug and run Ada-based real-time applications on VAX systems.*

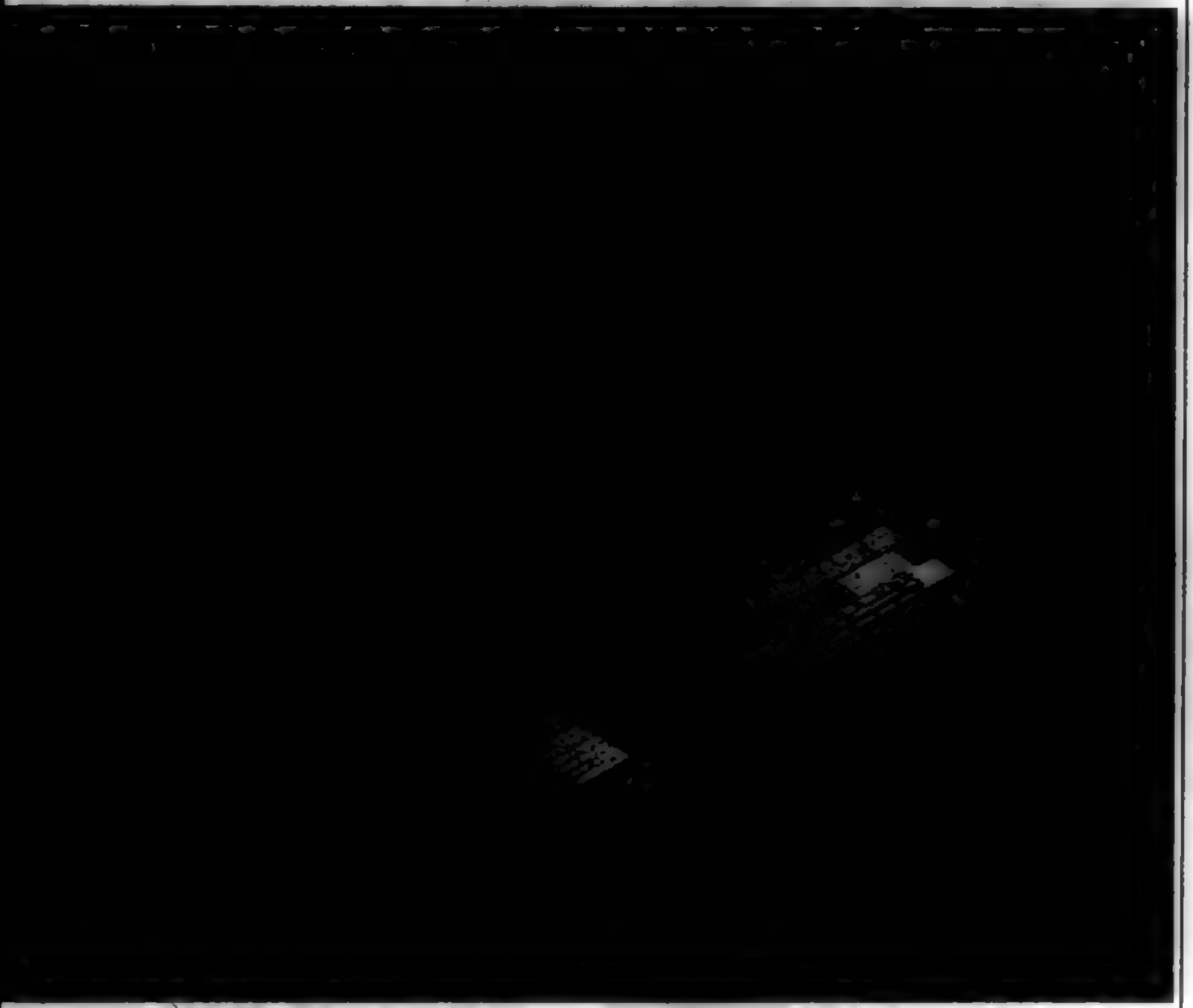
The Sun and Apollo compilers are priced at $3,095, and the VAX-to-Altos cross-compiler costs $18,570. Pricing for the HP 9000 compiler, which will be sold by HP, has not been determined.

Adaquery puts manual on-line

Alsys' Adaquery tool puts the entire official American National Standards Institute *Standard Ada Reference Manual* on a computer for rapid reference. Users reportedly can search Adaquery using keywords to pinpoint reference material. It runs under IBM's PC-DOS and Microsoft Corp.'s MS-DOS and is priced at $500.

A spokesman said Adaviewer is a tool designed to ease the maintenance of Ada programs. It allows a user to move quickly through program sections, supports cross-referencing through windowing capabilities and provides simultaneous views of different compilation units or two different levels of detail within the same compilation unit. Adaviewer has not yet been priced, the spokesman said, but it will cost less than $1,500.

Finally, Alsys' CAI course, "You know Fortran — Ada is simple," teaches Ada programming skills by demonstrating similarities to Fortran. It runs on the IBM Personal Computer and is priced at $1,620.



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Software slump takes its toll

From page 27

Independent systems software vendors actually improved their financial performance slightly. Smith said the Gartner Group's mid-year research indicated that revenue increased more than 27% for the first half of 1985, compared with the same period last year. In the first six months of 1984, systems software revenue increased by nearly 25% over that of 1983. The relative growth enjoyed by systems software vendors was primarily due to the lower cost of the packages, he said.

> ***"IBM had a better year than the independent software vendors primarily due to its large base of rental customers."***
>
> **— Scott Smith**
> **vice-president of Gartner Securities**

Compared with the independent software vendors, IBM fared considerably better this year. While independent vendors' revenue growth for 1985 is expected to be only 15% — compared with 41% growth in 1984 — Big Blue's software revenue growth was nearly double that for 1985. IBM's 29% 1985 revenue growth figure was, however, a substantial decline from the 39% growth rate it enjoyed last year.

Smith said IBM's software revenue for 1985 is expected to total $4.1 billion. That figure represents only about 8% of IBM's total revenue, but software was clearly the fastest growing segment of IBM's revenue picture in 1985.

"IBM had a better year than the independent software vendors primarily due to its large base of rental customers," Smith said. "If IBM raises its software prices by 10%, it essentially increases its software revenue by the same amount."

Breaking down IBM's software revenue, Smith said the company's combined applications and DBMS revenue is expected to grow at little more than 16% in 1985, compared with a growth rate of more than 24% in 1984. IBM's systems software revenue will grow more than 37% this year, a decline from 1984's growth rate of nearly 60%.

Smith blamed the flagging software industry growth rate this year on four key factors:

- The state of the general economy and the impact of budgetary constraints.
- Problems in the delivery or installation of certain "key" products, such as Cullinet's manufacturing applications and Hogan Systems, Inc.'s large-scale banking systems. Smith said the problems "scared other users" from investing in high-ticket software systems.
- The dearth of important products announced in 1985. "This was a year for delivering on yesterday's promises," Smith said. "Few vendors made new promises this year."
- Increasing competition in nearly all sectors, a factor that increased the time involved in user purchases.

Smith said the Gartner Group's research indicates that revenue growth will pick up some steam in 1986, though a return to the boom years' performance of 1983 and 1984 is unlikely. The firm predicted that the IBM mainframe software market will grow by 27% in 1986.

"Users can only postpone decisions for so long," Smith said. "Also, the benefits of earlier investments in software will begin to become apparent. Those users who invested in systems like Cullinet's manufacturing packages and Hogan's banking applications will start to enjoy the benefits, and other users will see that. New products announced next year, such as expert systems, will also spur sales."

CRI Ada-based DBMS unveiled

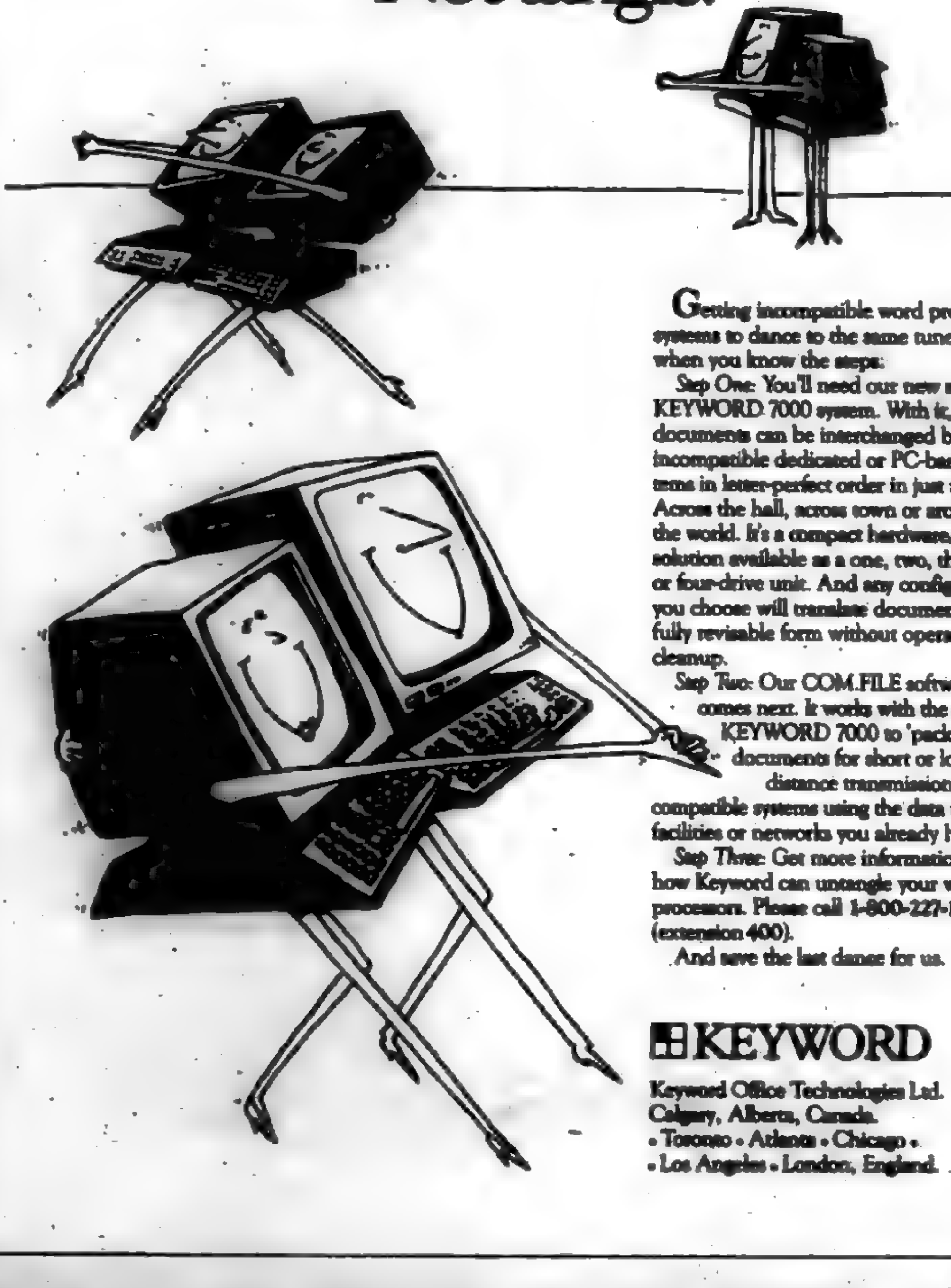
From page 27

transfer a data base to any system with an Ada compiler.

Relate/3000, scheduled for first-quarter availability, features an applications development tool known as Application Builder. Fuller described Application Builder as a development language that uses high-level commands to access Relate/3000 commands and constructs, defining screen layouts with page images stored in the application file. It also offers an on-line debugging facility and a data dictionary dubbed Dataguide.

Fuller said Relate/3000 will be priced between $18,500 and $43,500, depending on the host system.

CRI also unveiled its Projectalert project management system, which works with Relate/3000. Projectalert was also rewritten in Ada. The system supports basic planning, scheduling and resource allocation functions and allows users to enter data via menus. It features a variety of reports and color graphics capabilities, supports cost and labor tracking, exception reporting and a network library. It is priced between $21,000 and $44,000.



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masterpiece

Building unfit systems faster

From page 27

whether they are really being used. Most systems analysts responsible for designing applications will say they rely on structured design methodologies. But many programmers have said they write only structured code. It is common knowledge how little truth there is in that answer.

That is the bad news. Now for the good news. There are productivity tools available for the systems analyst and systems designer that will assist in the structured design process and that will create and maintain quality documentation as well.

These tools are known as computer-aided design or analysts' workbench tools. They usually support structured system design methodologies that include either the process-driven or data-driven approach or both. They keep the entire design in a machine-readable format to ensure a consistent and rigorous design that includes automatic validation of many of the aspects of the design process.

Project control, component standardization and maintenance issues are also addressed. Excelerator, from Index Technology Corp., is an example in this category of productivity tools.

Taking a simplistic view of the entire development life cycle for the sake of example, one would have something like this: 1) logical design, for example, user requirement and data modeling; 2) physical design, for example, external and internal specifications; 3) programming; and 4) maintenance. In this discussion, testing is included in the programming phase and implementation is excluded.

Addressing programming, maintenance

The current productivity tools for development address the programming and maintenance phases as well as some portion of the physical design phase through their prototyping and high-speed analysis features.

The productivity tools for design address both the logical and physical design phases and generate selected program code, such as screen definitions, data base and screen I/O areas, through their limited code-generation capabilities.

These code-generation capabilities are likely to expand dramatically in the future as vendors attempt to merge all aspects of design, development and documentation into a single product.

When this occurs, the so-called fifth generation of languages may become a reality, and program code will be automatically generated from design specifications.

Degree of overlap

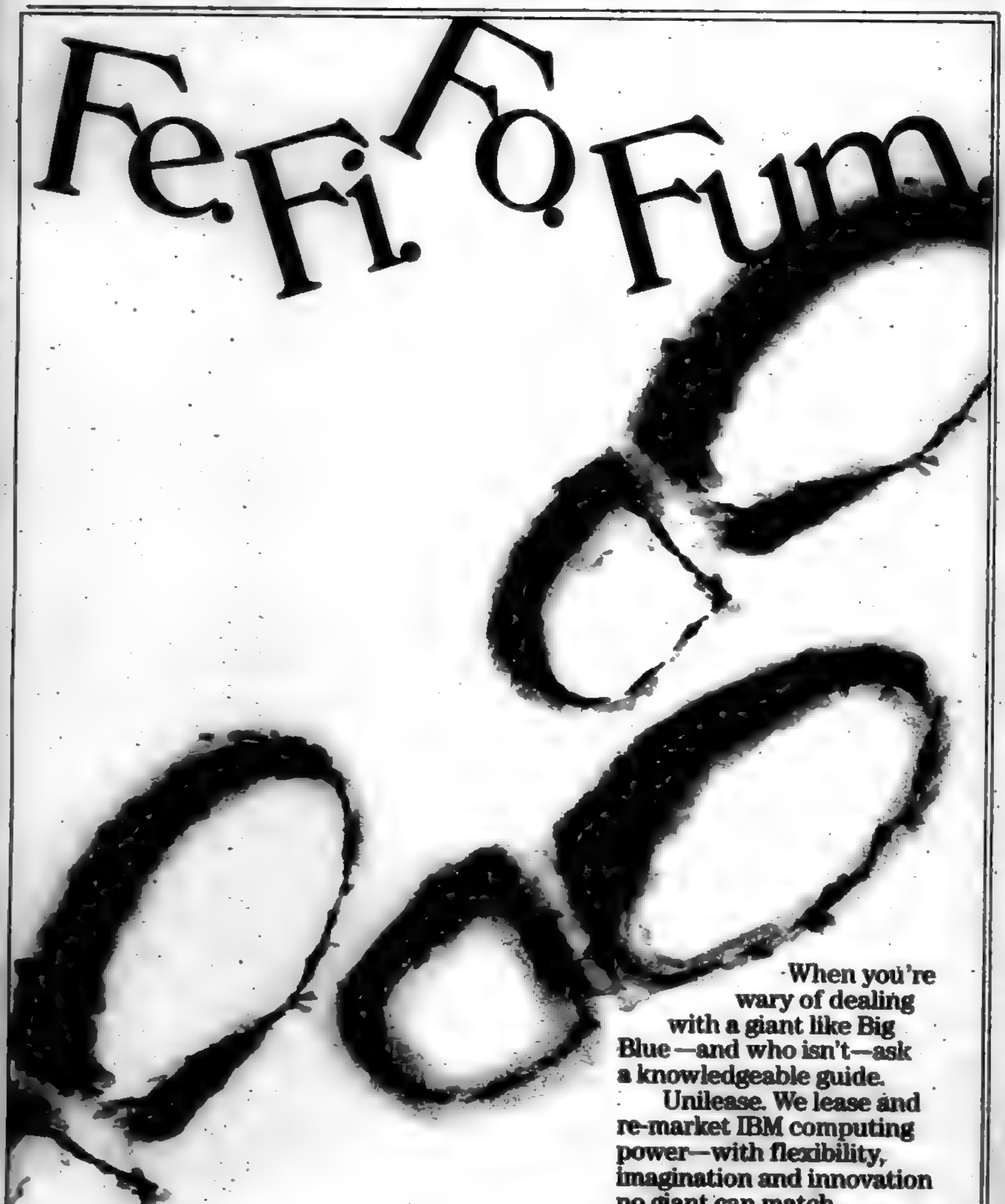
Currently, there is a degree of overlap between these separate design and development tools, but it is acceptable depending on the application being built.

The larger, more complex systems will usually need the comprehensive design tools while the smaller, less complex systems are able to use the prototyping features of productivity tools for development.

The systems that fit somewhere between the large and small categories could use either tool.

Individual organizations may dictate which tools will be used in specific situations, depending on their preference for formal, structured design methodologies or prototyping with high-speed analysis.

The bottom line is that in most DP organizations there is adequate need and justification to acquire productivity tools for both design and development.



When you're wary of dealing with a giant like Big Blue—and who isn't—ask a knowledgeable guide.

Unilease. We lease and re-market IBM computing power—with flexibility, imagination and innovation no giant can match.

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Softscope: Behind the doldrums

From page 27

number of networks, each of which is independent for some very good reason. The problem we should be addressing is what to do with a variety of networks."

■

What's behind the doldrums in the large system software industry? Well, said H. Michael Braude, vice-president and director of the **Gartner Group's Software Management Strategies Service**, "It's a function of the nonusability of software and slow applications development. It will be hard to escape the doldrums unless that changes.

"Many [users] are reluctant to invest in software," he added, "because they don't know where its going or whether you can port it to new environments. That is especially true in the DBMS market where there are no standards and users don't know where the technology is moving."

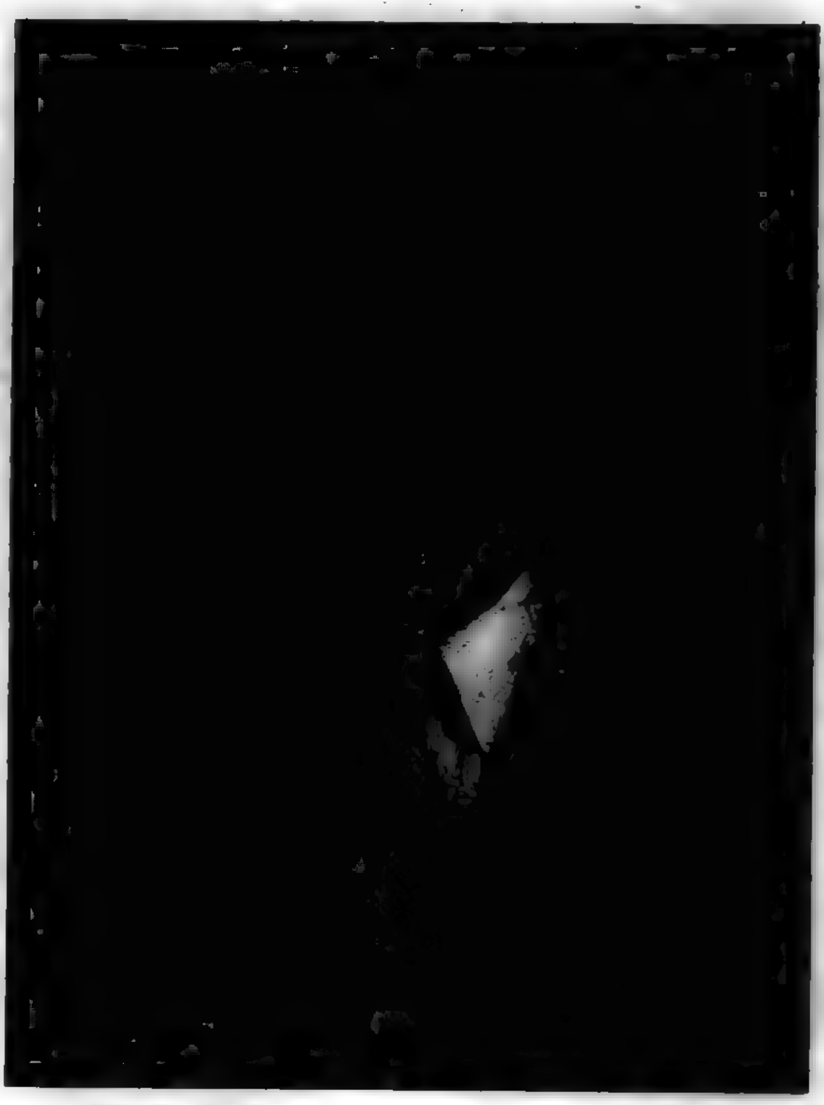
Braude said **IBM** is getting closer to announcing its rumored R-Star distributed DBMS. He said IBM has moved R-Star, reportedly in the works at an IBM facility in San Jose, Calif., from the realm of research into that of development this year.

■

Product differentiation may hold the key to whether DBMS vendors survive the decade, according to Scott Smith, vice-president of **Gartner Securities Corp.** Smith said the increasingly competitive DBMS mart, where vendors like **Cullinet Software, Inc., Applied Data Research, Inc., Software AG, Cincom Systems, Inc.** and **Computer Corporation of America** are all slugging it out, may see a shakeout before 1990. In fact, **Ameritech's** acquisition of **ADR** may be the first sign of such consolidation in the market.

Straight talk about software companies.

"When you buy a computer software product, you're buying the company behind it."



When Cullinet Software was founded in 1968, it was one of the first companies created to specialize exclusively in computer software products. We felt it was time to stop re-inventing the computer software wheel.

But remember, this was 1968—the era of hardware myopia. There were some who said we could never succeed.

Others had tried and failed. "Why," it was asked, "would Cullinet succeed?"

First, we had the belief that there is no substitute for superior products. When Cullinet introduced IDMS, it pioneered the concept of integration via an active dictionary-driven database management system. And we've achieved many other technical firsts since then:

The first back-end database machine prototype and distributed database system; the first, and only, teleprocessing monitor built for IBM computers in the last ten years; the first online Applications Development System (ADS/OnLine) for complex, high-volume applications; the first, and only, 4th-Generation Applications Software; the first transparent integration of personal computers with mainframe systems; the first implementation and full integration of database, applications, and information center/PC software; and much more.

More importantly, we also brought to the industry a standard of excellence and financial maturity. And a financial stability that is a matter of public record. A stability that enabled us to become the first computer software products company to be listed on the New York Stock Exchange, and to be cited for many of our achievements in growth and management by leaders from the business and financial communities.

As proud as we are of all these accomplishments, however, we are proudest of the special relationship that exists between ourselves and our customers. Cullinet has brought to the software industry a characteristic common to all successful companies: we are "user-driven." We understand clearly that we are in business to serve the needs of our customers. And this understanding shapes everything we do.

It is this emphasis on customer requirements and satisfaction that has resulted—year after year, in survey after survey—in Cullinet's top ranking in the categories of vendor support, documentation, training, and overall user satisfaction.

We have built an uncommon loyalty among our users because they understand that we truly care about them. It's that simple.

John J. Cullinane
Chairman of the Board

These are five of the reasons why Cullinet is the leader and most respected company in the computer software industry.

1. Number One in Industry Sales

INDEPENDENT SOFTWARE VENDORS Software News' Top 50 Independent Software Vendors	
CULLINET SOFTWARE, Westwood, MA	[illegible]
LOTUS DEVELOPMENT CORP., Cambridge, MA	[illegible]
MICROSOFT, Bellevue, WA	[illegible]
MANAGEMENT SCIENCE AMERICA (MSA), Atlanta, GA	[illegible]
APPLIED DATA RESEARCH INC. (ADR), Princeton, NJ	[illegible]
COMPUTER ASSOCIATES INTERNATIONAL (CA), Jericho, NY	[illegible]
INFORMATICS GENERAL, Woodland Hills, CA	[illegible]
DUN & BRADSTREET (D&B), Wilton, CT	[illegible]
UCCEL CORP., Dallas, TX	[illegible]
1984 U.S. Revenues ($000)	

While Cullinet never expected or sought to become the largest software company in the world, it still is a significant accomplishment.

Source: Software News

2. Number One in DBMS Sales

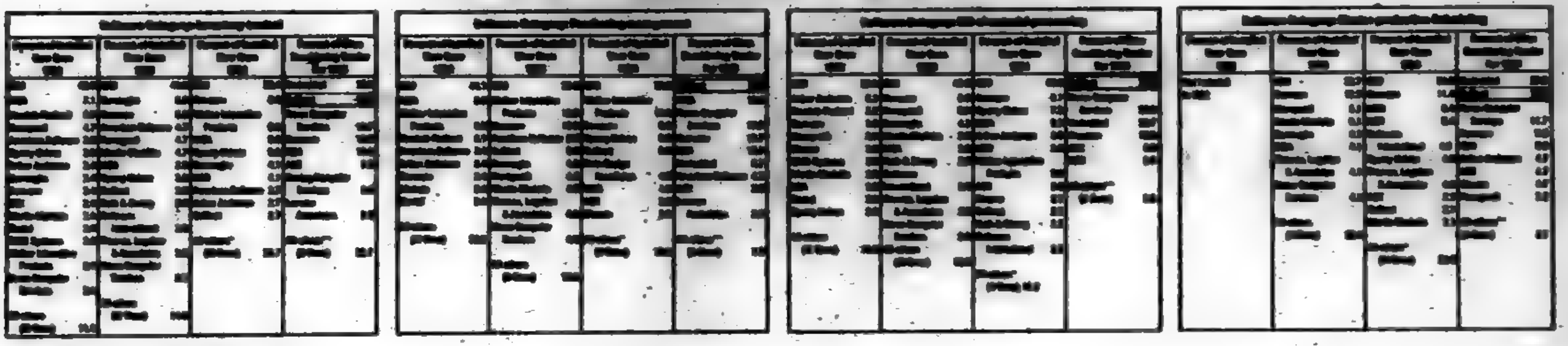
Intentions to Buy DBMS

	1983	1984	1985 (YTD)
CULLINET	173	206	148
IBM (IMS)	147	180	79
ADR	76	130	64
IBM (DB2)	2	47	50
IBM (DL/I)	158	140	49
IBM (SQL)	81	110	48
SAG	91	100	46
CINCOM	38	72	17
CCA	17	21	11

Buying preference for IDMS/R is increasing because as more buyers become more knowledgeable in database technology, they recognize the technical advantages of IDMS/R over competing products.

Source: Computer Intelligence Corporation

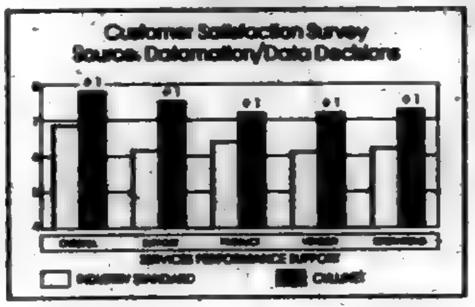
3. Number One in Manufacturing Applications



Source: Software News

Buyer surveys show convincing proof that Cullinet's 4th Generation manufacturing applications are the way of the future.

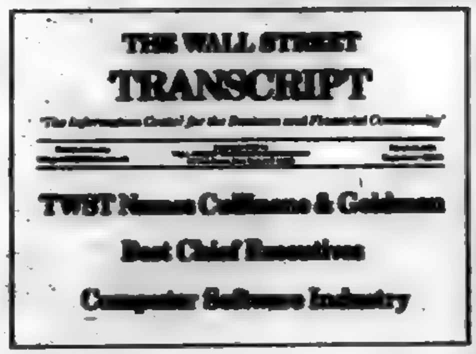
4. Number One in User Satisfaction



When it comes to vendor support, Cullinet is rated Number One year after year in every category.

Source: Datamation/
Data Decisions

5. Number One in Management



THE WALL STREET
TRANSCRIPT
"The Information Central for the Business and Financial Community"

TWST Names Cullinane & Goldman
Best Chief Executives
Computer Software Industry

Cullinet management has been consistently singled out by the computer and financial industries as the best. John Cullinane, Cullinet chairman, was named CEO of the Year in 1982 and Co-CEO of the Year sharing honors with Cullinet president Robert Goldman in 1984 and 1985.

Source: The Wall Street Transcript

The Leader in Information Systems Software

Cullinet

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The people who make database software have some strange logic. They tell you information is the most valuable thing in the world. And then they design their products for single-user systems.

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While editing, data integrity is protected by a locking mechanism that operates at the item level. This important feature lets the other users work with columns and rows of the same table. Instead of making them wait around for the other guy to finish his editing job.

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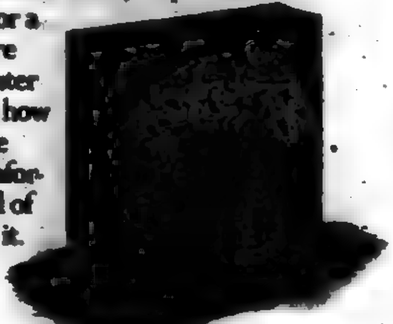
The full price is $1500, complete with three sets of documentation. But if you believe in common sense as much as we do, you won't make a decision this big till you get your hands on a copy and see for yourself. And that's just what we'd like you to do. For only $50, we'll send you a copy of the program that has all the features, one set of documentation, and all the functionality of the full product, except for limitations on the numbers of rows, columns and tables.

Just call 1-800-547-4000 and ask for Dept. 866. From Oregon, or outside the U.S., call 1-503-684-3000, Dept. 866. Or head straight for a leading software store or computer dealer. And see how nice it is to take advantage of information. Instead of taking turns at it.



R:BASE 5000 MULTI-USER
FROM MICRORIM

IT ALL COMES DOWN TO COMMON SENSE.

[illegible]

MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Vendors jump into the nets

While we've seen a lot of lip service given to networks in the past few years, Comdex/Fall '85 gave some concrete examples that mainstream personal computer software vendors actually are plunging into nets.

Ashton-Tate President Edward Esber, whose firm's Dbase III Plus led the list of new network applications, summed it up neatly: "We hear from our customers that the world's going local-area network."

The Las Vegas extravaganza also featured the first display of a networked all-in-one integrated micro package. Offering a version of its modular Smart Software System, Innovative Software, Inc. found itself answering many questions about what exactly you get by tailoring integrated packages for nets.

In particular, who needs a multiuser spreadsheet?

"A lot of the time, you do have people working on the same spreadsheet at the same time," insisted Ron Ferguson, Innovative's marketing vice-president. As one illustration, he suggested, several managers could each work separately on their own chunks of a departmental budget and then consolidate their results.

The networked Smart spreadsheet does not provide record locking, but a user can copy a spreadsheet that someone else is working on, manipulate it and then store it under a different name, Ferguson noted.

Other integrated micro software packages may lack one crucial feature for networking, he remarked. A random-access-memory-based data base

See VENDORS page 38

Windows finally opens

Microsoft's environment reaching the retail shelves

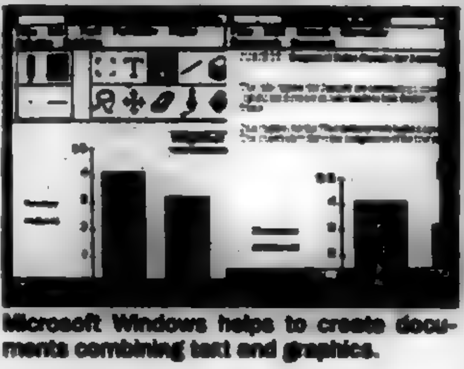
By Eric Bender

LAS VEGAS — Microsoft Corp.'s Windows operating environment, which first bowed more than two years ago, finally shipped in a $99 retail version late last month, the company announced at Comdex/Fall '85.

The multitasking operating environment provides a graphical-based user interface and will establish "a foundation for hardware and software advancements of the next few years," Microsoft Chairman Bill Gates said.

Relatively few software houses publicly lined up behind Windows for the announcement, but Gates predicted that Windows will make many converts once software suppliers get their hands on a commercial version. "It's clearly something that needs to build over time," he said.

While Windows is targeted at the Fortune 1,500, "if you talk to large corporations, nobody knows what it really is," commented President Jon Shirley. He suggested, however, that a 10-minute demonstration will show 90% of Windows' benefits.


Microsoft Windows helps to create documents combining text and graphics.

Compatible with most existing IBM PC-DOS applications, Windows is said to permit users to work with multiple applications, easily switching from one application to another and transferring information between them, according to Shirley.

The retail product also features a set of desktop applications, including a file management program, an electronic appointment book, a card-style filing program, a

See WINDOWS page 39

Norton utility, editing tools bow

By Rosemary Hamilton

SANTA MONICA, Calif. — Peter Norton Computing, Inc. has introduced an upgraded version of its utility software package and a text editing package.

Version 3.1 of the Norton Utilites marks the "sixth or seventh version" of this package, which is best known for its ability to rescue killed files from a disk, creator Peter Norton noted. More than 100,000 copies have been sold to date since the first version was introduced in 1982.

The upgraded version features a long list of enhancements, but the two major additions are Quick Unerase, which has fewer steps than the existing file search command, and Unremove Directory, which allows users to recover entire directories that have been deleted. "The main thing is that we've made it easier to use," according to Norton. "We've added defaults that people most often want, and we've extended the power of a lot of the little programs."

Version 3.1 costs $100. Current users can upgrade for $25.

The $50 Norton Text Editor, which has a menu of word processing functions, marks the first time Peter Norton Computing has offered a separate product from its utility software. According to the company, the package includes indenting aids for writing programs in Pascal, C and other structured programming languages and a parentheses and bracket-matching function that eliminates the programming task of counting open and closed parentheses and brackets.

INSIDE

Hayes launches an internal modem supporting asynchronous and synchronous communications through the same port/39

NEW THIS WEEK

- Sperry enhances its Usernet local-area network
- Compuscan introduces two optical-character recognition desktop scanners
- For more on these and other new products, see pp. 71-82.

INSTANT ANALYSIS

"If I ever take off copy protection and let corporate users duplicate software, I will impose even greater responsibility on them for policing."

— Edward Esber
Ashton-Tate president

WHO IS THE WORLD LEADER IN IBM/38-36 BACKLOG REDUCTION?

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The world's most successful companies have made Fusion Products International the leading supplier of query/report-processor, PC interface and spreadsheet software for the IBM System/34/36/38.

Why is Fusion number 1, worldwide? Because we fully support the PC. Because we're one of the few S/38-36 vendors who actually answer their customer-service telephones. Because we offer on-site training. Because *easy-to-use* means never having to read your manual. Because selected Fusion products are available in many languages. Even Japanese.

That's why the leading software company in Japan selected Fusion as their *only* S/38-36 report processor. The *best and brightest*, everywhere, choose to spend their valuable time on business issues, not on computer issues.

You probably know our name. Isn't it time you made a most important phone call? Isn't it time you used Fusion power to obliterate your backlog?

FUSION.

Fusion Products International [illegible] Larkspur L.C. Suite [illegible] Larkspur, California [illegible] Telephone 415 [illegible] Telex [illegible]. Also in New York and Newport Beach.

Vendors get into nets

From page 37

management system can't handle record locking.

Ashton-Tate and Innovative also joined the trend toward network "packs," selling their applications configured for a certain small number of users on a net. As customers expand their nets, they simply buy more packs. While software pricing is always guaranteed to make somebody unhappy, the pack seems to be emerging as the way to market network software.

"We're now selling in five-user increments," said Gail James, chief executive officer of Software Connections, Inc., which formerly marketed its packages in large and small net versions. "Our retailers like that. They can talk about uniform pricing to users, and it gives customers a reason to come back."

> *While software pricing is always guaranteed to make somebody unhappy, the pack seems to be emerging as the way to market network software.*

Along with a handful of other suppliers, Software Connections has been offering multiuser network application for years, and, "We've caught a few arrows," James said. "We're glad to see some of the better known players get into the market — it will help our cause."

He cautioned, however, that not all network applications really offer full multiuser functionality, with some vendors selling only network pricing rather than a true network design. Supporting only PC-DOS 3.1 locking and unlocking features is "pretty superficial," he commented.

Multiuser personal computer net software still lacks the sophistication of mainframe packages, one missing ingredient being "a fully distributed operating system that gives more power and resources to the individual user," he said. "The final network operating system standard has yet to be revealed."

As micro software gets more powerful, however, it poses new challenges to vendors and resellers. "In the multiuser version, we ran into issues we never thought we'd have to deal with," Esber commented. "It's more than an order of magnitude more complex."

So how effectively will dealers — the main distribution channel — support the new packages? Esber acknowledged that the situation makes him a bit uneasy.

Ashton-Tate originally considered offering Dbase III Plus in two versions, single user and network, and restricting sales of the network version to high-end resellers such as Businessland, Inc. and Entre Computer Centers. The decision to go with network packs still leaves an additional profit margin for dealers, some of which will go to training and support, he said.

Dbase III Plus' network hooks are no surprise, as Ashton-Tate announced plans for a network version when Dbase III was first announced in July 1984. For other vendors, it's just a question of time.

Fred Gibbons, president of Software Publishing Corp., described nets as an ongoing grass roots movement and "the trunk from which office automation will spring." Software Publishing will move its products over to networks within six to nine months, he predicted.

"All of our products can run off a server," Microsoft Corp. Chairman Bill Gates said. While Microsoft Word is available in a networked version, he was cagier about plans for other network-specific applications.

Gates did comment that data base management "is the big one, the one where you really take advantage of the server." He also predicted that electronic mail will join data base managers, spreadsheets and word processing as a primary application.

And Gates repeatedly underlined the trend toward networking diskless personal computers. "We really believe there will be one on every desk."

Guess who just unveiled seven

The new IBM 3161 ASCII Display Station is really seven different ASCII displays in one.

In addition to its own function-rich native mode, the new IBM 3161 can emulate:

- IBM 3101 Model 881
- ADDS Viewpoint*
- Hazeltine 1500*
- Lear Siegler ADM-3A*
- Lear Siegler ADM-5*
- TeleVideo 910*

Besides fitting nicely into existing systems, the IBM 3161 also offers impressive improvements in ergonomics.

Improved Ergonomics For Improved Productivity

Take the 102-key ASCII-style keyboard, for example. Its low profile, gentle contour and typewriter touch make for faster keying with fewer errors. The keyboard has programmable function and editing keys so it can be custom-tailored to meet your application needs.

Then, for comfortable viewing, there's the tilt and swivel of the 12" display. And the sharp, clear 8 x 16 character matrix for easy reading. Plus cursor, character and field attributes (blink, reverse video, underscore, dual intensity, etc.). And scrolling. And partitioning. And lots more.

The IBM 3163 with Plug-in Cartridge

And, as if that weren't enough, we're also announcing

The sharp 8 x 16 character matrix helps make for easier reading and fewer operator errors.

a second new ASCII display station with even higher function—the IBM 3163.

Outwardly, these two new displays look alike. But the 3163, in addition to its built-in emulation of the IBM 3101 Model 881, also offers the ability to emulate the DEC VT 52 and VT 100* by means of a unique plug-in cartridge.

And while you'll like the power and flexibility of the 3161, for your high-function applications the 3163 goes even further. For example, a 7,680-character buffer and up to three windows enable you to view and modify portions of different host data bases. The 3163 lets you redefine and even recap the keys.

On both displays the setup is menu-guided and written in plain English, so it can be done easily and quickly. The point is, both are designed to improve your user productivity.

Very Attractive Prices

The price per terminal is $695 for the 3161 and $1,095 for the 3163. Quantity discounts are available. What's more, IBM maintenance offerings start as low as $35 per year per terminal for customer carry-in repair.

Now there's a new family of ASCII displays with the quality, service and support IBM is famous for. Both displays are available through IBM Authorized Distributors and IBM marketing representatives.

FEATURES	3161	3163
Lines x Characters	25 x 80	25 x 80
Double-sized chars	No	Yes
Line drawing chars	36	36
Vertical scroll	Jump	Jump/Smooth
Definable function keys	36	36
Windowing	No	Yes
Partitioning	Horiz	Vert/Horiz

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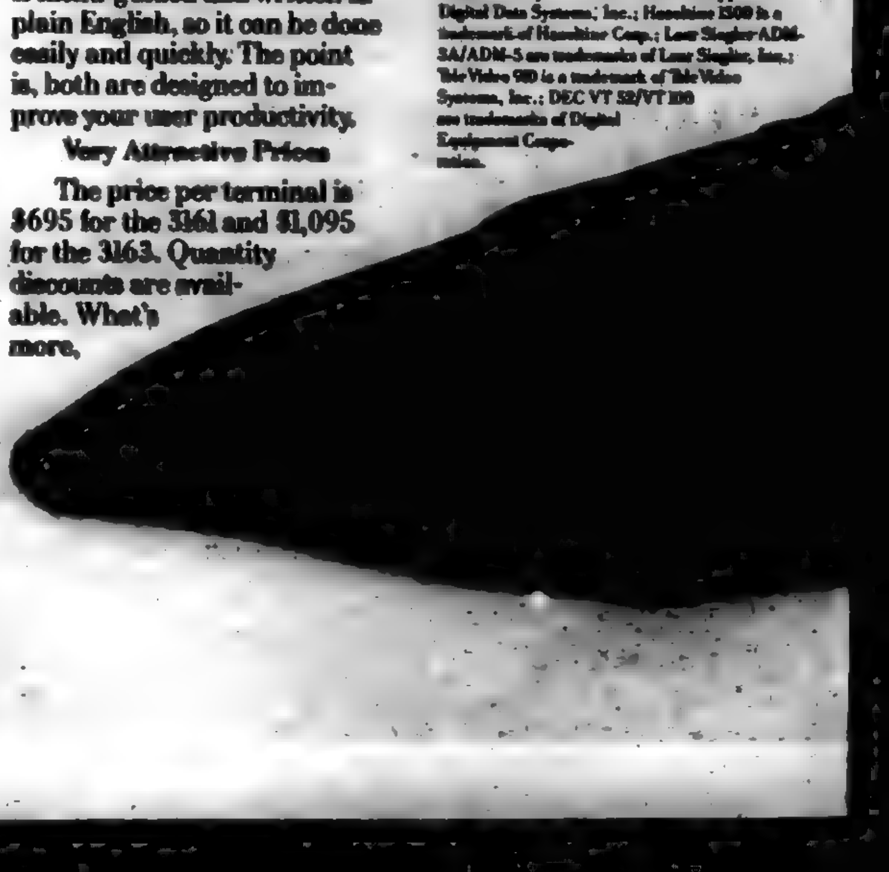

Hayes internal modem supports synchronous data links

NORCROSS, Ga. — Hayes Microcomputer Products, Inc. has introduced the Smartmodem 2400B, said to be the first internal modem for the IBM Personal Computer line and compatibles that supports both asynchronous and synchronous data transmission through a single standard communications port.

The device's synchronous communications capabilities, which will permit users to access mainframe applications, address a growing demand among customers, said Hayes President Dennis Hayes.

Available this month for $739, the 2400B operates at 300, 1,200 or 2,400 bit/sec. over standard dial-up or leased lines, the company said.

The device is fully compatible with Hayes' Smartcom II communications software and will be offered bundled with that software for $799, according to the company.

The 2400B offers all the features of Hayes' standalone 2400 model, including local and remote diagnostics, automatic speed adjustments, call-progress monitoring and the ability to transmit a data file and then switch to voice transmission in a single phone connection, according to the company.

Working through the standard COM1 or COM2 ports, the modem also "handles many functions usually performed by a separate synchronous interface card," the supplier said. "For example, in an [IBM Synchronous Data Link Control] environment, these functions include zero-bit insertion and deletion, address recognition" and Nonreturn to Zero and Nonreturn to Zero - One encoding and decoding.

The new modem will reportedly support communications software written to the just-announced Hayes Synchronous Interface, a set of conventions for synchronous communications applications.

different ASCII displays in one.

The IBM [illegible] ASCII Display Station

Windows finally ships

From page 37

notepad, a telecommunicaions program, a calculator and a clock. Several utilities also are bundled in, including a control program for system parameters, an editor for program information files, a program for setup of random-access memory disks, a clipboard and a print spooler.

During a limited-time introductory offer, two applications will be bundled in: Windows Write, a graphics-oriented word processor, and Windows Paint, a drawing tool.

On machines equipped with a hard disk drive or memory expansion card, such as Intel Corp.'s Above Board, Windows lets users run more applications than will normally fit in the 640K-byte limit of the IBM Personal Computer and compatibles. "If there is insufficient space to load a program, Windows will automatically attempt to swap out an application that is not in use," Microsoft said. A few existing applications, primarily asynchronous communications packages, cannot be swapped, the company noted.

Windows operates with either a keyboard or a mouse. The software requires at least 256K bytes of internal memory and two floppy disk drives. A hard disk drive and 512K bytes of memory are recommended for running multiple applicatons or when using PC-DOS 3 or higher.

Windows works with the IBM Color Graphics Adapter, IBM Enhanced Color Adapter and the Hercules Computer Technology Co. Graphic Card. Among supported output devices are the Hewlett-Packard Co. Laserjet printer, Epson America, Inc. FX-80, IBM Graphics Printer and IBM Proprinter, Okidata Corp. 192 and 193 and the HP 7470A and 7475 plotters.

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SYSTEMS & PERIPHERALS

HARD TALK
Donna Raimondi
CW Senior Writer

Beast from down below

A beast lurks within some of our industry's most exciting products. It is a monster that lies dormant until activated by users' demands.

The beast surfaced in Digital Equipment Corp.'s Microvax II, which looked like an innocent-enough small computer but which is now threatening to devour the whole lower and mid-size range of DEC's other VAXs.

Then, Data General Corp. announced its Eclipse MV/2000DC, a sleek, large-suitcase-size imp that houses the standard Eclipse line's operating system and a 15- by 15-in. board that has the makings of a full-scale minicomputer. Also, for less than half the price of DG's next-in-line MV4000DC, it has some functions even minicomputers do not routinely have.

Apollo Computer, Inc.'s founder John Poduska joined the *danse macabre* two weeks ago by raising the specter of desktop supercomputing. He claimed that within a year and a half, he will astound the engineering marketplace with desktop access to 20 million to 30 million instructions per second of power via networking. Will wonders never cease?

As each of these companies introduces its little dazzler, one wonders if they are aware of the effect of these beasties on the market. In talking with Microvax II owners, I hear requests and demands for more power, more capacity, more connectivity:

"The Microvax II is a wonderful machine, but it does not have enough storage capacity," users say. "The Microvax II is a great system, but it needs to have clustering capabilities," software developers claim. "The Microvax II is incredibly powerful, but I want to add more users to it than DEC allows," an MIS manager complains.

All the while these people are asserting that they could not go back to the DEC VAX-11/750 and even the VAX-

See BEAST page 48

Micro/PDP-11/83 debuts for desk-side, cabinet use

By James Connolly

MAYNARD, Mass. — Digital Equipment Corp. has expanded the Micro/PDP-11 series of minicomputers, which it introduced in early 1984, by adding a microprocessor-based version of its PDP-11/83.

The Micro/PDP-11/83 is the third micro-based version of the PDP-11 and was designed for desk-side and cabinet implementations. DEC officials noted that the Micro/PDP-11 systems, based on DEC's J11 microprocessor, were designed for customers with investments in the PDP-11 architecture and software.

Designed as DEC's most powerful Q-bus, 16-bit computer, the Micro/PDP-11/83 reportedly can support up to 33 users when configured with 1G byte of mass storage in a 40-in.-high cabinet and up to 21 users in the desk-side configuration.

Previous Micro/PDP-11 offerings included the Micro/PDP-11/23 and the Micro/PDP-11/73.

Abbot Gilman, DEC's product manager for the Micro/PDP-11/83, said of the new system, "The PDP-11 is the world's most popular computer in its class. Since its introduction 15 years ago, more than half a million computers in the family have been shipped. The number of man-years of [DEC] and third-party software development numbers in the millions, and the Micro/PDP-11/83 is capable of running these application programs without cross-assembling or recompiling. We've combined a stable architecture and software environment with state-of-the-art advances in processor, memory and peripheral technology."

DEC said the Micro/PDP-11/83 is the first Q-bus PDP-11 system available with DEC's 456M-byte nonremovable and 205M-byte removable-media disk drives. System elements include an 18-MHz chip set and a private memory interconnect

See DEC page 47

Burroughs user gains speed, space

Switch from B6810 to A 15 improves performance

By Donna Raimondi

SEATTLE — A nursing home firm that ran two Burroughs Corp. B6810 mainframes has replaced them with a Burroughs A 15 system and gained two to three times faster performance plus plenty of room in which to grow.

Hillhaven Corp. owns and operates 400 convalescent homes in 43 states, said Robert Tobiasson, manager of computing and network services. Seven years ago, Hillhaven bought its first B6810, adding another one four years ago.

The B6810 is "a very good workhorse — we were at about 80% to 85% capacity on them consistently," he said. Most of the application load from the 4.6M-byte B6810 machines has been moved to the 24M-byte A 15. The new machine is routinely running at 23% to 25% of capacity, Tobiasson said. He added that a "pretty heavy week" recently used 36% of the machine's capacity.

"We took a good look at IBM's 3080 series" when it came time to decide on a new system, Tobiasson said. The cost of converting existing software was a major factor in deciding on Burroughs equipment. Hillhaven also did research to make sure that Burroughs had overcome equipment maintenance problems it had experienced over the last three to four years, he said. "I think vendors always have a way to go — things to improve upon — but we are pleased," he said of Burroughs' efforts to improve maintenance.

> *'On the A 15, a compile list that would have taken all day on a 6800 took an hour.'*
>
> — Robert Tobiasson
> Hillhaven Corp.

The IBM 3083 that the company considered would have required software conversions that, according to Tobiasson, involved both real dollar outlay and lost opportunities in not being able to develop new systems for a period of time. The prin-

See BURROUGHS page 48

INSIDE

The mainframe vs. microcomputer debate continues with even co-workers disagreeing on whether micros will emerge dominant/42

Hewlett-Packard announces a family of computer-aided design systems/46

NEW THIS WEEK

- Telex Computer Products introduces two intelligent workstations
- Encode Technology offers a computer-aided manufacturing system
- For more on these and other new products, see pp. 71-92.

INSTANT ANALYSIS

"I have a philosophy that a benchmark can be made to come out any way you want it to."

— Robert Tobiasson, a user of the Burroughs A 15 mainframe and manager of computing and network services for Hillhaven Corp.

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IDC execs disagree on impact of micro use on mainframes

By Paul Korzeniowski

NEW ORLEANS — As microcomputers increase in power, how will they impact mainframe operation?

William Zachmann, corporate vice-president of research at International Data Corp. (IDC), and Frank Gens, director of IBM systems advisory services at IDC, presented two contradictory scenarios at the 1985 IDC Fall Executive Conference titled "MIS Management Issues and Strategies: Sharpening Your Company's Competitive Weapons."

Zachmann claimed that small systems now represent the best system price/performance ratios for the first time ever. The price for each mainframe million instruction per second (MIPS) of processing power is approximately $160,000, compared with only $5,000 per microcomputer MIPS. Also, mainframe main storage costs 20 times more than similiar microcomputer capabilities.

Other economic benefits that smaller systems offer are lower maintenance costs, fewer system operators and less installation space.

Handicaps to small system use, such as network management and security, are smoke screens from managers who are unwilling to evolve, according to Zachmann.

"Security problems exist on large systems as well as on small systems," he claimed. On small systems, there are many access points. On large systems, a person has access to all corporate data once that person has bypassed security procedures.

A by-product of this shift in price/performance will be a variety of implementation alternatives. "Smaller systems can supply most of the functions of the larger systems," Zachmann said.

Also, users who confine their strategies to traditional large systems will suffer. "Someone who solves a problem and pays $5,000 per [MIPS] will spend a lot less money than the user working with a mainframe solution," he said.

So, information system costs will be transformed into competitive weapons. "If one company's system costs less than its competitors', services can be priced more cheaply, yet profits may actually be greater," Zachmann said.

"This shift in economics will destroy the way that information systems have been planned and implemented," he added.

Companies will be forced to staff technology teams, which would experiment with different types of equipment. "The team could tinker with a local-area network even if the company was not planning on installing one," the analyst said. "A company first has to understand how a technology works before it realizes when it is needed."

Porsche vs. Boeing 747

Gens disagreed with Zachmann's cost comparisons. He presented his own example and compared a Porsche automobile that can travel at speeds up to 200 miles per hour and a Boeing 747 that moves at speeds of 600 miles per hour. Using Zachmann's logic, the 747 aircraft should cost only three times more than the Porsche.

"We all know that 747 is priced at a factor more than the Porsche," he said. "What [Zachmann's] comparisons don't take into account are system functions. We all know that a Porsche can't fly. Microcomputers cannot complete some mainframe functions."

Gens added that large systems will continue to be used widely because IBM dominates most markets and it is intent on increasing its principal revenue that comes from mainframe sales.

One attendee presented another shortcoming in Zachmann's scenario. "I can't get some of my necessary projects funded," he said. "I would be laughed out of the company if I wanted to support an evaluation team that was just tinkering with technology."

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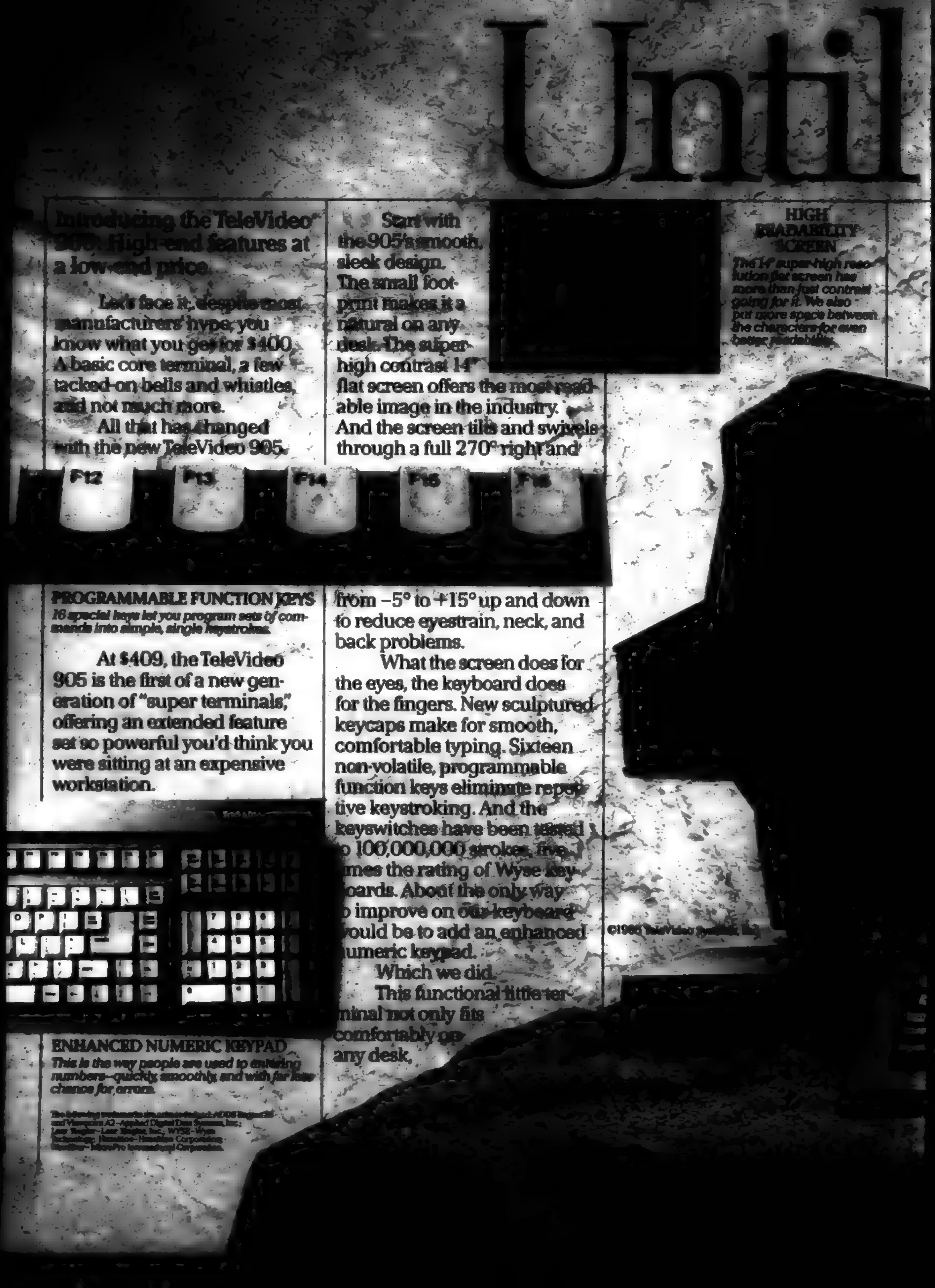

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HP reveals workstation, marketing contracts, OA software

Entries fortify CAD/CAE push

By Donna Raimondi

PALO ALTO, Calif. — Hewlett-Packard Co. has announced design workstations, marketing agreements and technical office automation software in support of computer-aided design and engineering (CAD/CAE) functions.

The announcements are a natural outgrowth of the company's interest in design engineering, a spokesman said. "Our history is instrumentation, which we still do today," the spokesman said. The design engineers that the company has always built for are now using more and more computer-aided systems, and HP is committed to providing what they need, he added, by making mechanical design, software design, electrical design and OA functions available on the same workstations.

The company released its Designcenter ME Series 50 mechanical CAE products that are systems of application software, engineering workstations and related peripherals configured for mechanical and electrical engineering applications. The ME Series 50 functions on the HP 9000 Model 550 under the HP-UX 5.1 operating system.

Supports graphics displays

The standard configuration supports one to three bit-mapped graphics displays and up to 32 terminals for technical OA such as word processing and documentation.

Prices for the ME Series 50 will vary according to the configuration. A typical three-seat configuration consists of the HP 9000 Model 550 with 6M bytes of random-access memory, two CPUs, the operating system, an HP 7914 disk drive, three HP 98700 graphics displays, an HP 239A terminal, an HP plotter or printer and HP Solid Modeling Design software, support and training. The price is approximately $250,000.

The HP Logic Designstation and Personal Logic Designstation each perform design capture and verification in electrical engineering applications and are part of the HP Designcenter series, which includes both mechanical and electrical CAE products.

The Logic Designstation uses HP Series 300 engineering workstations and the HP-UX 5.1 operating system in conjunction with HP's Design Capture System engineering software and Genrad, Inc.'s Hilo-3-based verification system software package. The Personal Logic Designstation can use either the HP Vectra personal computer or the IBM Personal Computer.

A typical HP Logic Designstation costs $58,000 and includes the Series 300 Model 310 with a 55M-byte disk drive, a ¼-in. tape drive with 67M-byte capacity, design capture software system, the Hilo-3 logic simulator with interfaces and simulation models.

A typical configuration of the HP Personal Logic Designstation costs $20,000 and includes the Vectra personal computer with design capture software and a 40M-byte internal disk drive.

Also announced was the HP Designcenter ME Series 10, a workstation-based, two-dimensional design and drafting system for mechanical engineering applications. The ME Series 10 operates on the HP 9000 Series 300 engineering workstation. Prices depend on selected configurations. Typical system prices are approximately $40,000 for the Series 10 and $20,000 for a ME Series 5, which is a scaled-down, entry-level system.

Marketing agreements between HP and four electrical engineering CAD/CAE software suppliers are said to supply a range of printed-circuit board and integrated circuit design capabilities on HP hardware. Initial participants in the program are Futurenet Corp. of Chats-

See HP page 47

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DataVantage simplifies DL/1 testing and development for users of IBM and DOS/DL1 data bases. DataVantage creates reliable test data bases that check logic thoroughly, even for data bases with complex relationships. Restructuring as well as comparing data bases is streamlined with DataVantage.

Here's how other companies strategically use VERIFY, InterTest, and DataVantage to increase productivity.

VERIFY ……………………………

Northern Natural Gas: Maintaining software quality while saving time.

"New applications development methodologies and hardware make it increasingly difficult to maintain quality. That's why we need VERIFY." So says John Latenser, Senior Systems Analyst at Northern Natural Gas, a leader in the transportation of natural gas products. VERIFY helps the Omaha company develop more reliable systems faster. "With VERIFY, we reduce our testing time by 25 to 30 percent," he said. "That gives us a definite competitive edge."

"I think it's fortunate that On-Line Software International came out with VERIFY, because it is the solution we had been looking for," Latenser continued. By way of an example, he cited an on-line system that required five successive revisions. "From the documentation standpoint alone, VERIFY shaved a whole day off the revision process. Quality and reliability were enhanced," he said.

InterTest ……………………………

ADT Security Systems: User-friendly testing produces more accurate systems.

Programmer productivity goes up appreciably with InterTest, according to Kathleen Wolfson, Senior Systems Analyst at ADT Security Systems, New York. "We get systems out quicker than we would have otherwise," she stated. "They're much more

[illegible]

McDonnell Douglas improves local-area net-based Microdata 7000

By Donna Raimondi

IRVINE, Calif. — Improvements to the Microdata 7000 (M7000) Integrated Business System, a local-area network-based distributed relational data base system, have been announced by McDonnell Douglas Computer Systems Co., the former Microdata Corp.

The enhancements are a result of continuing development of the product, said Terry Wetton, product sales manager for the M7000. By repackaging the hardware and incorporating newer technology, Wetton said, the company has been able to produce the system in a less expensive way than before. He added that the unit has been well received, with 100 installations in the U.S. and more than 650 worldwide since its introduction in 1983.

The M7000 has been packaged in a smaller cabinet. Its local-area network now consists of standard coaxial cable with transfer rates improved from 625K byte/sec. to 2M byte/sec. Configuration flexibility has been improved by eliminating the old eight- and 16-port sets and by selling ports in pairs, the company said.

The Sovereign operating system now includes a screen painter, enhanced file editor, 5¼- and 14-in. disk support, an improved local-area network protocol that can address more peripherals and that has greater error-correction facilities, a personal computer link (information terminal emulation and file transfer) and speed enhancements to the company's English information retrieval language.

The M7000 system is said to accommodate up to 208 concurrent users. The basic unit, for a single user, costs $25,000.

MIS DP SOFTWARE STRATEGIES

thoroughly tested, and much more accurate, which is very important to me."

"If ever there was a package that was user-friendly, InterTest has got to be the best at that," Wolfson continued. "The biggest benefit to us is, you can have people who are not the world's greatest experts learn from their mistakes, and they'll be able to turn something around very quickly."

"There are other testing packages, but InterTest is one of the few packages on the market that I just can't imagine running a CICS shop without," she observed.

DataVantage

GTE Communication Systems: Easy testing of complex IMS recursive relationships.

GTE's first use of DataVantage was at its North Lake, Illinois facility for manufacturing large central office switching systems. "This was a particularly demanding application because of the IMS recursive relationships involved," Senior Data Base Analyst Brian Bowers explained. "DataVantage has proved to be a most valuable data base subset management tool for us."

Running an IBM 3084™ under IMS, GTE Communication Systems uses DataVantage to generate accurate subsets of data bases. "We have found it to be a completely functional tool that is also easy to use," he said.

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HP unwraps workstation

From page 46

worth, Calif.; Analog Design Tools, Inc. of Menlo Park, Calif.; Zuken, Inc. of Yokohama, Japan; and VLSI Technology, Inc., based in San Jose, Calif.

HP also released technical OA software for the HP 9000 Series 300 and 500 engineering workstations. The Alix integrated package from Applix, Inc. is said to include applications such as multifont word processing, sketching, graphics, spreadsheet, business graphics, personal data base and electronic mail. Alix costs from $2,500 to $9,000.

Stand-alone choices of applications include project management, graphics, word processing, spreadsheet and equation solving and range in price from $195 to $1,550 on the HP 9000 Model 300, depending on the product and number of users. On the HP 9000 Series 500 machines, the cost of the stand-alone products will range from $1,495 to $2,500.

DEC unveils mini version

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(PMI). The PMI is said to provide a high-speed data path between processor and memory. The system also uses error-correcting memory to enhance reliability.

DEC also announced enhancements for the Micro/PDP-11/73. The company added higher density memory boards and the capability to use a 71M-byte, 5¼-in. storage disk and 95M-byte streaming tape on the mid-range system.

A rack-mounted version with 1M byte of memory costs $10,100, and floor-standing systems start at $18,045.

Prices for the Micro/PDP-11/83 start at $34,360 for a desk-side version and $53,420 for a cabinet version.

Burroughs user gains speed, space

From page 41

cipally Cobol shop has 30 programmers and a total DP staff of about 65 people, including operators, networking specialists, applications analysts and administrative personnel.

Tobiasson said that the company also looked at a pair of used Burroughs B7800 machines, but the B7800s were slower and had less memory than the A 15; such a solution would have satisfied the company for only one or two years.

Hillhaven uses more than 410 Convergent Technologies, Inc. microcomputers, mostly AWS 277 models, which are used for patient accounting, payroll data entry and a few nursing applications in its convalescent homes. All of the micros are networked to the A 15 in corporate headquarters using networking software from Automated Programming Technologies, Inc. of Birmingham, Mich. They were previously networked to one of the B6810s via Convergent Technologies' RJE software package.

> ”
>
> *A payroll job that took 10 hours to run on the B6810s now runs in less than three hours on the A 15.*

The Hillhaven home office processes payroll information for its 40,000 employees twice a month. A payroll job that Tobiasson described as a processor-intensive application that took 10 hours to run on the B6810s now runs in less than three hours on the A 15. A closing process in the general ledger package, which ran in 24 to 30 hours before, now runs in 12 hours, he claimed. The company added about 1.5G bytes of disk storage equipment for a total of 7G bytes now.

Installation of the new system went smoothly, Tobiasson said. The A 15 rolled off the truck on Sept. 9 at 9 a.m., and by 7:30 that night it was "hot loaded," meaning that it started running.

Because Hillhaven was the first user that was not a beta test site, there were Burroughs manufacturing people present for observation and training. "There was one installation manager, and he knew what he was doing, and he had everyone very well coordinated," Tobiasson said.

After they left, the local Burroughs field engineers took over to test the machine. For the next week, they handled any problems within an hour, Tobiasson said. The machine was turned over to Hillhaven for use on Sept. 16.

"By the first or second week in October, we had our three main applications — payroll, general ledger and accounts payable — up and running," Tobiasson said. "We had some older code that we had to recompile. . . . On the A 15, a compile list that would have taken all day on a 6800 took an hour," he added.

Tobiasson did not run a lot of benchmark tests before his purchase. "I have a philosophy that a benchmark can be made to come out any way you want it to," he said. He preferred to dig around and find answers to his questions, he said.

Beast within Microvax II

From page 41

11/780, which have the capacity for all those things because they are too expensive now relative to the Microvax II.

Third-party vendors are working overtime to come up with solutions to the built-in limitations of these systems. Systems Industries claimed it can cluster the Microvax II with other VAXs. Owners have been very creative in finding clever ways to add more users. DEC itself keeps adding memory and storage options to the machine.

DG will most likely suffer even more demands with its MV/2000DC. When asked why a customer should buy the company's previous low-end minicomputers, such as the MV/4000DC, instead of the new MV/2000DC, a spokesman said the new one cannot yet share the large peripherals that the rest of DG's line can share. How long does the company think it can get away with that? If DG does not design a way to share, then a third-party vendor surely will, putting DG's previous low-end machines in a precarious position.

The idea of supercomputer power on a desk is not new, although it still seems like science fiction. If entrepreneur Poduska carries it out, and if a capability that powerful is available in a year and a half or two years, what will happen to the hardware industry in general?

The industry has started to swallow its own tail. But progress cannot be stopped, nor should it be. Just as we could not have predicted something as powerful as DG's MV/2000DC in such a small package five years ago, so we cannot even begin to imagine what is just around the corner now. We will just have to wait to see what happens after the monster has devoured its older siblings.

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Mini system cuts microwave tool maker's time-sharing costs

PALO ALTO, Calif. — A manufacturer of microwave equipment for military and satellite operations, which did all of its programming through time-sharing services, installed a minicomputer system and, subsequently, brought its time-sharing bills down to earth.

In 1982, Teledyne MEC, a manufacturer of traveling wave tubes, did not have an in-house computer system. It ran all of its development programs on time-sharing services. "The main problem was the high cost of time-sharing," explained Larry Wood, the firm's project leader for research and development. "We decided to bring the programming in-house and save money.

"We wanted a system that could handle our proprietary design programs written in Fortran," he continued. "The largest program we have uses 2M bytes of main memory.

"We needed a system capable of handling multiusers so we could run several programs at once." The system also had to be expandable so that the firm could grow with it, Wood added.

In 1983, the firm installed a Hewlett-Packard Co. HP 1000 XL minicomputer with 3M bytes of main memory and a 12M-byte hard disk. The firm has since traded in the original CPU for an HP 1000 A600 processor and replaced the 12M-byte hard disk with a 132M-byte hard disk. According to Wood, the system supports several HP 2621 terminals, a 2623 graphics terminal, a 2327 color graphics terminal, an HP 150 personal computer used as a graphics terminal and a 2624 data entry terminal. In addition, an IBM Personal Computer, running communications software, has also been integrated into the network.

Originally, the firm used the system for its less complicated but frequently run development programs and kept its lengthy, complicated programs on time-sharing mainframe computers. Wood said the firm purchased a high-speed printer and wrote a custom communications program to allow two-way communications between the printer and the time-sharing computers. "Through a 4,800 bit/sec. modem, we used the printer as a batch printer to download programs from the time-sharing services," Wood explained.

"As we grew with the system, we brought more of our development programs in-house," he added. The nature of the traveling wave tube manufacturer's business requires a constant development process for designs undergoing several iterations before the final versions are completed. "Traveling wave tubes are used in satellite communications," the firm's R&D project leader explained. "For example, when television signals come from Europe, they are transmitted via satellite. They are beamed up through a traveling wave tube.

"Our customers always require new designs for our products," he continued. "The computer enables us to go through several iterations of the design program quickly to come up with a new computer design."

One of the firm's most complex design programs is used to design electron guns, the part of the traveling wave tube that emits an electronic beam. But the program requires 2M bytes of memory to run, Wood said, and the HP 1000 A600 only had 3M bytes of memory.

In order to protect itself against slowdown, the firm added an HP 1000 A900 processor, which provided an additional 3M bytes of high-speed memory, and a floating point match processor. With these additions, the firm now runs the complex electron gun program in-house, using double-precision numbers to produce accurate results.

"We now use the HP 1000 A600 to control and store data for our automated network analyzer," Wood said. "That gives us more room to run our applications on the A900."

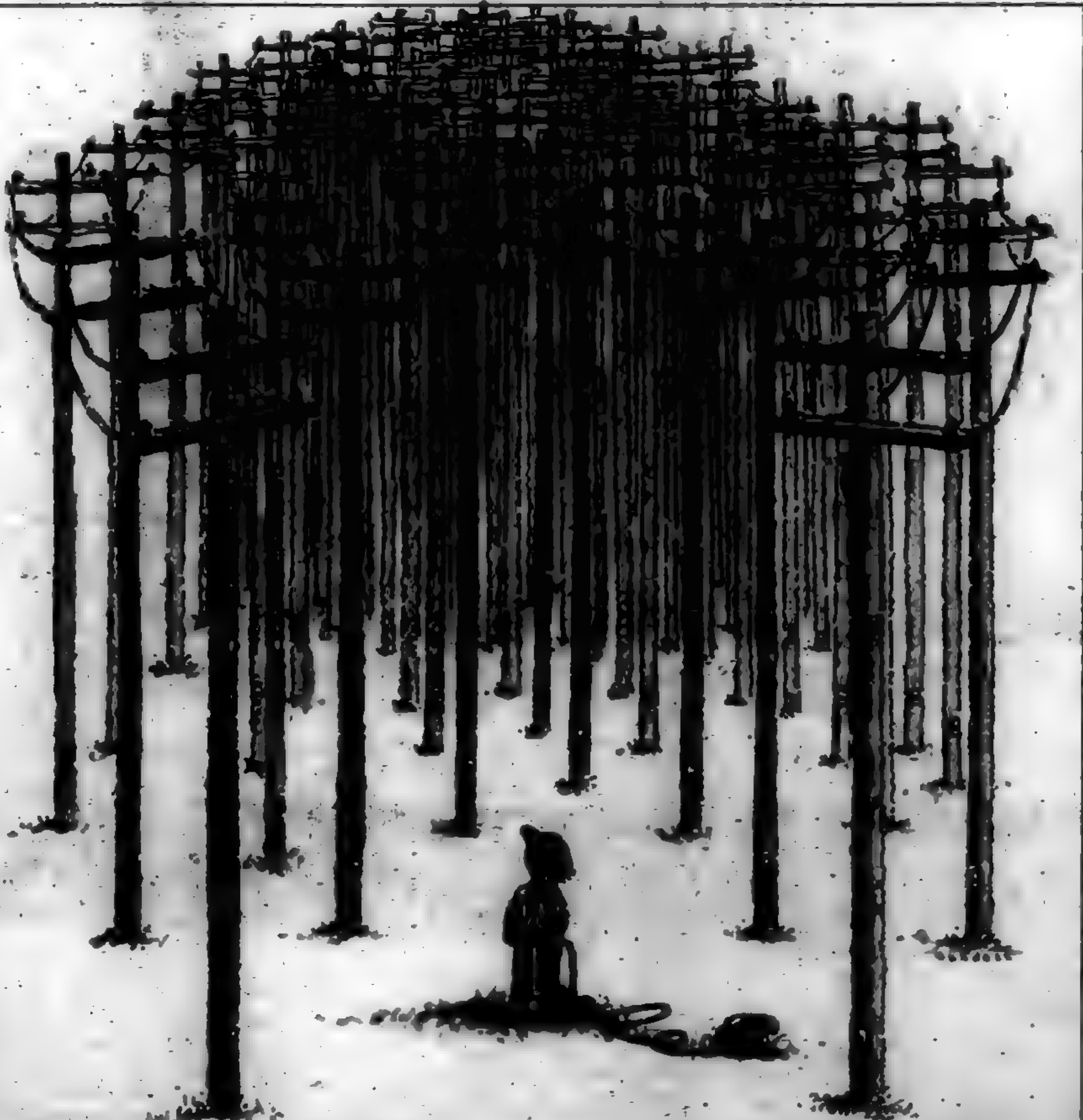
Time-sharing savings

Wood said the firm still uses time-sharing services, but only for storage and as a backup when the minicomputer system goes down. "Before we had the system, our bill for outside time-sharing services peaked at $15,000 per month," Wood said. "Since we have been off-loading our program onto our own system, our latest time-sharing bill was $1,200 a month. We use HP for software consulting and maintenance services, which costs $700 a month. The difference is what we save every month — about $13,000."

Wood estimated that the firm would cash in approximately $80 million in sales this year.

Since the minicomputer system was completely new to the microwave equipment manufacturer, the firm hired one new employee to oversee system operation. The new system manager attended a two-week training program offered by HP for the HP 1000, according to Wood.

The implementation of the system was not without its problems, but according to Wood, the problems were solved as they arose. "The only problems we had occurred when new software revisions came out," he explained. "We found some bugs in the programs, which we reported to HP, and then we worked together to solve them."



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CALL FOR PAPERS

THE MACHINING OF MINIATURE PARTS

Detroit, Oct. 21-23

A call for papers has been issued by the Society of Manufacturing Engineers (SME).

Mail inquiries by Jan. 10 to Leigh E. Sweda, Special Programs Division, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

EUROMICRO '86: THE 12TH SYMPOSIUM ON MICROPROCESSING AND MICROPROGRAMMING

Venice, Sept. 15-18

Original, unpublished papers are being sought on the following topics: software engineering; management of micro-based projects; software engineering environments; hardware development tools; AT&T Unix applications; hardware description languages; very large-scale integration hardware and software; multimicroprocessors — structure, software and operating systems; new computing structures; and continuing education of engineers.

People interested in presenting a scientific paper should submit six copies of a three-page abstract by Jan. 15 to the program chairman, John Molgaard, Elektronik Centralen, Venlighedsvej 4, DK-2970 Hoersholm, Denmark.

SYMSAC '86: THE 1986 ACM-SIGSAM SYMPOSIUM ON SYMBOLIC AND ALGEBRAIC COMPUTATION

Ont., Canada, July 21-23

Symsac '86, sponsored by the Association for Computing Machinery's Special Interest Group on Symbolic and Algebraic Manipulation (SIGSAM), has issued a call for papers. Papers, tutorials, system demonstrations and proposals for discussions are invited on the following topics: algebraic and analytic algorithms, problem representation and solution, languages, systems and applications.

Five copies of submitted papers with abstracts must be received no later than Jan. 15 by D.Y.Y. Yun, Program Committee Chairman, Symsac '86, Department of Computer Science and Engineering, Southern Methodist University, Dallas, Texas 75275. General conference information may be obtained from Richard Fateman, EECS Department 573, Evans Hall, University of California, Berkeley, Calif. 94720.

1986 MICROWAVE POWER TUBE CONFERENCE

Monterey, Calif., May 12-14

Papers for this conference may include uncompleted work, reports on unsolved problems, recent new requirements and ideas not yet fully worked out. Specific topics related to new U.S. Department of Defense thrusts such as the Strategic Defense Initiative, high-power radio frequency (RF) generation in space and the impact of low observable criteria on RF system design are appropriate for submission.

The deadline for the submission of abstracts is Jan. 23. Twelve copies of all materials should be submitted to Ralph Nadell, 1986 Microwave Power Tube Conference, Palisades Institute for Research Services, Inc., 11th Floor, 201 Varick St., New York, N.Y. 10014.

CLEO '86

San Francisco, June 9-13

Topics to be considered for the Conference on Lasers and Electro-Optics (CLEO) include the following: atmospheric and space applications, industrial applications, lasers in chemistry, laser fusion and laser-produced plasmas, gas lasers, solid-state and liquid lasers, medical applications, laser processing of semiconductors and microelectronics, nonlinear optics and spectroscopy, optical communications, optical signal processing, switching and bistability, optical storage, ultrafast optics and electronics and optical materials.

Solicited are original papers, not previously presented, that describe new technical contributions to the areas covered by the technical sessions as broadly described by the list of topics above. The deadline for submission of papers is Jan. 6. Papers should be forwarded to CLEO '86, c/o Optical Society of America, 1816 Jefferson Place N.W., Washington, D.C. 20036. Papers submitted from Europe should be sent to the subcommittee chairman, F. P. Shafer, Max-Planck-Institut fur Biophysikalische Chemie, Abteilung Laserphysik, D3400 Gottingen-Nikolausberg, West Germany.

1986 INTERNATIONAL CONFERENCE ON PARALLEL PROCESSING

St. Charles, Ill., Aug. 19-22

Authors are invited to submit papers describing recent advances on all aspects of parallel and/or distributed processing. These may include parallel and distributed logic circuits; impact of very large-scale integration on parallel processor architecture; various concurrent-, distributed-, parallel-, pipeline- or multiple-processor architectures; processor-memory interconnections; computer networks; distributed data bases; reliability and diagnostics; or various application studies.

The deadline for submitting papers is Feb. 1. Papers should be submitted to one of the following people. Hardware papers go to Kai Hwang, Computer Research Institute, SAL-110, University of Southern California, Los Angeles, Calif. 90089. Software papers go to Steven M. Jacobs, TRW Defense Systems Group, 119/1842, One Space Park, Redondo Beach, Calif. 90278. All other papers go to Earl E. Swartzlander, TRW Electronics Systems Group, M5-1408, One Space Park, Redondo Beach, Calif. 90278.

CALENDAR

WEEK OF DECEMBER 8

DECEMBER 8-11, CHICAGO — **1985 Fall Industrial Engineering Conference.** Contact: Stephanie Starr, Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

DECEMBER 9-10, BOSTON — **Systems Analysis & Design for the HP 3000.** Contact: Charles Volz, Volz Associates, 34 Undine Ave., Winthrop, Mass. 02152.

DECEMBER 9-10, DALLAS — **PC/MIS Managers Speak Out!** Contact: Ken Orton, Future Computing, Inc., 8111 LBJ Freeway, Dallas, Texas 75251.

DECEMBER 9-10, DALLAS — **Third Annual Microcomputer Conference.** Contact: Financial Managers Society, Inc., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

DECEMBER 9-11, WASHINGTON, D.C. — **Financial Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

DECEMBER 9-13, LOS ANGELES — **Telecommunications and Communications Engineering Program.** Contact: University of California at Los Angeles Extension, Department of Engineering and Science, P.O. Box 24901, Los Angeles, Calif. 90024.

DECEMBER 9-13, MIAMI BEACH — **The 2nd Conference on Artificial Intelligence Applications.** Contact: Trade Associates, Inc., Exposition Management, Suite 200, 12250 Rockville Pike, Rockville, Md. 20852.

DECEMBER 10-11, NEW YORK — **Emerging Technologies 1986.** Contact: Yankee Group, 14th Floor, 89 Broad St., Boston, Mass. 02110.

DECEMBER 10-12, DETROIT — **Automotive Computer Graphics Conference and Exposition.** Contact: Carmelita Smirnes, Media Relations Coordinator, Engineering Society of Detroit, 100 Farnsworth Ave., Detroit, Mich. 48202.

DECEMBER 10-12, PHILADELPHIA — **1986 Videodisc, Optical Disk & CD-ROM Conference/Exposition.** Contact: Jean-Paul Emard or Marilyn Reed, Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

DECEMBER 10-12, TOKYO — **Interface in Japan.** Contact: Peter B. Young or Linda M. Yogel, Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

DECEMBER 11-13, ANAHEIM, CALIF. — **Dexpo West '85 — The Eighth National DEC-Compatible Exposition.** Contact: Carol Henderson, Expoconsul International, Inc., 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

DECEMBER 12-13, OAKLAND, CALIF. — **Forum on Business Videotex.** Contact: Madelynn Davis, Videotex Industry Association, Suite 200, 1901 N. Ft. Myer Drive, Rosslyn, Va. 22209.

DECEMBER 12-13, WASHINGTON, D.C. — **Satellite Communications.** Contact: TMSA Seminars, c/o Technology Training Corp., Department SATCOM, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510.

DECEMBER 13, DALLAS — **MIS/DP/Telecommunications Consultants.** Contact: Barbara Moosechekian, Infomart, 1950 Stemmons Freeway, Dallas, Texas 75207.

WEEK OF DECEMBER 15

DECEMBER 16-17, FORT LAUDERDALE, FLA. — **Buying and Selling Rights to Software, Hardware and Services.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Dec. 17 in Boston.

DECEMBER 16-18, NEW YORK — **Data Analysis & Logical Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

DECEMBER 17-19, WASHINGTON, D.C. — **System 2000 Applications Programming Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

DECEMBER 19, COLUMBUS, OHIO — **DOS/VSE Working with Shared DASD.** Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 19-20, BOSTON — **Troubleshooting the Data Communications Networks.** Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07040.

WEEK OF JANUARY 5

JANUARY 6-8, IRVINE, CALIF. — **Automated Business Technologies '86.** Contact: James Ramsey, Automated Business Technologies '86, Suite 386, 8532 Commonwealth Ave., Buena Park, Calif. 90621.

JANUARY 6-9, ANAHEIM, CALIF. — **ATE West '86.** Contact: Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

JANUARY 6-10, SAN FRANCISCO — **Writing Procedures, Policies and Documentation.** Contact: Mary Ann Cluggish, Information Mapping, Inc., 275 Wyman St., Waltham, Mass. 02154. Also being held Jan. 27-31 in Orlando, Fla.; Feb. 3-7 in Dallas; and Feb. 10-14 in Washington, D.C.

JANUARY 7-8, BOSTON — **Writing Management Reports.** Contact: Mary Ann Cluggish, Information Mapping, Inc., 275 Wyman St., Waltham, Mass. 02154.

JANUARY 8-11, MILWAUKEE — **Mini and Microcomputer Concepts.** Contact: John T. Snedeker, University of Wisconsin at Milwaukee Extension, 929 N. Sixth St., Milwaukee, Wis. 53203.

JANUARY 9, DEDHAM, MASS. — **Elements and Applications of Microcomputers in the Graphic Arts Industry.** Contact: Frank R. Trocki, Director, Graphic Arts Program, Northeastern University Center for Continuing Education, 370 Common

See CALENDAR page 54

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WYSE

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CALENDAR from page 53

St., Dedham, Mass. 02026. Also being held Jan. 16 and 30 and Feb. 6 in Dedham.

JANUARY 9, IRVINE, CALIF. — **Invitational Computer Conference.** Contact: Suzanne Hubner, U.S. Conference Director, Invitational Computer Conference, No. C-2, 3151 Airway Ave., Costa Mesa, Calif. 92626. Also being held Jan. 28 in Austin, Texas and Jan. 30 in Dallas.

WEEK OF JANUARY 13

JANUARY 12-14, KEY BISCAYNE, FLA. — **The Outlook for Computer Printers.** Contact: Gail Montgomery, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

JANUARY 13-15, ATLANTA — **Telecommunications Management.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JANUARY 13-15, WESTBORO, MASS. — **A Structured Approach to Software Testing.** Contact: Central New England College, 3 Westboro Business Park, Research Drive, Westboro, Mass. 01581.

JANUARY 13-17, MILWAUKEE — **Microprocessor Hardware and Software — An Introduction.** Contact: John T. Snedeker, University of Wisconsin at Milwaukee Extension, 929 N. Sixth St., Milwaukee, Wis. 53203.

JANUARY 14-16, KEY BISCAYNE, FLA. — **Thermal Printing.** Contact: Gail Montgomery, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

JANUARY 14-16, LONG BEACH, CALIF. — **Annual Battery Conference '86.** Contact: Rita Johnson or Jane Doherty, Annual Battery Conference, Department of Electrical Engineering, California State University, 1250 Bellflower Blvd., Long Beach, Calif. 90840.

JANUARY 15-16, SAN JOSE, CALIF. — **Buscon '86.** Contact: Anne Weber, Bus Users Show and Conference '86, Suite 116, 17100 Norwalk Blvd., Cerritos, Calif. 90701.

JANUARY 15-17, DENVER — **Usenix Technical Conference.** Contact: Usenix Conference Office, P.O. Box 385, Sunset Beach, Calif. 90742.

JANUARY 16, NEW YORK — **CDLA Regional Reception.** Contact: Manager of Convention Planning, Computer Dealers and Lessors Association, Inc., 1212 Potomac St. N.W., Washington, D.C. 20007.

JANUARY 16-18, SAN FRANCISCO — **Macworld Exposition.** Contact: World Expositions, Mitch Hall Associates, P.O. Box 860, Westwood, Mass. 02090.

WEEK OF JANUARY 19

JANUARY 19-22, DALLAS — **Forum '86.** Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

JANUARY 20-21, ARLINGTON, VA. — **Ada.** Contact: Specialized Training Services, Inc., P.O. Box 1618, Dahlgren, Va. 22448.

JANUARY 21-22, NEW YORK — **Introduction to Telecommunications Systems: Technologies and Applications.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JANUARY 21-23, SAN JOSE, CALIF. — **ASEE '86 — Advanced Semiconductor Equipment Exposition Technical Conference.** Contact: Joyce Estill, Exposition Manager, Cartlidge & Associates, Inc., M259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

JANUARY 23-25, SAN DIEGO — **1986 SCS Multiconference.** Contact: Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

JANUARY 24-25, DEDHAM, MASS. — **Copyfitting.** Contact: Frank R. Trocki, Director, Graphic Arts Program, Northeastern University Center for Continuing Education, 370 Common St., Dedham, Mass. 02026.

WEEK OF JANUARY 26

JANUARY 29, DEDHAM, MASS. — **Newsletter Preparation: Design and Layout.** Contact: Frank R. Trocki, Director, Graphic Arts Program, Northeastern University Center for Continuing Education, 370 Common St., Dedham, Mass. 02026.

JANUARY 29-31, BOSTON — **How to Select and Implement a Telephone System.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JANUARY 29-31, DALLAS — **Data Communications I — Basic Concepts.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JANUARY 29-31, SCOTTSDALE, ARIZ. — **1986 Robotic Industries Association Annual Meeting.** Contact: Robotic Industries Association Headquarters, P.O. Box 1366, Dearborn, Mich. 48121.

JANUARY 30, NASHUA, N.H. — **Assertive Management.** Contact: Seminar Administrator, New Hampshire College, Resource Center, 2500 N. River Road, Manchester, N.H. 03104. Also being held Jan. 31 in South Portland, Maine.

JANUARY 30-FEBRUARY 1, ORLANDO, FLA. — **SEROMDA '86 Convention and Exposition.** Contact: Southeastern Regional Office Machine Dealers Association, Inc., Office, Suite 111, 224 Peters Road, Knoxville, Tenn. 37923.

JANUARY 30-FEBRUARY 2, LAS VEGAS — **Healthcom '86 — Computers, Telecommunications and Information Systems for the Health Care Industry.** Contact: Lia Fish, Fleishman & Linden Expositions Group, Inc., 2401 Plum Grove Road, Palatine, Ill. 60067.

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Publishing in-house can sharpen DP image

In-house publishing systems reduce outside costs, keep documents timely and allow closer quality control. As electronic publishing gains a solid foothold in the corporate environment, MIS is the logical choice to coordinate equipment spread throughout the company.

CW PHOTO

- Know thy vendor.
- Start small.
- Plan for a payback period of three years.

By Johanna Ambrosio

As if MIS directors didn't have enough to think about, here comes one more responsibility: corporate electronic publishing.

This just might, however, be a job welcomed by MIS. If handled properly, the computer publishing phenomenon can offer a chance to wow top corporate management while not getting stuck with day-to-day details.

Corporate electronic publishing is the creation and publishing of documents inside companies other than bona fide publishers. Corporately published documents are generally created for the support of other products and include brochures, catalogs and service manuals.

Corporate electronic publishing can help reduce money spent on outside suppliers, produce more timely publications and allow for greater control over document quality.

"Electronic publishing is distinct from ordinary correspondence because it requires a higher level of typographic sophistication such as graphics and changes in type styles and sizes," says Gregory Van Buren, director of research and simulation for Interconsult, Inc., a Cambridge, Mass., consulting firm.

If the document can be produced with a letter-quality printer and a word processing package, it does not represent a corporate electronic publishing effort. The necessary components for corporate electronic publishing include the following:

An input device used to create the document, such as a personal computer or terminal hooked to a mainframe.

Text-processing software that allows the raw input to be massaged into production-quality copy with various type fonts and sizes.

A hard-copy device such as a laser printer or typesetter.

This list, of course, describes the most basic level of corporate electronic publishing. Other possible components could include computer-aided design (CAD) systems, graphics workstations, color-image systems and optical-character recognition scanners to input printed material that has been created elsewhere.

To date, few companies have taken the in-house publishing route. But the benefits of corporate electronic publishing will entice approximately 2,000 companies to invest in systems in the next two years, Van Buren estimates. Cumulative computer publishing revenue will total $4 billion to $12 billion by 1987 and more than $50 billion by 1990.

The revenue accrues to a variety of vendors, including personal computer manufacturers, software and laser printer vendors that may or may not be specifically identified as electronic publishing vendors. The recent excitement over low-cost laser printers has not driven the electronic publishing market so much as it has brought high-quality publishing to users' attention.

Wait is over

Not everyone agrees with those predictions. Jose Ramos, publisher of the "Wysiwyg (What-You-See-Is-What-You-Get)" newsletter on computer publishing,

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Johanna Ambrosio is a Queens, N.Y.-based free-lance writer specializing in technology and business.

believes that Interconsult's figures are too high. But he does agree that electronic publishing's long wait to become a viable market is over.

"The electronic publishing industry is beginning to come alive," Ramos says, and more user firms will invest over the next two years as the benefits of corporate electronic publishing become better known through word of mouth and through users groups and trade shows.

Indeed, corporate electronic publishing is an idea whose time has come, if one considers what Fortune 1,000 companies already spend on publishing — between 6% and 10% of their revenues, Van Buren points out.

Lack of control

Yet many firms are not aware of the inefficiency of their publishing expenses. At least half of the companies Van Buren's firm interviewed for a recent study did not specifically track dollars spent on publishing.

> ***In an organization, one or more technical groups, the DP documentation unit and the marketing area all use in-house electronic publishing.***

Furthermore, millions of dollars spent on electronic publishing equipment never serve that purpose because the gear is not purchased with electronic publishing in mind. Laser printers, for example, are often seen as replacements for line printers when they can also be used as publishing output devices.

The problem is that corporate electronic publishing equipment — in one form or another — is spread out across many departments in most companies, with no central point of control. In a given organization, one or more technical groups, the documentation unit within data processing and usually the marketing department all use in-house electronic publishing in some form.

Furthermore, each of these groups believes it should retain control of the system. But as electronic publishing gains a stronger foothold in the corporate environment and the system grows larger and becomes more integrated with other installed computers, MIS is seen as the logical choice as a coordinator.

Oiling the system

But MIS must overcome several problems before corporate electronic publishing becomes a well-oiled machine.

Difficulties stem from the unplanned, grass-roots origin of most in-house publishing efforts. Because in-house publishing staffs do not occupy a specific place in corporate planning, they generally lack a capital-equipment budget. Instead, the in-house publishing group is dependent on an operating budget for paper, ink and personnel costs.

Besides not being able to purchase new equipment, this group has often inherited methods that are not cost-effective. "These people are so busy publishing that they don't even know what's available to them," Ramos says.

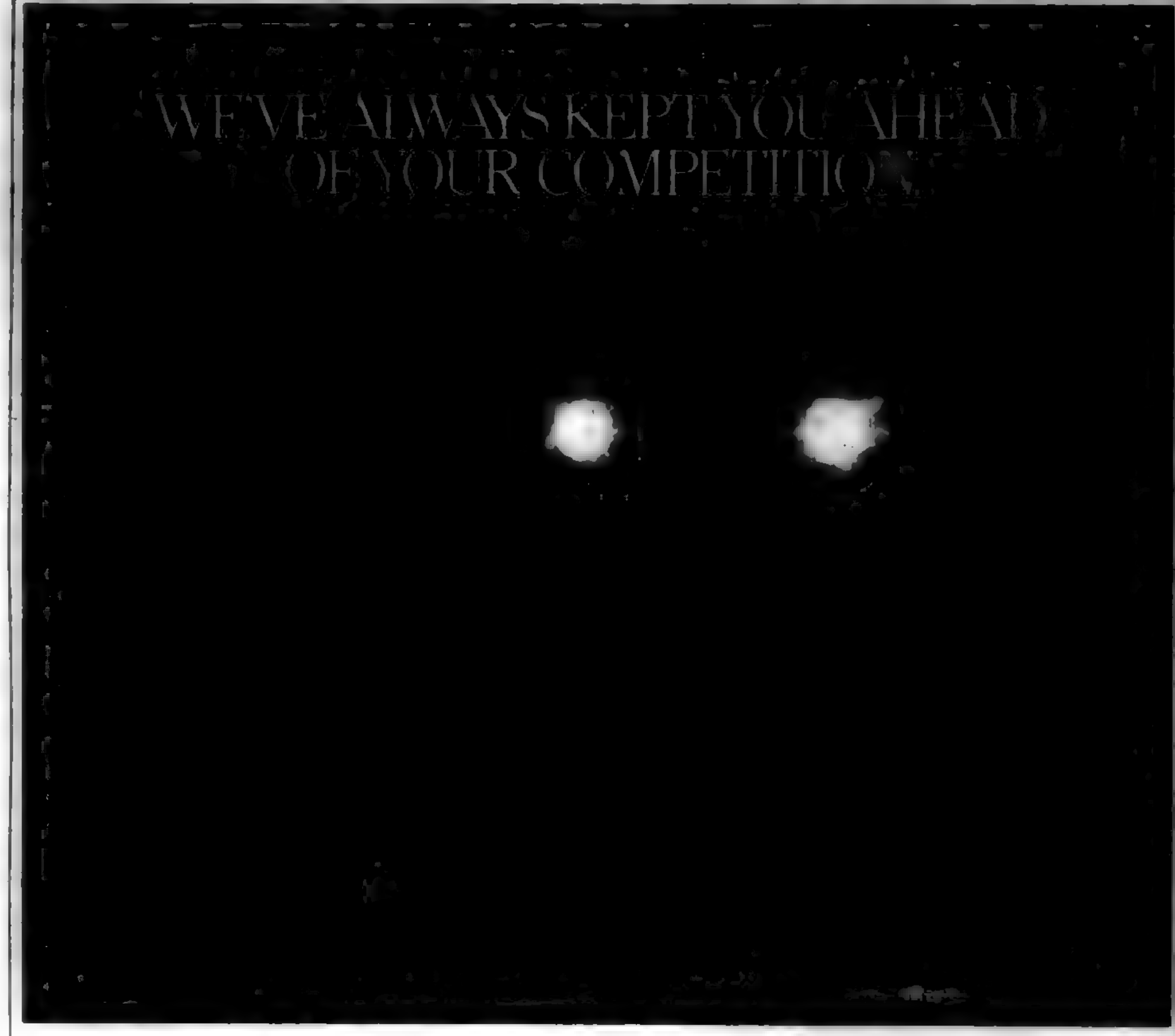
MIS' role

By stepping in and elevating the publishing function's position within the organization, MIS can help the firm save money. The MIS staff can direct higher level management attention and techniques toward turning corporate electronic publishing into the effective tool it should be.

Of course, by doing so, MIS staff members become heroes to top management, which generally functioned unaware of the problem.

MIS can sell the corporate electronic publishing concept to the executives while allowing the people who have always run the publishing area to continue. This approach spares MIS the day-to-day control problems, consolidates the publishing function into one distinct entity and hopefully solves the publishing staff's capital-expenditure problems.

Another possible organizational structure draws together one centralized publishing staff, with some publishing gurus remaining in user departments that generate heavy electronic publishing requirements.



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Early users are trying out different approaches to corporate electronic publishing. One, Caterpillar Tractor Co. in East Peoria, Ill., maintains a centralized electronic publishing department.

Corporate mandate

Caterpillar's Communications Services Division, which falls under the auspices of the company's marketing group, administers the department.

Caterpillar reorganized the Communications Services Division in August and gave the division a corporatewide mandate for electronic publishing, explains Jerry Meixsell, supervisor of the division's systems section.

Before that time, his unit was part of the technical publications group that handles service manuals and operating guides.

"We realized we possess technology that the rest of the company can use," Meixsell points out. Now, his division, which works closely with but does not report to MIS, handles all of the company's publications, including the parts catalogs and brochures sent to Caterpillar's dealers.

The reorganization created a lot of interest in the corporate electronic publishing program, Meixsell emphasizes. "We used to have to go to users and say, 'Look what we can do for you.' Now they come to us and ask for help reducing costs," he notes.

Meixsell's group created a corporate electronic publishing system by adding equipment to the Atex, Inc. text processing system in use since 1976.

Lazard Freres & Co., a New York-based investment banking firm, installed a corporate electronic publishing system earlier this year.

The firm uses a small publishing system run by a secretary in one of the divisions. The system, made by Interleaf, Inc., has been installed since January.

A panel of end users, in this case investment bankers, wrote the specifications for the system and made the final system selection, according to Hamish Norton, an associate in Lazard Freres' corporate finance department who had a hand in the selection process.

Credibility boost

The user panel decided it wanted a corporate electronic publishing system to improve the quality of its presentations to new clients. Lazard's needs emphasized the intangible benefits of electronic publishing more than the bottom line, based in part on studies that show how credibility is boosted by typesetting documents.

With an in-house publishing system, many documents that were traditionally produced on a daisywheel or matrix printer will now be easily typeset.

Another point to consider, for those documents that were once simply printed, is cost saving on ink and paper. Since typeset copy takes up about 45% less space than information from a line printer does, the same document will require fewer materials to be produced on an electronic publishing system.

Once the panel reached its decision, the person in charge of computational services narrowed the selection down to several specific equipment vendors. "He was familiar with the state of the art; we were familiar with what we needed," Norton says.

Besides giving the panel the names of possible vendors, the DP person acted as the liaison between end users and top management. "He helped explain the decision to the people who ultimately had to approve it," Norton adds.

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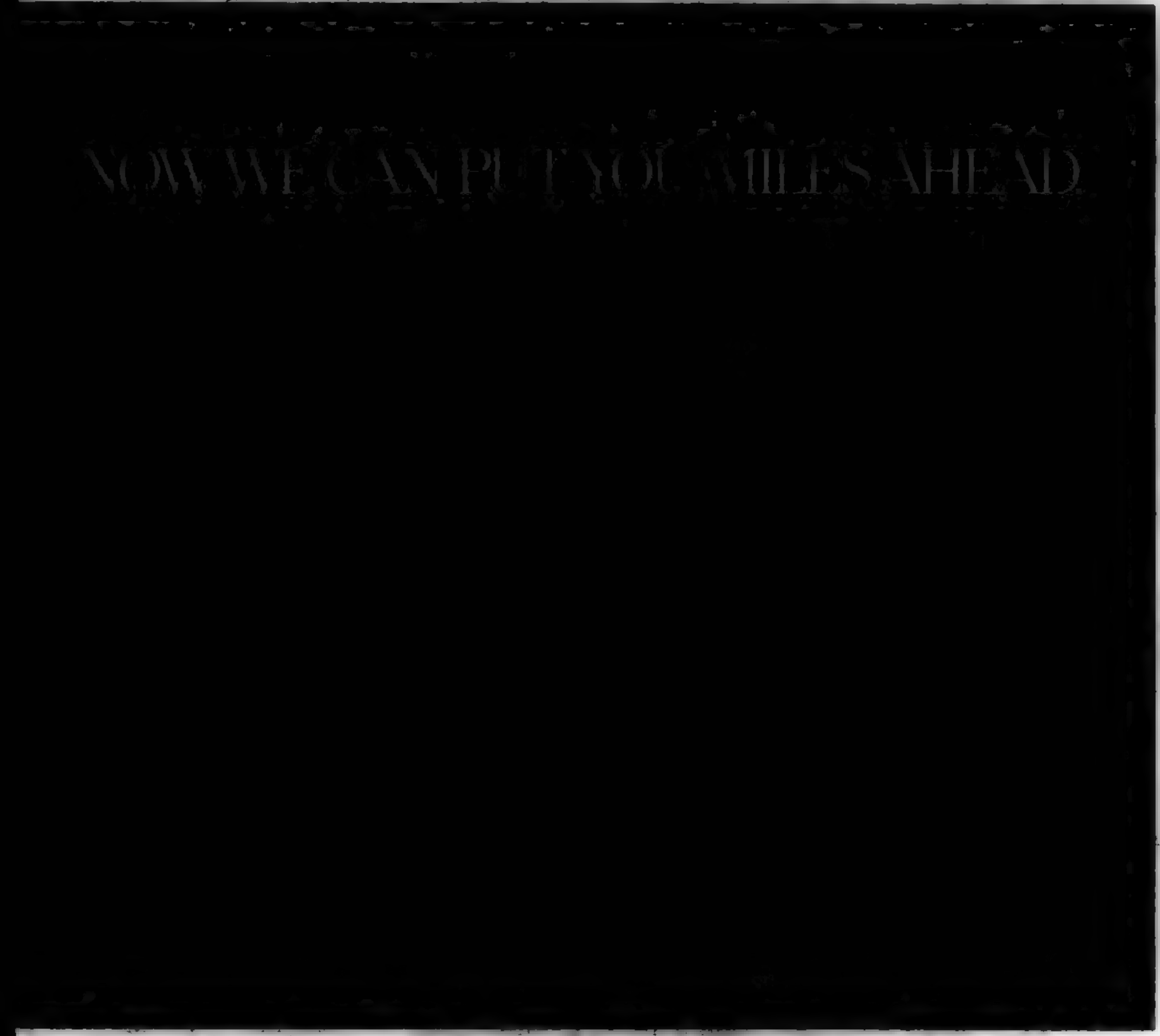
> *Lazard's needs emphasized the intangible benefits of electronic publishing more than the bottom line, based in part on studies that show how credibility is boosted by typesetting documents.*



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Both Lazard Freres and Caterpillar have discovered firsthand corporate electronic publishing's cost-saving benefits. One department alone at Lazard is saving $1,500 each month over the cost of using outside typesetters for reports to clients.

As for Caterpillar, the company found its corporate electronic publishing system reduced manpower requirements. Whereas 10 people used to perform paste-up functions, now the equivalent of one person — spread out among several third parties — handles the task. The company was able to reduce document inventory because of on-demand printing, Meixsell says, and information going out to dealers and customers stays more up to date.

Caterpillar's electronic publishing program is doing so well that it is growing. Meixsell's group already uses an Atex system for text and an Autotrol Technology Corp. CAD system for line art. The group shares the company's IBM 3084 mainframe to compile a data base of art and to scan and store art created elsewhere.

Almost completed is a workstation project whereby 16 writers in the nearby publications division will be receiving IBM Personal Computer AT systems. The machines, with Xyquest, Inc.'s Xywrite word processing software, will be linked via IBM's PC Network and will share a laser printer. The division will add gateways to the IBM mainframe and to the Atex document processing system.

Meixsell estimates the project will boost the writers' productivity by

[illegible]

Although corporate electronic publishing is catching on, the [illegible] [illegible] that users should eliminate all outside printing expenses. Nor does the size of the user firm alone indicate that in-house publishing is the best solution.

Outside costs, such as those for typesetting and photocomposition, currently account for about 15% of most firms' publishing budgets, notes Gregory [illegible], director of research and [illegible] for [illegible], Inc. And no hard-and-fast rules can determine when to bring production in-house.

The most important considerations are how many pages need to be produced and how fast a turnaround time is required. Other factors to consider include the sophistication of system requirements, the training costs of employees and the cost of hiring one or more craftsmen skilled in typography.

Given all these possibilities, it is quite feasible that a large company would opt to continue using outside services because the real cost of a system would be too high. But if heavy work flow remains relatively steady then an electronic publishing system may be more attractive.

Typesetting houses and other suppliers are becoming more flexi- [illegible] small corporate electronic publishing systems. [illegible] that a type house will [illegible] if its customers [illegible] be replaced by in-house electronic publishing.

Another money-saving idea for users who will put bring all their typesetting in-house is to create the [illegible] electronically in the [illegible] firm. If the copy [illegible] form the typesetter's [illegible] understand, the [illegible] drop the price of typesetting since the material need not be rekeyed.

In the event a user wants to investigate buying a corporate electronic publishing system, the first step is to perform an in-depth analysis of the way documents are currently being produced. This study can later become the basis of a cost-justification plan for upper management, explains Arlene Karsh, electronic publishing systems analyst and a director at the consulting firm C. A. Pesko Associates.

"Take stock of how many documents are produced and how many different document styles are used," Karsh advises. Each step in the production process must be listed and its cost determined, includ- [illegible]

Many of these costs are hidden, [illegible]. One example is the cost of [illegible]

After [illegible] has determined the [illegible] of its current publishing system, the next step is to create a [illegible] [illegible] When this step is completed, the projected costs of a corporate electronic publishing system can be compared with the real costs of the current method.

Finally, Karsh suggests [illegible] a publishing system [illegible], it is advisable to have the manufacturers work with the user's actual documents so that [illegible] benchmarks can be determined.

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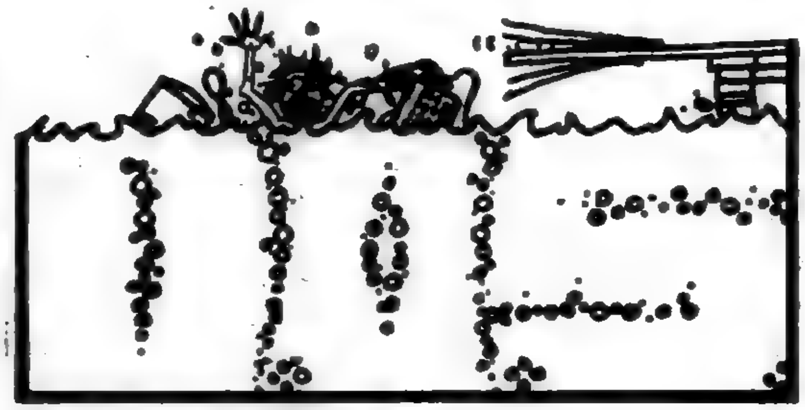

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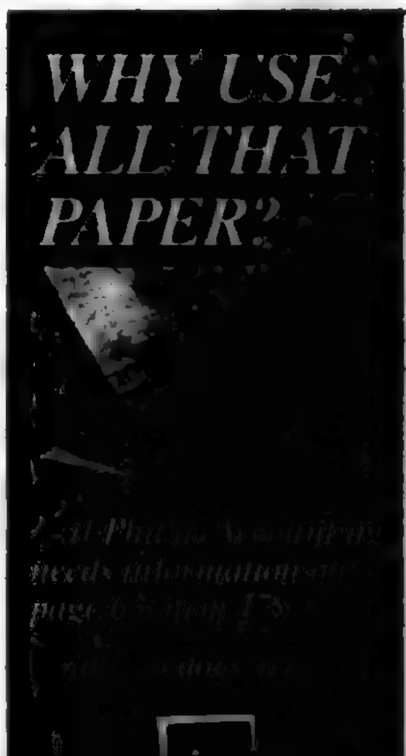

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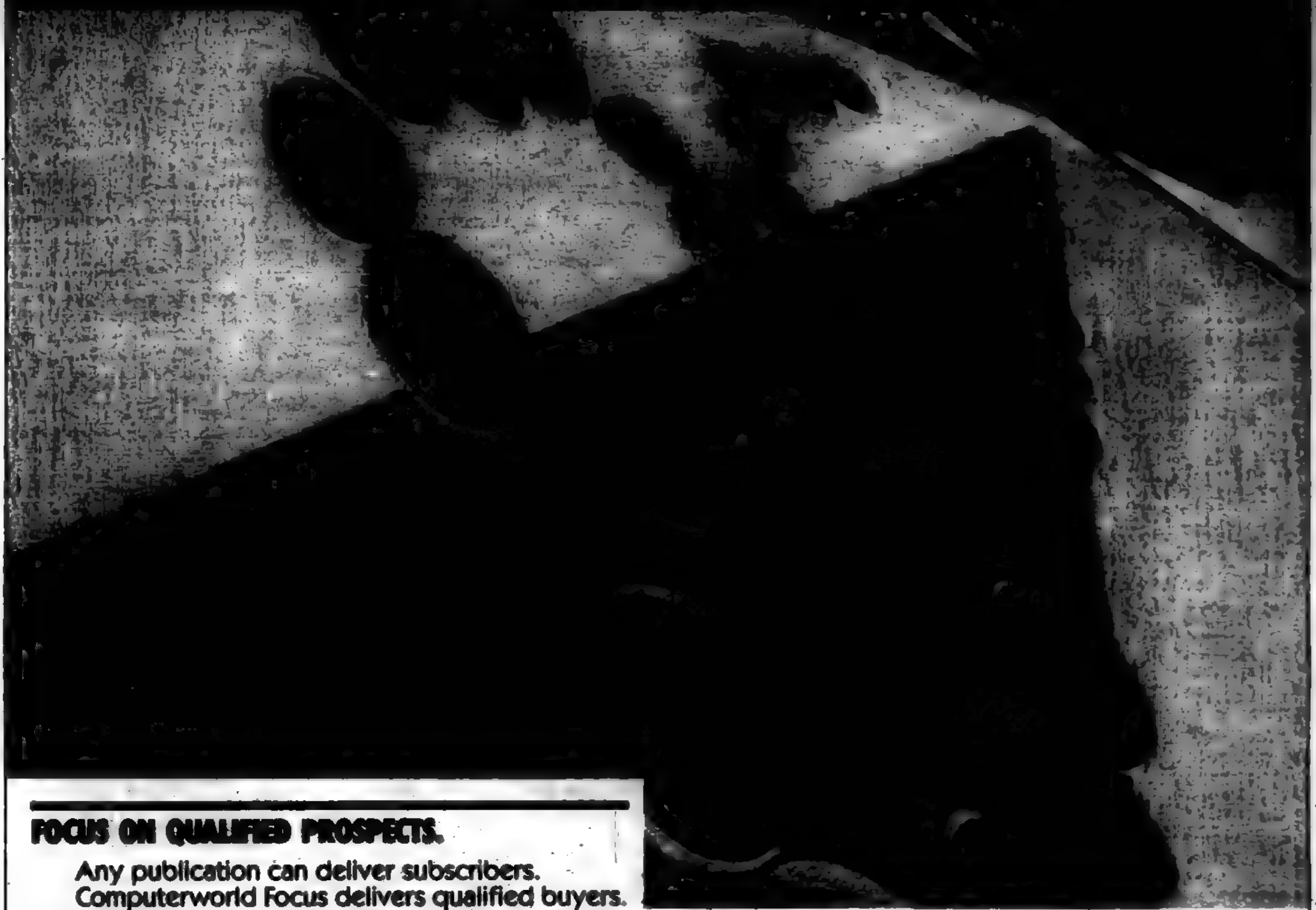

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But hurry, the closing for the January 15th Communications issue is December 6th.

Computerworld Focus Topic	Issue Date	Closing Date*	Show Distribution
Communications	January 15**	December 6	Comnet
Software	February 19	January 10	
Manufacturing	March 19	February 7	Advanced Manufacturing
Microcomputing	April 16	March 7	Comdex/Spring '86
Office Automation	May 14	April 4	NCGA, NCC
Software	July 9**	May 30	PC Expo, Software Expo
Unix™	August 20**	July 11	Unix™ Expo
Communications	September 17	August 8	TCA
Office Automation	October 8	August 29	Info '86
Microcomputing	November 12	October 3	Comdex/Fall '86

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We Put The Hottest Issues In The Day In Focus.

[illegible] New York Atlanta San Francisco Los Angeles [illegible]% to [illegible]%. About 10 stand-alone units are functioning already. Before the workstations were installed, employees would write out documents by hand on legal paper and give the pads to secretaries to type.

Limitations

Despite the advantages of corporate electronic publishing, users should be wary of some limitations. At Caterpillar, the publishing staff still must paste in drawings and photographs manually, leaving spaces for them on the electronically created layout. "We haven't found a cost-effective way of [entering them] with an automated method," Meixsell says.

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> *The corporate electronic publishing industry itself is fragmented, with many vendors trying to get dibs on an emerging market.*

Furthermore, most in-house publishing systems available today handle only black-and-white documents because of the dearth of color image-processing technology and because of the high costs of four-color printing. A basic color system can sell for upwards of $1.3 million, in contrast to the $50,000 cost of a black-and-white unit.

"Color is prohibitively expensive at the moment; you need incredibly high volume to justify it," Interconsult's Van Buren says.

And the corporate electronic publishing industry itself is fragmented, with many vendors trying to get dibs on an emerging market. Traditional electronic publishing vendors such as Atex have been joined by numerous startups. Relatively new companies such as Interleaf, Xyvision, Inc. and Texet Corp. have become very successful, one reason some observers feel corporate electronic publishing's time has come.

Joining the fray are the computer-systems vendors. In April, Xerox Corp. introduced its XPS 700 corporate electronic publishing system, a hardware/software system based on the Xerox 9700 laser printer.

Currently, Digital Equipment Corp. offers Decpage typographic composition software for its VAX family of computers. Apple Computer, Inc.'s Macintosh Office System offers a typographic option with its Laserwriter printer and accompanying software, also.

Analysts agree more systems vendors, including IBM, AT&T and Wang Laboratories, Inc., are expected to jump into the market, possibly within the next year or two.

Watch and wait?

A large user may be well advised to wait until the major manufacturers "bless" the market, simply because of the integration issues, Van Buren says. A major computer vendor, especially one with which users already do business, may be better equipped to link existing computers

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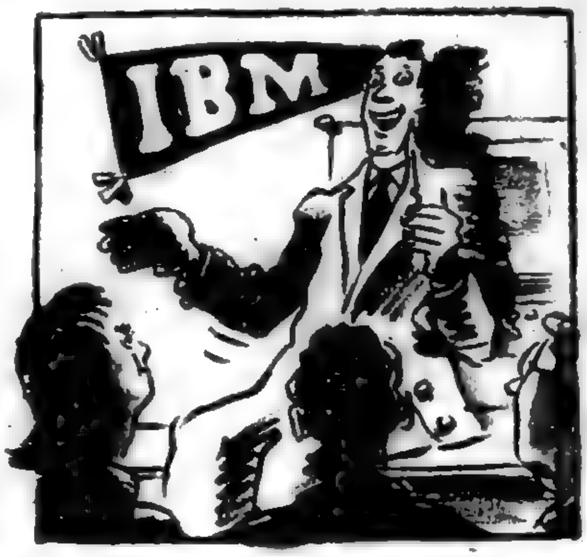

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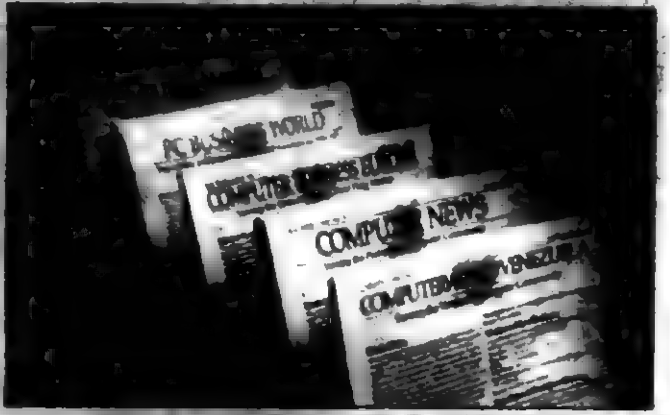

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> *'There's no need to spend $70,000 for a system right away. Buy some software packages first, for $3,000 or so, to find out what corporate electronic publishing can mean to your business.'*

to the corporate electronic publishing system.

However, some observers feel that the electronic publishing systems already on the market adequately handle the integration problems.

"Most can accept ASCII code files from computers and can output to typesetters and laser printers," Ramos says. On the other hand, some users feel that companies that have been in the business for a while know it better than ones who enter later on.

There is another reason large users might be wary of purchasing certain publishing systems right now: Analysts expect a major shakeout in the corporate electronic publishing industry by late 1986 or early 1987. "I don't see a way for everyone to win," Van Buren says.

Despite the risks, if a user firm needs a corporate electronic publishing system relatively quickly, it can reap substantial benefits in a short time by attending to certain guidelines:

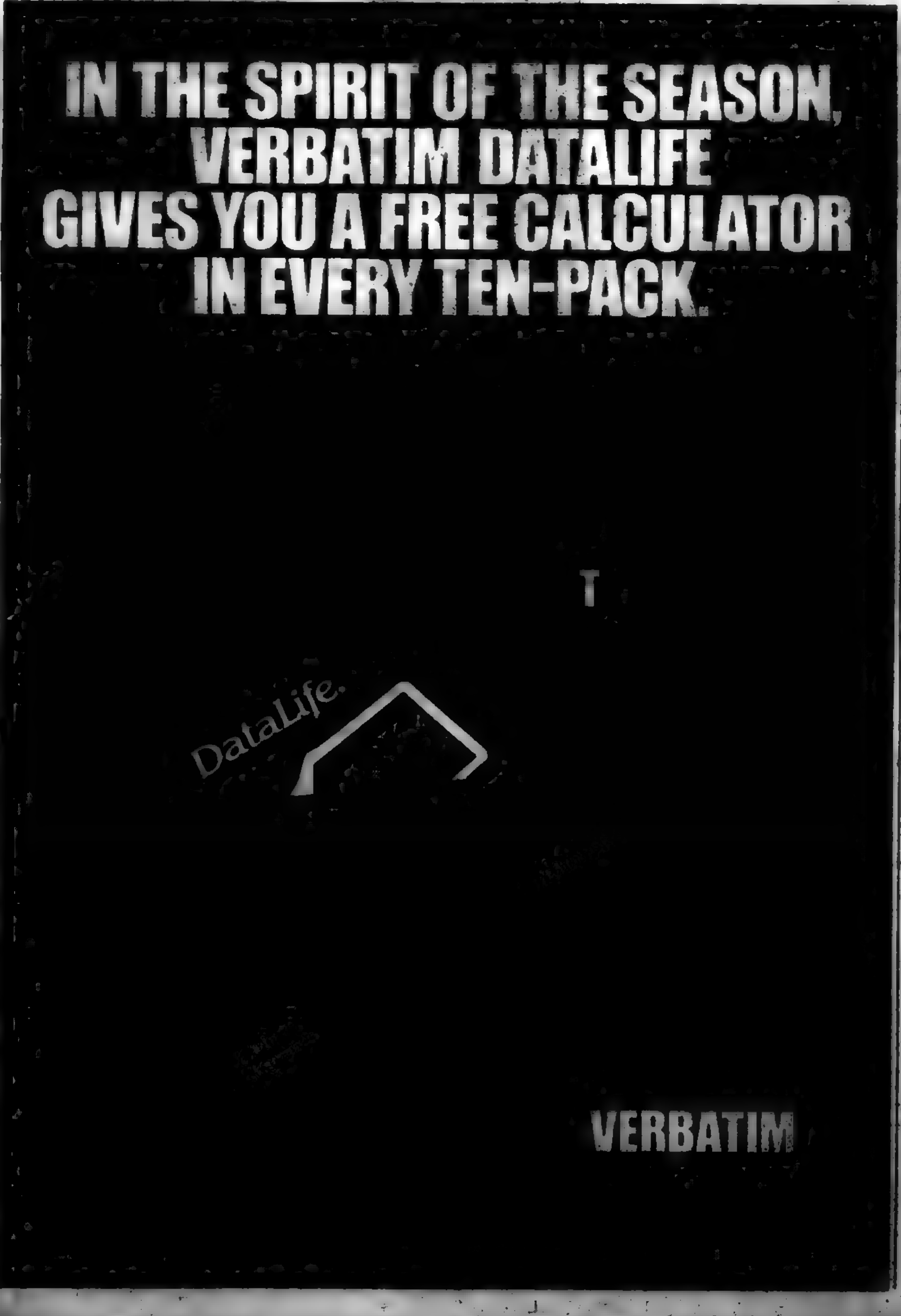
- Know thy vendor. Understand a vendor's track record in terms of how the company will withstand a shakeout.
- Plan for a payback period of three years, to avoid possible problems over the long term.
- Start small. As Ramos says, "There's no need to spend $70,000 for a system right away. Buy some software packages first, for $3,000 or so, to find out what corporate electronic publishing can mean to your business."

Technical advances

As users decide whether in-house electronic publishing is worth their time, money and effort, the technology itself will undergo some changes. Anticipated developments include electronic publishing systems based on personal computers instead of higher cost workstations.

The major stumbling blocks until now have been personal computers' smaller memory, lack of power and slower response time. But, Van Buren points out, manufacturers can get around most of these obstacles with Intel Corp.'s new 80386 chip, which he calls the real news in the electronic publishing industry. "[The chip is] a tool that can address 99% of the corporate publishing applications," he declares.

Other related technologies that will continue to improve include scanners that do not degrade an entire system's performance and better methods of storing and compressing graphics. And, naturally, some overall computer industry predictions hold true for corporate electronic publishing as well: more power, lower prices and better performance. ■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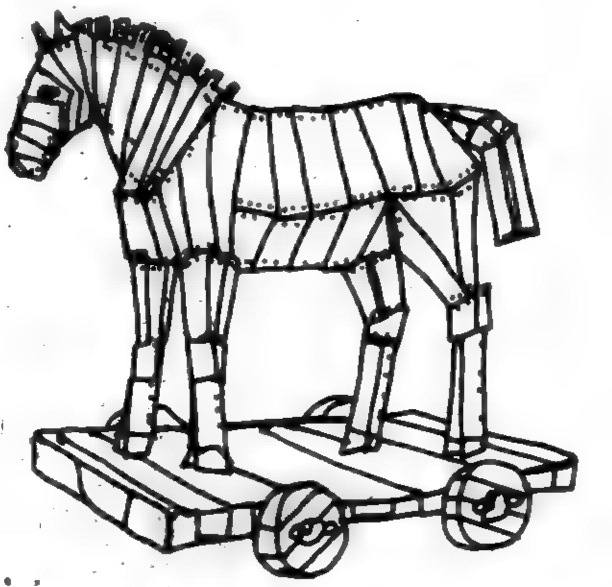


Trojan horse rolls up to DP gate

Design flaws leave many multiuser systems vulnerable to hidden attack by programs that make clandestine copies, corrupt stored text or scan input for critical documents to destroy. Standard access control precautions fail to detect these intruders.

By Earl Boebert, Richard Kain and Bill Young

Most computer systems are secure only in the sense that they have not yet been compromised or in that the methods by which they can be compromised are known to only a small, select group of individuals.

There are, broadly speaking, three classes of risks to information in a computer system: There may be accidental flaws an exploiter can attack; flaws may have been deliberately introduced; or the design may be fundamentally flawed.

We can make an analogy with aircraft safety: An aircraft can be unsafe because of faulty workmanship or maintenance; it may have been sabotaged; or its design could be inherently unsafe — for instance, its center of gravity might be improperly placed.

In both airplanes and computers, the first two classes of flaws are rich in detail and relatively barren of principle; they can be counteracted by diligently applying various quality-assurance techniques. But no degree of diligence in workmanship and inspection can overcome an inherent flaw in design.

Inherent flaws in aircraft design tend to fall into general categories, such as structural weakness or aerodynamic instability. In the case of computer systems, the richest category of design flaws leaves the system open to what are called Trojan horse attacks.

An illusion

To understand the workings of a Trojan horse attack, it is first necessary to note that all knowledge one gains about a computer system is gained indirectly; there is no directly observable physical reality whatsoever. The relation between man and machine has been characterized as a "computer-enhanced hallucination" because responses in human minds are triggered by events inside the machine that are not themselves directly observable.

Consider the difference between a mechanical typewriter and a computerized word processor, two machines that accept keystrokes and convert them into visible text.

In the typewriter, a direct and observable mechanical connection exists between

---

Earl Boebert is Senior Fellow at the Honeywell Secure Computing Technology Center (SCTC), Minneapolis. Richard Kain is a professor of electrical engineering at the University of Minnesota and serves as a consultant to SCTC. Bill Young is a SCTC researcher and a doctoral candidate in computer science at the University of Texas in Austin.

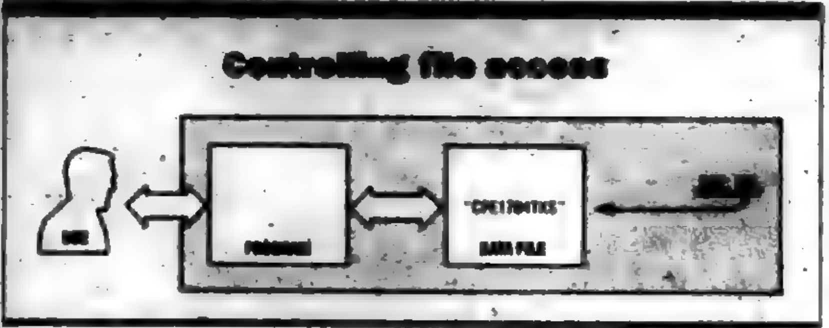


Figure 1. The access control list is the means by which most computer systems attempt to protect sensitive data. Associated with each data file is an access control list that pairs a user or group of users with allowed modes of access. In this case, user Doe, attempting to protect the critically sensitive character string "CPE1704TKS," has set the list for the file to allow read/write access to programs accessing on his behalf and no access to programs acting on the behalf of other users.

a given keystroke and the appearance of the corresponding letter. In the word processor, no such observable link exists. An intermediary, or agent, in the form of a computer program performs the transformation; the actions of this agent cannot be directly observed by the user of the machine. Indeed, the agent's reliability is established only by experience; every key pressed so far has displayed the corresponding letter.

Experience may convince the user that the machine is correctly performing its intended function. There is, however, no assurance whatever that the program inside the word processor is not performing extra tasks hostile to the interests of the user: making clandestine copies, corrupting stored text or scanning input for indications that a critical document is being prepared and then destroying the document when it is completed. This is the first element of a Trojan horse attack: agents in the form of computer programs, the actions of which are visible indirectly, if at all.

The second element is a computer organization in which several such agents operate on data simultaneously. This organization — variously called resource sharing, time sharing or the multiuser approach — was originally used for only the largest hardware sets. The rapid decline in hardware costs has allowed it to be applied to computer hardware costing as little as $5,000.

Spreading the benefits of multiuser computing (such as lower computational cost, flexible access and the ease with which data can be shared) has also meant expanding the domain in which Trojan horse attacks are possible and increasing the threat they pose.

Access control

The designers of even the earliest multiuser systems recognized the need to control the sharing of data, if only to limit the damage faulty programs could cause. The standard mechanism for such control has been the access control list.

There are two parts to this mechanism. First, users are required to identify themselves by name (and, generally, by secret password) before they can invoke a program; the system therefore knows at all times on whose behalf a program is executing. Second, every unit of data, such as a file, has an associated list of paired attributes of the form name access. A set of such pairs forms the access control list for the unit of data.

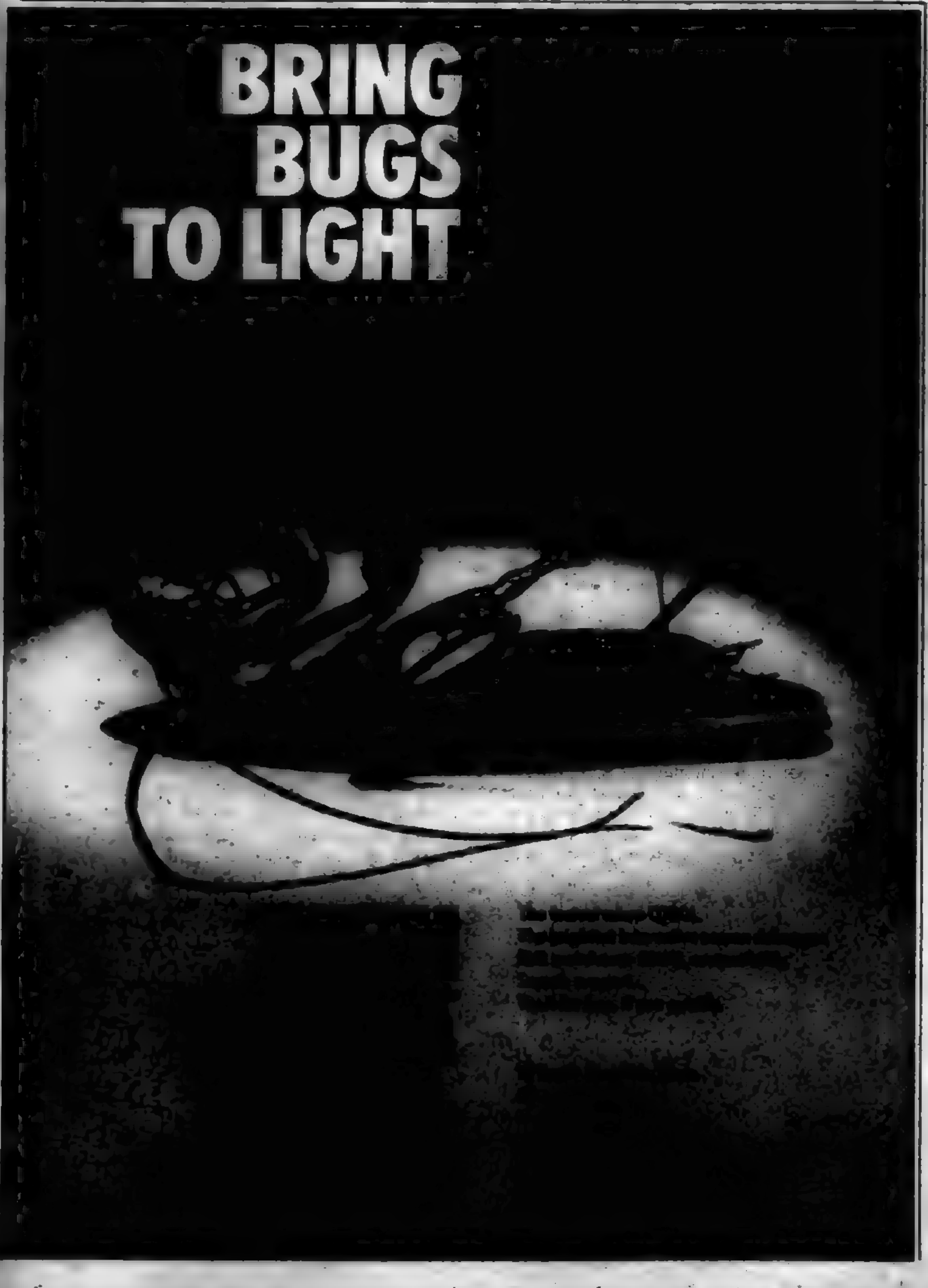
The name portion of an access control list entry is the name of a user, and the access portion defines the modes of data access that programs executing on behalf of that user are permitted to use.

For the sake of illustration, we shall assume that the possible data access modes are **read**, which means that a program can examine data in the file; **write**, which means that a program can alter data; **read/write**, which means that it can do both; and **null**, which means that it can do neither.

Before permitting a program to access data, the system searches the access control list associated with that data for an entry containing the name of the user on whose behalf the program is running. If such an entry is found, the system allows only those modes of access granted by the access portion of the access control list entry. If no such entry is found, all access is denied.

This arrangement appears intuitively secure to many observers. Unfortunately, the computer security field is rich in results that are counterintuitive and dismaying to system designers. In this case, a description of the workings of a Trojan horse attack shows that the access control list mechanism is fundamentally and fatally flawed.

Consider the situation shown in Figure 1. Doe, a user, interacts, through a program, with a data file containing the critically sensitive character string "CPE1704TKS." Doe has diligently applied the access control list mechanism to ensure that only programs executing on his own behalf can gain access to the sensitive file.



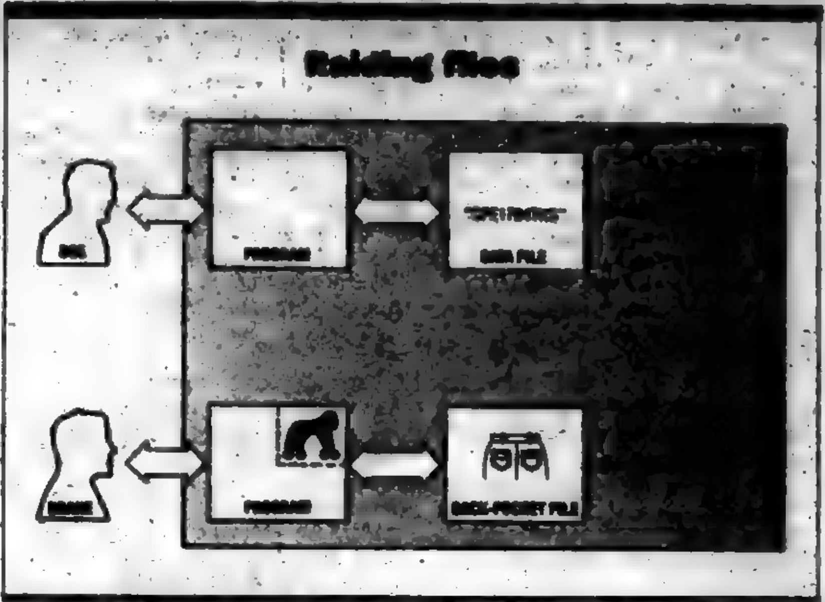


Figure 2. A hostile user, Drake, prepares a raid on Doe's data by installing a Trojan horse program and a private file. The program has two functions. One is innocent and visible to the user who invokes the program; the other is hostile and invisible. The private file serves as the "back pocket" during the attack. Drake sets the access list on this file to allow programs executing on his behalf read/write access and programs executing on Doe's behalf write access only.

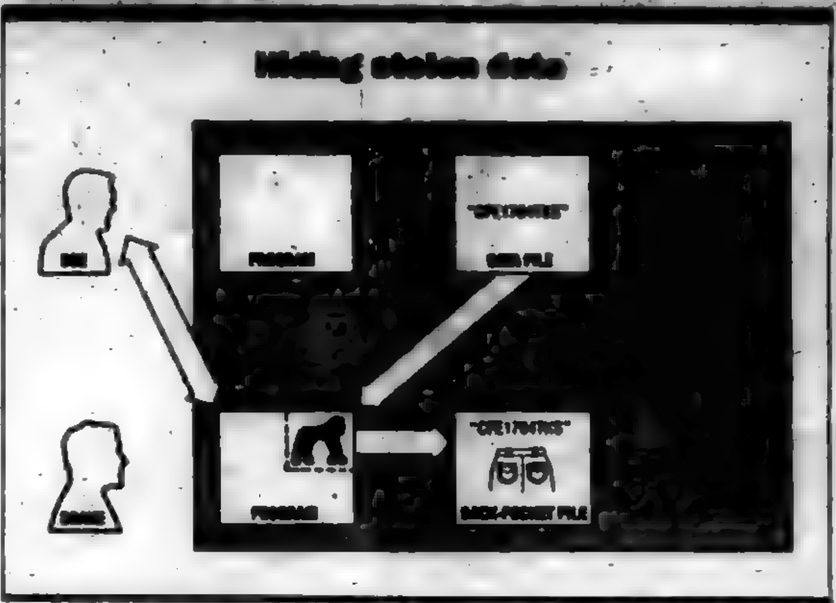


Figure 3. The Trojan horse program is designed to detect when it is being executed by user Doe. When Doe unwittingly invokes the program, it acquires read/write access to his file and write access to Drake's back-pocket file. The Trojan horse code within the program surreptitiously reads Doe's files and writes their contents to Drake's back-pocket file. Drake then has only to read his file later to learn the value of the critically sensitive character string.

The Trojan horse attack begins when a hostile user, whom we shall call Drake, gains legitimate access to the system and installs both a Trojan Horse program and a private file to be used in the attack as a "back pocket" where data is stored in secret.

Drake sets the access control list of this private file to allow full access to programs executing on his behalf and to allow programs executing on Doe's behalf to write into the file. Drake is careful not to notify Doe of this fact. This situation is shown in Figure 2.

Drake now induces Doe to invoke the Trojan horse. The inducement can take any one of a number of forms. Drake might, for example, implant the Trojan horse code in a useful utility program or an entertaining game. When the Trojan horse detects that the program in which it is embedded is being executed on Doe's behalf, it copies the critically sensitive character string from Doe's file to Drake's.

This copying, depicted in Figure 3, takes place completely within the constraints imposed by the access control list mechanism; that is, it happens even if the mechanism is flawlessly implemented and correctly used. Drake then has only to access his file at some later time to learn the value of the character string.

This example should make clear the principle and effectiveness of Trojan horse attacks: The attacks represent the improper use of properly granted rights by a subverted agent whose actions cannot be directly observed.

A particularly dangerous form of Trojan horse is the so-called virus program, which embeds a copy of itself in other programs, thereby propagating throughout a system and even over a computer network. A virus has to be invoked only once to infect the other programs commonly invoked by the target user. Thus, one invocation allows the virus to obtain frequent invocation and opportunity to create havoc.

Attack prevention

Work began in the late 1960s to develop system principles that

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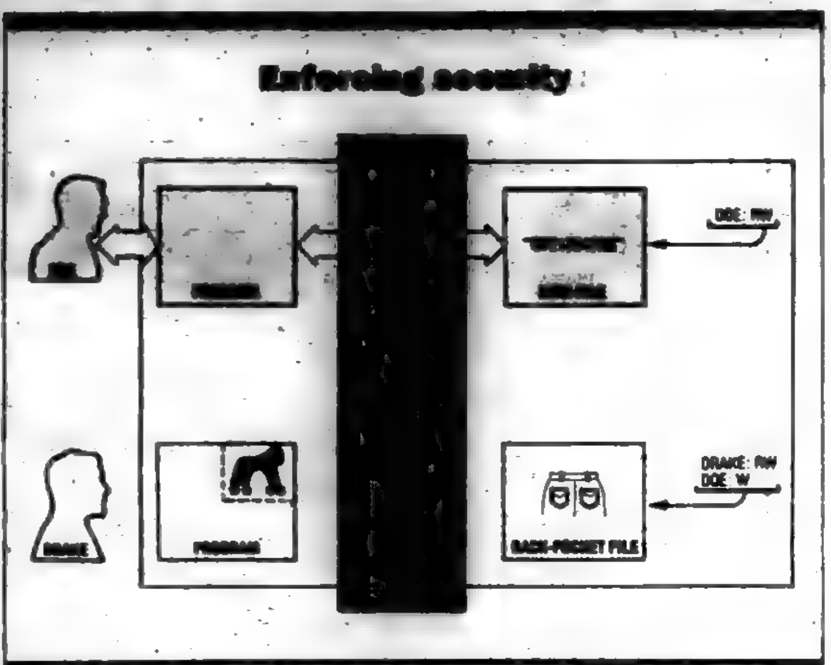


Figure 4. A secure computer includes a subsystem called a reference monitor, the function of which is to check the legitimacy of every attempt to access data. The monitor makes decisions based on security levels, of which there are two: sensitive (gray) and public (white). These levels are assigned to every subject, such as an executing program, and every object, such as a file. A program cannot read a file at a higher security level (the Simple Security Property), nor can it write to a file at a lower security level (the *-Property). Here, Doe's executing program is allowed access to the file containing the important character string because the program and the file have the same security level.

would prevent Trojan horse attacks. This work — which was performed largely at System Development Corp., Case Western Reserve University, Mitre Corp. and the U.S. Air Force Electronic Systems Division — resulted in the concept of a reference monitor, the definition of a mandatory security policy and the formulation of the Bell and La Padula Model of Security. We shall describe each of these in turn and then return to our example to show how they frustrate Trojan horse attacks.

The reference monitor of security, kernel as it is sometimes called, is a subsystem that checks the legitimacy of a program's attempt to access data.

A reference monitor is defined to have the following attributes:

- It must be tamperproof.
- It must be constructed so that it cannot be bypassed.
- It must be small enough and simple enough that it can be thoroughly tested.

More recently, it has become practical to make the third requirement stronger; the requirement is now that there be an a priori proof that the reference monitor works properly. Both versions of the requirement recognize that security is critical. The fact that a system has not exhibited vulnerability so far cannot be considered sufficient evidence that it is secure.

The next element, **the mandatory security policy**, is a statement of the restrictions on information transfer that a reference monitor is to enforce. The term "mandatory" emphasizes that the policy is one that cannot be selectively invoked.

The mandatory security policy characterizes access restrictions in terms of the subjects' actions. A subject is an active agent, such as a running program, that operates on behalf of a user. Each subject is assigned an immutable security level.

The security level takes the form of a value belonging to a partially ordered set of values. A value in a partially ordered set may be greater than, less than, equal to or noncomparable to any other value in the set. In a fully ordered set, the values must be comparable. The security level of a subject reflects the degree of trust placed in the user on whose behalf the subject operates.

The general statement of the mandatory security policy is that a subject at a high level may not convey information to a subject at a lower or noncomparable level unless that flow accurately reflects the will of an authorized user. (Here and elsewhere, "authorized" means authorized to cause such downward flows.)

The movement of information from a higher to a lower security level is called downgrading. Movement to the lowest level, where open access is permitted, is called declassification.

The final element, **the model devised by D. Elliot Bell and Leonard J. La Padula** of Mitre Corp., translates the intent of the mandatory security policy into rules that a reference monitor must follow. To state such rules, two additional concepts are necessary: objects and accesses.

Objects are passive, information-holding entities such as files. Every object must be assigned a security level — one of the same set of values that may be assigned to subjects. Accesses are operations such as those found in access control lists: read, write and so on.

The Bell and La Padula model describes the mandatory security policy in terms of operations, such as decisions to grant or deny access, rather than in abstractions, such as information flow. In the simplified form we shall use for exposition, the model states that a reference monitor is secure in the sense described in the discussion of mandatory policy only if it exhibits two properties. These properties are called the Simple Security Property and the *-Property (pronounced "star property").

The "*" in *-Property does not stand for anything. No one could think of an appropriate name for the property during the writing of the first report on the model. The asterisk was a dummy character entered in the draft so that a text editor

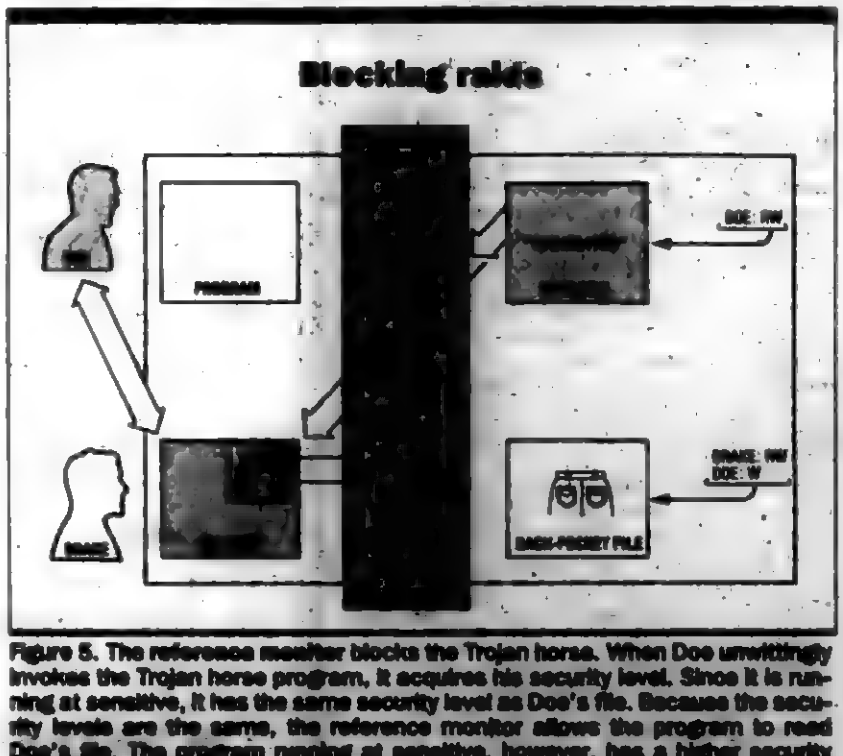
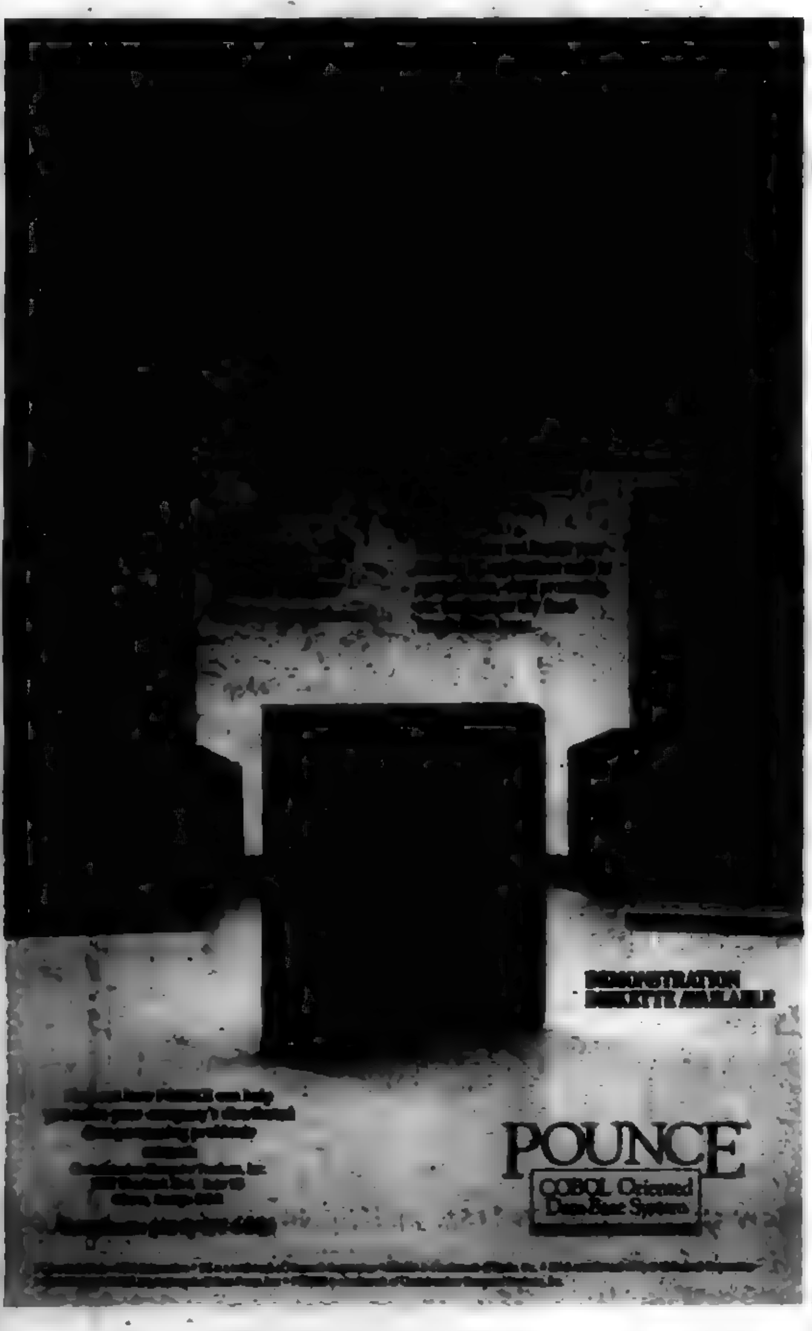


Figure 5. The reference monitor blocks the Trojan horse. When Doe unwittingly invokes the Trojan horse program, it acquires his security level. Since it is running at sensitive, it has the same security level as Doe's file. Because the security levels are the same, the reference monitor allows the program to read Doe's file. The program running at sensitive, however, has a higher security level than the back-pocket file. Because writing from higher to lower level would violate the *-Property, the monitor blocks this action. Note that the monitor blocks actions the access control list would permit; the monitor blocks the write even though the list for the back-pocket file allows it.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could rapidly find and replace all instances of its use once the property was named. No name was ever devised, and so the report was published with the "*" intact.

The Simple Security Property states that a referenced monitor shall grant a subject read access to an object only when the security level of the subject is greater than or equal to (dominates) the security level of the object. The *-Property states that write accesses shall be granted only when the security level of the object being written to is greater than or equal to the security level of the subject doing the writing.

Together, the two properties restrict the access of subjects to objects to reading down or writing up. Since the only way to obtain the information stored in a computer system is to access an intermediary object, the combined effect of the two properties is to ensure that information can only flow up.

We shall now return to our example, interpose a reference monitor, assign security levels to subjects and objects and show how the system organization that results is secure against Trojan horse attacks.

Security levels are typically assigned to subjects at logon on the basis of criteria such as the terminal from which the machine is being accessed and the user associated with the subject. The user's identity is generally confirmed by knowledge of a secret password. The mechanisms described here do not guard against lost or stolen passwords, just as no lock guards against a purloined key.

The system organization is illustrated in Figure 4. There are two security levels, sensitive and public, ordered so that sensitive is greater than public. Subjects executing on Doe's behalf and the file containing the important character string are assigned the sensitive security level. Drake's file and subjects executing on Drake's behalf are restricted to the public security level.

The illustration in Figure 5 shows what happens when Doe unwittingly invokes the Trojan horse program. As before, the program acquires the privileges associated with Doe and runs at sensitive security level. It is therefore able, under the Simple Security Property, to observe the character string "CPE1704TKS."

When the program tries to store the string in a public file, however, the *-Property is violated, and the attempt is disallowed by the reference monitor. Thus, one link of the Trojan Horse copy-and-observe-later chain is broken. One can easily verify that the rules frustrate the other two possibilities: Drake logging on and trying to read the string directly and his assigning a security level of sensitive to the back-pocket file.

Note that the illustrated system, like most real systems, retains the access control list mechanism. The enforcement of the mandatory security policy as interpreted by the Bell and La Padula model takes precedence over the access list mechanism. For example, the attempt to copy into the back-pocket file is denied, even though the list permits it. The access control list mechanism, which is also called the discretionary access policy, is kept primarily as an administrative convenience; it allows a user to restrict object access to a subgroup of the subjects that would be granted access under the mandatory security policy alone. ■

> ”
>
> *A subject at a high level may not convey information to a subject at a lower level unless that flow reflects the will of an authorized user.*

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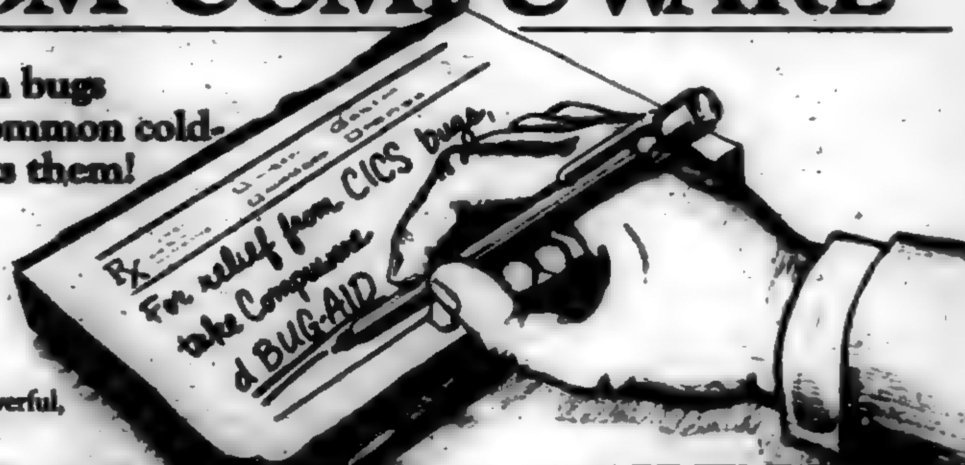
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Issue Date: December 30/January 6

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NEW PRODUCTS

INSIDE

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Telex offers intelligent workstations

Telex Computer Products, Inc. of Tulsa, Okla., has unwrapped two intelligent workstations aimed at the IBM 3270 mart.

The 1260 and 1280 models in the company's Intelligent System series, running under Microsoft Corp.'s MS-DOS operating system, are said to feature IBM Personal Computer XT and AT compatibility, respectively.

The Telex 1260 incorporates an Intel Corp. 80186 microprocessor with an 8-MHz clock rate. It comes with 256K bytes of memory, expandable to 640K bytes. The 1260 includes a diskette controller that can support up to two 360K-byte floppy disk drives. An optional fixed-disk controller that costs $250 supports up to two fixed-disk drives of either 10M, 20M or 40M bytes.

The 1260 model costs $3,830 in a typical configuration that includes a 12-in. monochrome monitor, two 360K-byte diskette drives and keyboard. The basic unit with 256K bytes of memory costs $2,485.

The 1280 includes an Intel 80286 microprocessor with 512K bytes of main memory, expandable to 2.1M bytes on the system memory board. An optional memory expansion board brings total available memory up to 4.6M bytes. The unit can be configured with up to four internal storage devices. The diskette fixed-disk controller supports two diskette drives and up to two fixed disk drives in 10M, 20M or 40M bytes.

The 1280 model costs $5,855 in a typical configuration that includes a monitor, a 1.2M-byte diskette drive, a 20M-byte fixed disk and keyboard. The base unit with 512K bytes of memory costs $2,990.

Both units come standard with single serial port and parallel ports. The 1260 has six 8-bit expansion slots available. The 1280 has six available expansion slots accommodating up to four 16-bit and two 8-bit adapter boards. A socket for an Intel 8087 numeric coprocessor is available on the 1260 (the coprocessor costs an additional $300), and a socket for the Intel 80287 numeric coprocessor is available on the 1280 (the coprocessor costs $375).

Tominy introduces Mach 1

Applications generation system automates design

Tominy, Inc. of Cincinnati has introduced Mach 1, an applications generation system said to automate the development process and reduce maintenance needs.

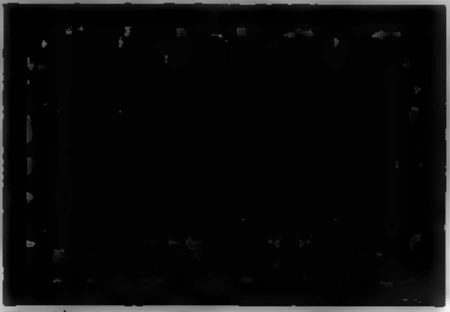
Mach 1 allows data base design to be developed through a logical data base structure and data directories that establish standardized edit criteria for the data fields. Mach 1 reportedly allows both designers and end users to design screens and menus in minutes. The screen fields are then mapped to the data directory, the vendor said.

Mach 1 offers a report handler featuring forms control, page handling and report headings all external to program logic. There is a Query/Report Generator that can be used to generate a report in 10 to 30 lines of English code. Mach 1 also offers interactive testing, allowing the developer to change variables and inputs to the procedural logic code without compiling. The logical module is compiled after testing.

Other features of Mach 1 include a data maintenance program generator, a fourth-generation procedural logic language, Help facilities, program security, job stream and menu access.

According to the vendor, Mach 1 is portable over 20 different environments from mainframes to micros. Code does not need to be recompiled, and the job stream does not need to be changed.

Prices range from $2,500 for a single-station microcomputer to $28,000 for a minicomputer such as the Digital Equipment Corp. VAX to $72,000 for an IBM mainframe. The mainframe must have IBM's CICS. There is a standard $2,000 installation and training fee, the vendor said.



The Mach 1 is said to automate development and reduce maintenance needs.

Usernet enhancements debut

Sperry Corp. of Blue Bell, Pa., has enhanced its Usernet system local-area network for personal computers.

Enhancements include two expanded models of data/print servers: the DS 200, suited for configurations requiring up to 20M bytes of disk storage, and the DS 220, intended for networks requiring up to 180M bytes of disk storage per server.

The Usernet Software/86 Network Operating System running under the control of Microsoft Corp. MS-DOS is required for each server attached to the network. Sperry's 3270 Systems Network Architecture (SNA) Protocol Communications Server software enables users connected via Usernet to operate under IBM's SNA.

The Archival Tape Subsystem is a free-standing cartridge tape unit that can store up to 64M bytes of information. The Usernet Desk Station Package is a stand-alone office automation application including writer/speller, calculator and filer.

The system uses a Sperry PC, Sperry PC/HT, Sperry PC/IT or IBM-compatible personal computer as a data/print server for monitoring the network's workstations and acting as the central storage device of both data and applications programs.

The Usernet Software/86 package includes network operating software, a feature board and documentation and is priced at $1,595. The DS 200 and DS 220 data/print servers include the Usernet Software/86 package and are priced at $6,727 and $9,722, respectively.

The Usernet 3270 SNA Communications Server software is priced from $1,995 to $3,995, and the Usernet Station Package is priced from $1,500 to $6,000, depending on the number of users. The Archival Tape Subsystem is priced at $4,445.

IBM system analysis tool out

IBM has announced CICS/OS/VS Performance Analysis Reporting System/MVS (CICSPARS/MVS), designed to provide systems programmers, systems analysts and CICS/OS/VS operators with information to manage the performance and accountability of CICS/OS/VS Version 1 Release 7 systems.

CICSPARS/MVS is said to provide on-line display capabilities, system-alert monitoring functions, problem determination aids and extensive batch reporting. It also incorporates functions previously provided by the CICSPARS, Performance Analyzer II and Generalized Performance Analysis Reporting for OS programs.

Other features include optional graphics displays, effective use of IBM 3270 display capabilities, comprehensive Help facility and extended addressing support.

The minimum configuration for CICSPARS/MVS is an IBM 370 supporting MVS/370 or MVS/XA with CICS/OS/VS Version 1 Release 7, a nine-track tape drive, DASD tape storage, one 3270-type terminal or a 3279 terminal supporting graphics for the optional color graphics. Prerequisites are IBM CICS/OS/VS Version 1 Release 7, IBM DFSORT or its equivalent, IBM GDDM if on-line graphics displays are desired and IBM SMP/E or SMP Release 4.

CICSPARS/MVS is available for a monthly charge. The basic license is $900 a month. A distributing site license option costs $675 per month.

Compuscan announces two desktop OCR scanners for data transfer

Compuscan, Inc. of Fairfield, N.J., has introduced two optical character recognition (OCR) desktop scanners that reportedly transfer data into the IBM Personal Computer.

The Compuscan PCS 230 enters text into the micro while the PCS 240 adds image scanning to OCR to transmit both text and graphics.

Both models reportedly perform OCR operations at 30 seconds per page. Included software allows full formatting for most leading IBM PC-DOS-based word processing programs. Several different type styles and fonts are supported.

The PCS 240 reads and transmits text at 12 seconds per page, with software-selectable resolution of 200, 150 or 100 dot/in.

The PCS 230 and 240 each require a minimum of 512K bytes of internal memory and a parallel interface port. They are compatible with mouse support and several different graphics boards for the PCS 240. Cost of the scanners is $5,695 for the PCS 230 and $5,995 for the PCS 240.

Information appearing in the New Products section has been provided by manufacturers and has not been independently validated by Computerworld.

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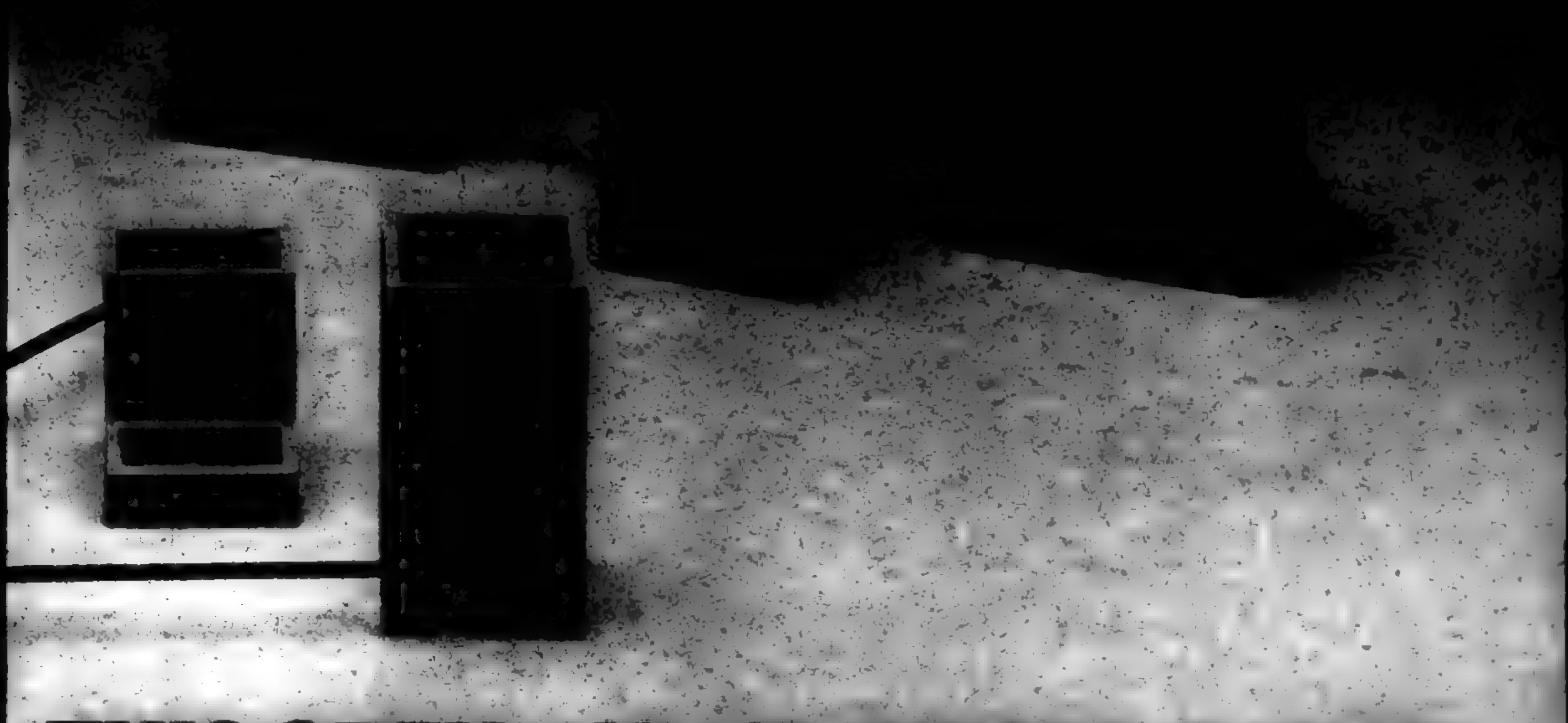

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NEW PRODUCTS/SOFTWARE & SERVICES

Systems software

J. Calder & Associates, Ltd. has introduced **Cumics,** a custom manufacturing inventory control system for the IBM System/34 and 36.

Cumics controls all stock types from marketing to scheduling, engineering, purchasing, receiving, production and shipping.

The system can manage part variation throughout these stages, thereby eliminating the need to fill out special forms for each part that varies from the standard list.

The basic Cumics system consists of 144 programs and generates more than 80 reports.

The system is priced at $40,000.

J. Calder & Associates, Suite 212, 9595 120th St., Delta, B.C., Canada V4C 6S1.

Gejac, Inc. has released **Version 3** of its **SRF Software Performance Monitor** for Digital Equipment Corp. VAX and PDP-11 computers.

Version 3 was designed for the RSX-11M or RSX-11M+ operating systems. New features include the ability to display real-time bar graphs that show the amount of activity on the system, to monitor and report on secondary pool usage statistics, to generate noninteractive reports, to monitor up to 300 tasks and to overlay data collection tasks.

SRF Version 3 may be licensed for $3,995 on RSX-11M and $4,495 on RSX-11M+.

Gejac, P.O. Box 188, Riverdale, Md. 20737.

Productivity aids

DGC, Inc. has announced **Produce/38,** a software tool for the IBM System/38.

Produce/38 contains 18 functions, 15 new System/38 commands and three System/38 subprograms.

The commands include enhanced capabilities for modifying job descriptions, physical and logical files and system values. The three subprograms can be called from any System/38 high-level language. There are two date subprograms and Mony, which can return a character string representation for a specified numeric value.

Produce/38 costs $295.

DGC, 1450 Preston Forest Sq., Dallas, Texas 75230.

Application packages

New Generation Software, Inc. is offering **Fixed Asset System,** a financial applications package for the IBM System/38.

The software provides asset information for one or more companies and divisions. Its functions include corporate, state and federal accountability; location control; transfer, sale and abandonment records; maintenance tracking; depreciation forecasting; monthly and annual reporting; investment tax credit reporting; and audit trails.

Fixed Asset System costs $12,500.

New Generation Software, 3840 Rosin Court, Sacramento, Calif. 95834.

■

SAS/AF, SAS/FSP, SAS/OR, SAS/ETS and SAS/IML — five SAS system software modules — were ported to Digital Equipment Corp. VAX 8600 and PDP-11/700 computers in **Version 5** from **SAS Institute, Inc.**

SAS/AF is an applications development facility. SAS/OR is the SAS project optimization module. SAS/ETS offers procedures for planning, forecasting, financial modeling plus row-and-column reporting. SAS/IML operates on value matrices and can transcribe formulas from matrix algebra notation into SAS/IML statements.

First-year corporate licenses cost from $1,500 to $8,000 for base SAS software; $1,500 to $6,000 for SAS/Graph; $1,500 to $4,000 for SAS/AF, SAS/FSP, SAS/OR and SAS/ETS; and $750 to $2,000 for SAS/IML.

SAS Institute, Box 8000, SAS Circle, Cary, N.C. 27511.

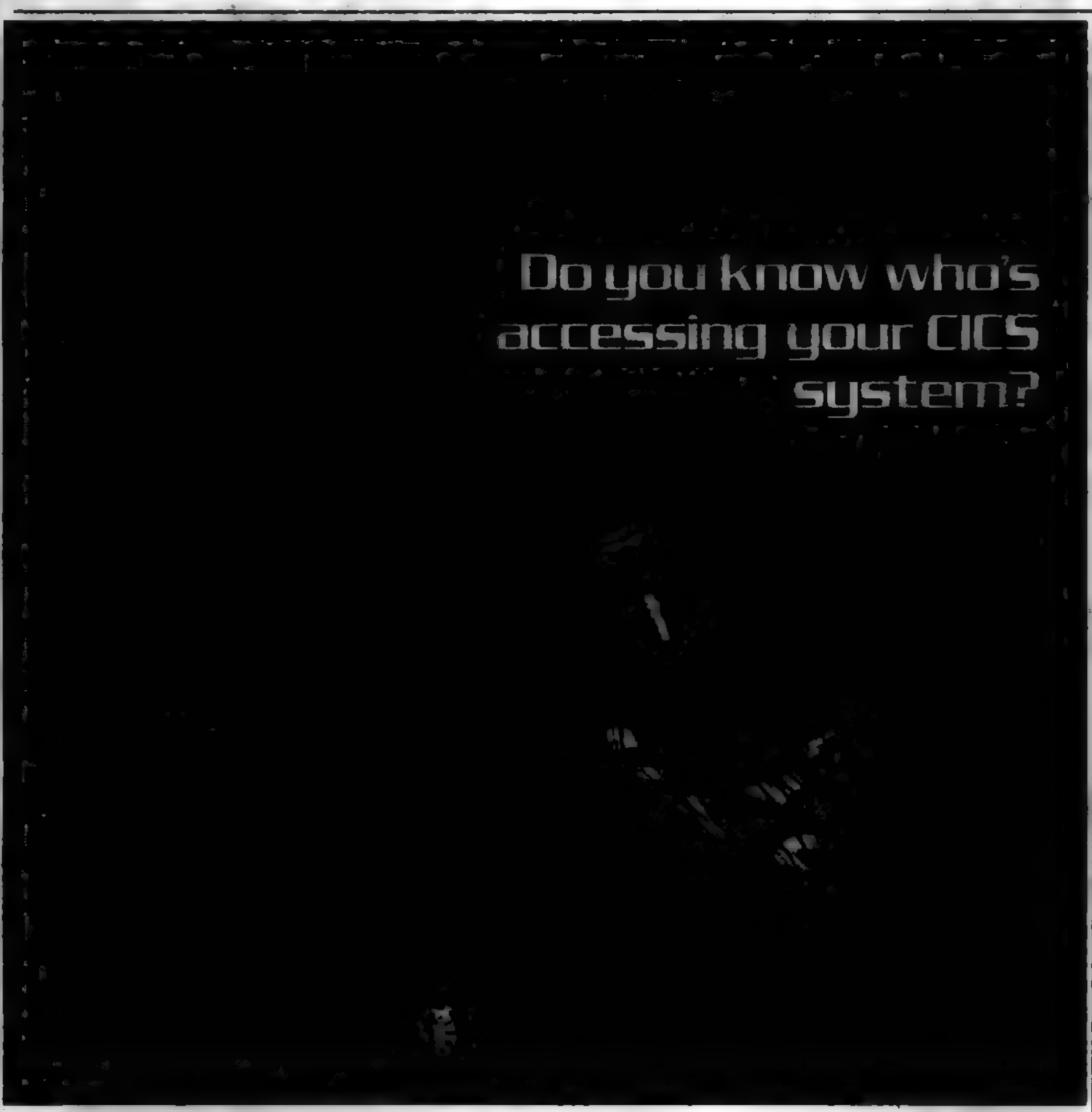
■

Tesseract Corp. has upgraded **Personnel Management System, Benefit Plan Administration System, Payroll Processing System** and **Claims Processing System,** its IBM mainframe applications software, as well as its data base architecture.

Release 2 of its data base architecture adds three table-file utilities.

Release 3 of Personnel

Continued on page 78



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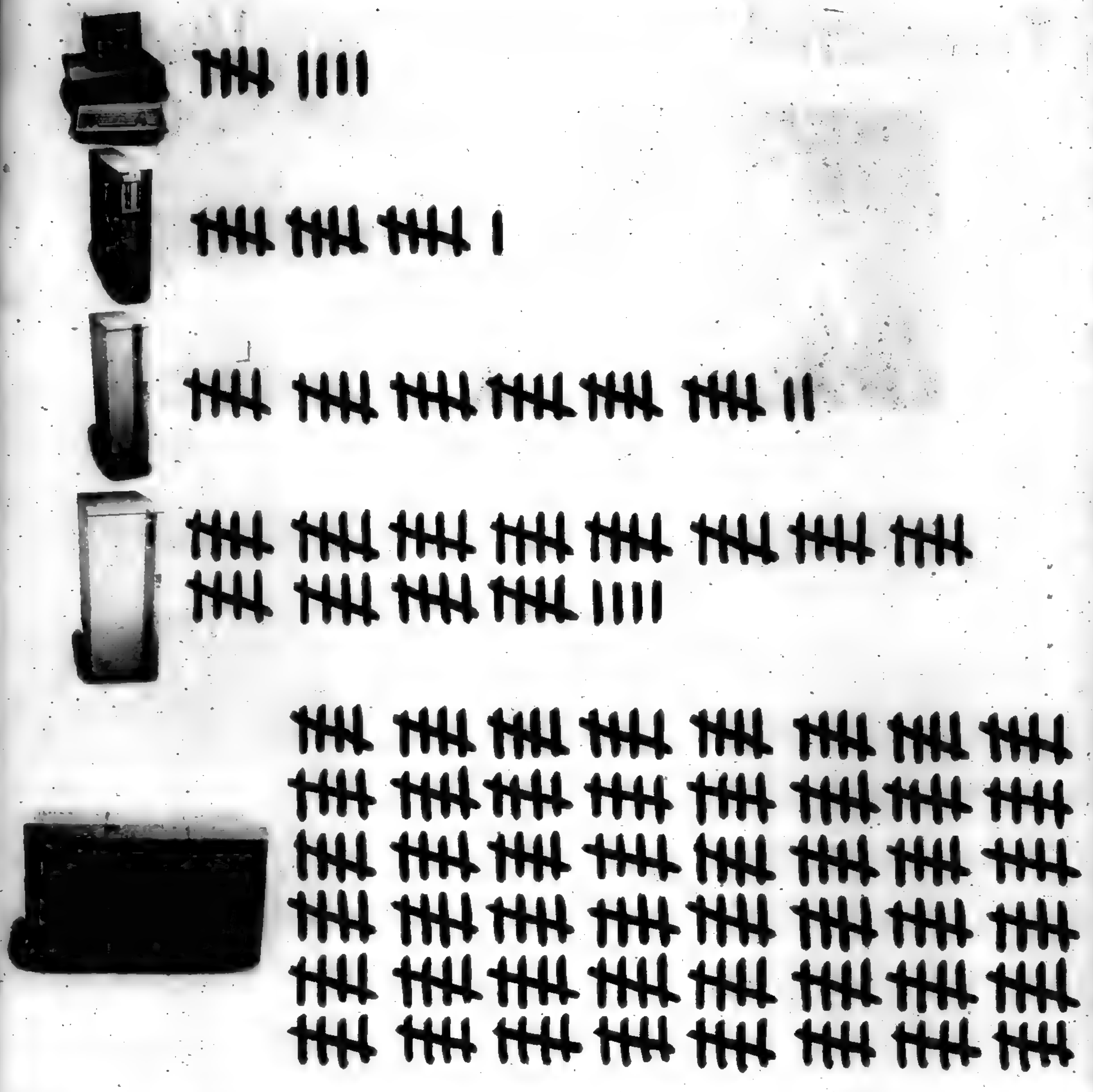

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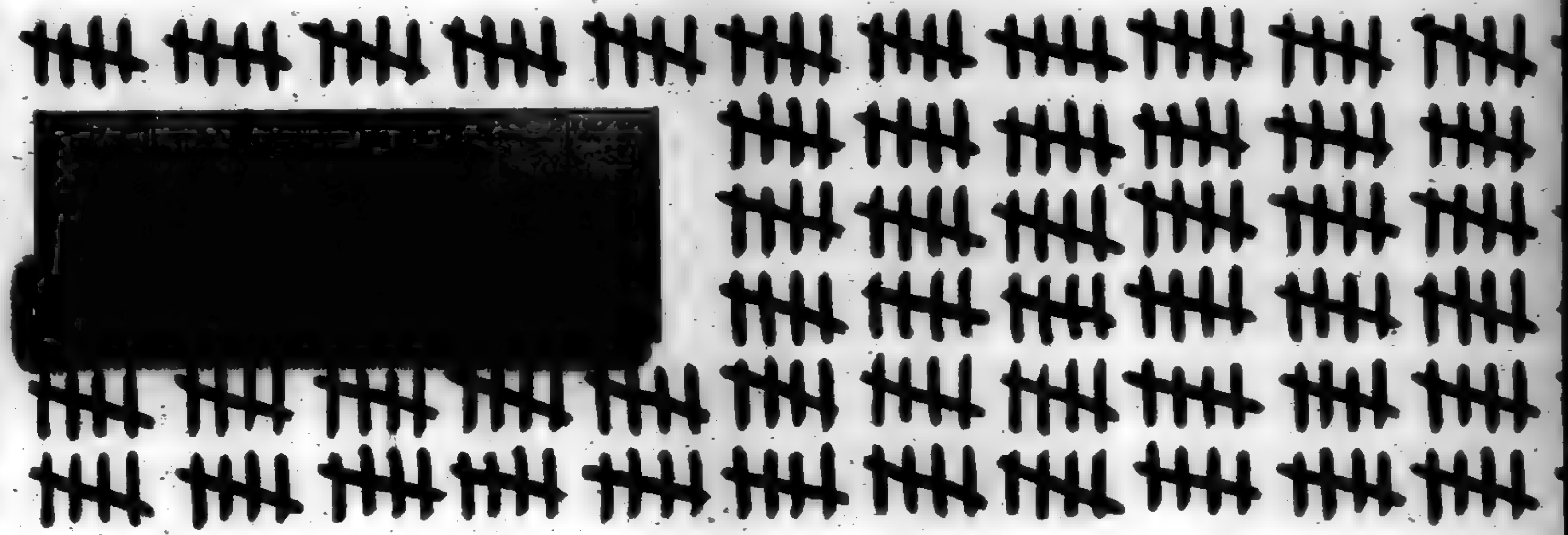

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SPERRY

NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 76

Management System adds data elements to selected screens, offers the ability to place employee records in a pending status and duplicate ID checks for use with IMS data bases.

Benefit Plan Administration System Release 4 includes expanded keys in the Benefit Plan Eligibility Table, three additional tables, two extra benefits reports and electronic funds transfer support.

The Payroll Processing System Release 1 allows the base screen to provide data from the Personnel Management System and Payroll as of the effective date.

Release 2.1 of the Claims Processing System allows last-quarter carryovers to apply to both plan and benefit category deductibles and history claim processing to handle claims that span different accumulation periods.

Prices range from $85,000 to $185,000.

Tesseract, Fifth Floor, 101 Howard St., San Francisco, Calif. 94105.

Data base management systems

Software House, Inc. has released the **Large Data Sets** module for its System 1022 data base management system for Digital Equipment Corp. Decsystem-10 and Decsystem-20 mainframe computers.

The Large Data Sets module boosts the data set size of System 1022 to 134 million records. The module distributes data sets over several disks.

A System 1022 license costs $22,500 to $72,000, depending on configuration.

Software House, 1105 Massachusetts Ave., Cambridge, Mass. 02138.

■

Computer Associates International, Inc. has announced **Release 3** of its **CA-Universe** relational data base and fourth-generation management system.

The data base nucleus has been enhanced to provide referential integrity, and the data dictionary has been extended. Both the information management and applications development facilities and the automatic forms-generation facilities have also been enhanced. Other features include extended reporting capabilities and integrated user and system Help.

The cost for CA-Universe is $140,000 in IBM DOS/VSE and $170,000 in IBM OS/MVS and VMS/CMS environments.

Computer Associates, 125 Jericho Tnpk., Jericho, N.Y. 11753.

Remote computing services

ITT World Communications, Inc. is offering **ITT Update**, a multilanguage international news service that is accessible by telex terminals worldwide.

Offered in cooperation with the Deutsche Presse-Agentur GmbH (DPA), the ITT Update provides world news in English, German and Spanish. Users can select news stories by continent and country. DPA supplies stories in the language in which it was filed. Major stories are translated into all three languages.

International users pay the cost of the telex call when using Update. The cost to domestic users is 20.5 cent/min plus the cost of the telex call.

ITT World Communications, Services Group, 100 Plaza Drive, Secaucus, N.J. 07096.

Training

Crwth Computer Coursewares has announced **Basic JCL**, an interactive computer-based training course designed to teach users, operators and programmers how to run jobs under the MVS operating system.

The course can be run under a computer-based training presentation system such as IBM's IIS, Goal System International, Inc.'s Phoenix or Boeing Computer Service Co.'s Scholar/Teach. Information is presented with interactive narrative text followed by questions. Much of the course involves writing JCL statements and programs.

The course can be leased on a yearly license for $4,500.

Crwth Computer Coursewares, 18th Floor, 10880 Wilshire Blvd., Los Angeles, Calif. 90024.

MICROCOMPUTERS

Software

Scientific Computing Associates has announced **Version 3.2** of its PC **SCA Statistical System** for the IBM Personal Computer, Personal Computer XT, AT and compatibles.

Version 3.2 features dynamic storage allocation, attention interrupt, access to DOS commands within a system session and access to other software applications within a session.

The entire system is distributed on 12 diskettes. It is priced at $595.

Scientific Computing Associates, P.O. Box 625, De Kalb, Ill. 60115.

■

Shields Computer Services has announced **PC/Flist**, a file organization product for IBM Personal Computers or compatibles.

PC/Flist is an IBM PC-DOS and Microsoft Corp. MS-DOS utility. Features include the ability to sort files, execute commands next to files, pass parameters and perform selective searches. It includes on-line Help and search capabilities and user-defined function keys. A browse program allows users to look at files in both ASCII and hexadecimal modes.

PC/Flist is priced at $29.95.

Shields Computer Services, 5749 Amend Road, Richmond, Calif. 94803.

■

Boston Business Computing, Ltd. has announced **PC/EDT**, a software editing tool designed for the IBM Personal Computer and compatibles.

PC/EDT is a personal computer implementation of Digital Equipment

Continued on page 82

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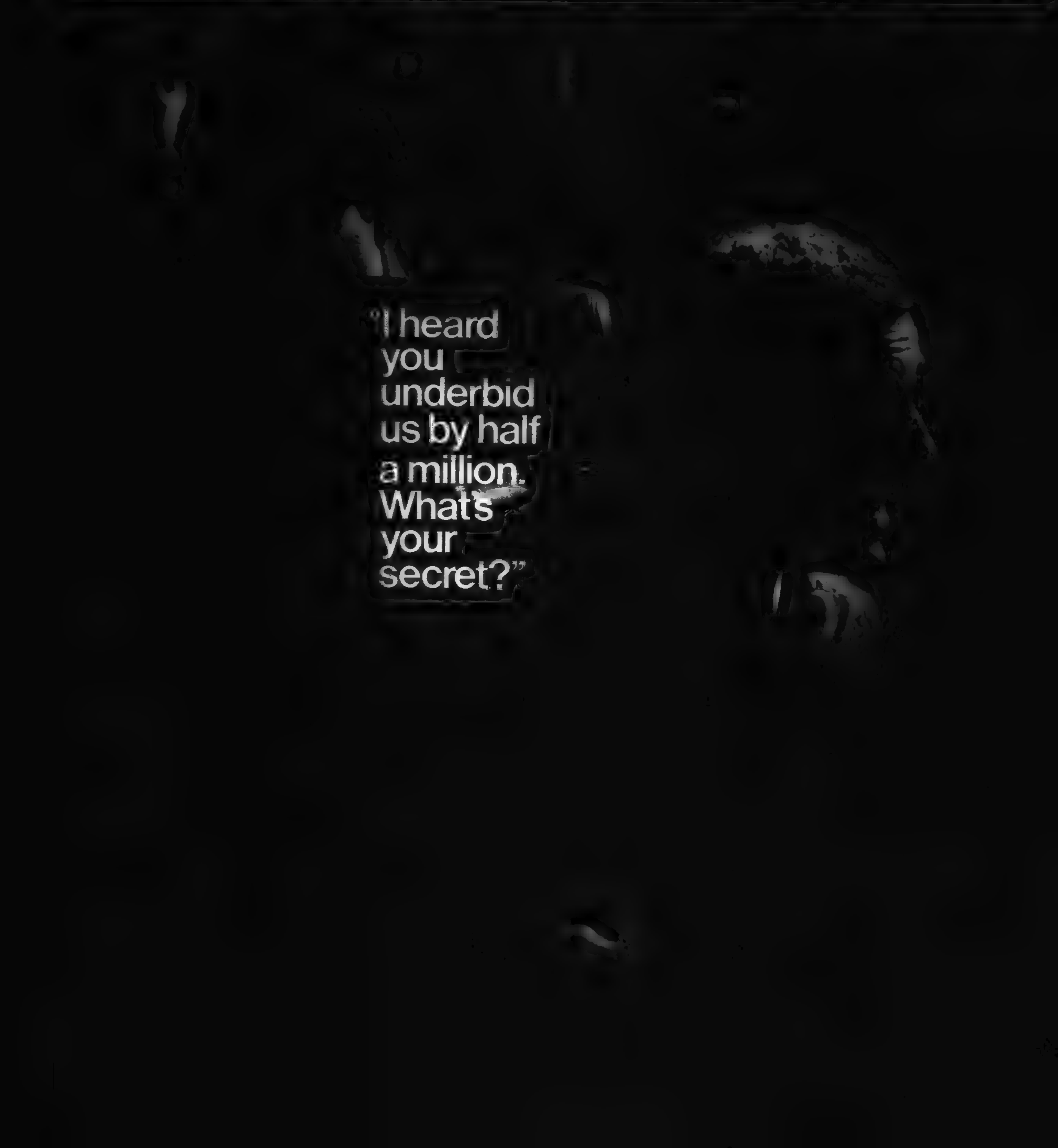
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To make Matt's secret yours, call Team Xerox at 1-800-833-2323, ext. 42 or send your business card to Xerox Corp., Dept. 420I3, P.O. Box 24, Rochester, NY 14292.

Continued from page 79

Corp.'s VAX EDT mainframe editor. Features include multiple buffers, undelete, keyboard redefinition, command macros, multiple file access, cut and paste, screen and/or keyboard command modes, command files and environmental variables.

System requirements are IBM PC-DOS 2 or higher and 128K bytes of memory.

PC/EDT is priced at $220.

Boston Business Computing, 360 Merrimack St., Lawrence, Mass. 01843.

■

Metafile Information Systems, Inc. has announced **Metafile Multi-User**, a multiuser software system for IBM Personal Computers and DOS 3.1 function call-compatible local-area networks.

Features of Metafile Multi-User include word processing, data base management, integrated text and data processing, windowing/forms creation, application development facilities and automatic and manual resource control.

A Metafile Network Access System is required for each workstation on the network, allowing it access to all the features and functions of the stand-alone Metafile workstation.

Metafile Multi-User and Network Access System require a minimum of 128K bytes of contiguous memory. Multi-User costs $1,195, and each Network Access System costs $395.

Metafile, 401 16th St, S.E., Rochester, Minn. 55904.

Systems

Gerber Systems Technology, Inc. has added the **Sabre-PC** to its Sabre-5000 family of workstations.

The Sabre-PC is an IBM Personal Computer-based three-dimensional design system designed to support computer-aided manufacturing tasks. It is based on Micro Control Systems, Inc.'s Cadkey software system. It can be used as a stand-alone 3-D design station or can be integrated into local-area networks or clustered with modems and direct cables.

The full turnkey Sabre-PC system costs approximately $20,000.

Gerber Systems Technology, 40 Gerber Road E., South Windsor, Conn. 06074.

■

Osborne Computer Corp. has introduced the **Osborne 2000 PC-Kit**, the **Osborne 2100** and the **Osborne AT**.

The Osborne 2000 PC-Kit is an assemble-it-yourself IBM Personal Computer compatible consisting of a desktop personal computer-style case, power supply, keyboard and logic board with 64K bytes of random-access memory (RAM), serial port and built-in floppy controller.

The Osborne 2100 is a two-drive, 256K-byte RAM, Intel Corp. 8088-based computer with a color graphics card, built-in serial port and parallel port. The Osborne AT offers IBM Personal Computer AT compatibility. It has 512K bytes of RAM and a 1.2M-byte floppy disk drive.

The Osborne 2000 PC-Kit is priced at $699. The Osborne 2100 is priced at $1,695, and the Osborne AT is priced at $2,995.

Osborne Computer, 42690 Christy St., Fremont, Calif. 94538.

Communications

Decisionlink, which is a division of Laguna Laboratories, Inc., has added **Local & Remote 5251** to its series of IBM Personal Computer to IBM System/34, 36 and 38 communications products.

Local & Remote 5251 is a software package that provides 5251 emulation in a local cluster of up to six IBM Personal Computers and compatibles or via asynchronous remote communications.

RS-232 cables and standard serial asynchronous communications ports are used to link local Personal Computers to the server.

Decisionlink Local & Remote 5251 is available on a per-Personal-Computer basis for $395.

Decisionlink, 1300 E. Normandy Place, Santa Ana, Calif. 92705.

■

Votrax, Inc. has announced microcomputer voice and sound circuit boards and software systems, the **Votalker IB** for the IBM Personal Computer and Personal Computer XT and **Votalker AP** for Apple Computer, Inc.'s Apple II, Apple IIe and Apple+ computers.

The synthetic speech generating systems each offer two preprogrammed voice modes. Text is generated by software translators through programs or computer keyboards.

Circuit boards include the SC-02 speech synthesis chip, speaker, audio amplifier, volume control, voice filter and switch and speaker jack.

Votalker IB costs $249; Votalker AP sells for $179. Prices include circuit board, software translator on a diskette and users manual.

Votrax, 1394 Rankin Road, Troy, Mich. 48083.

Storage

Kapak Design has announced the **Novo Drive 1000**, a 1M-byte equivalent to a hard disk for IBM Personal Computer XTs and compatible machines.

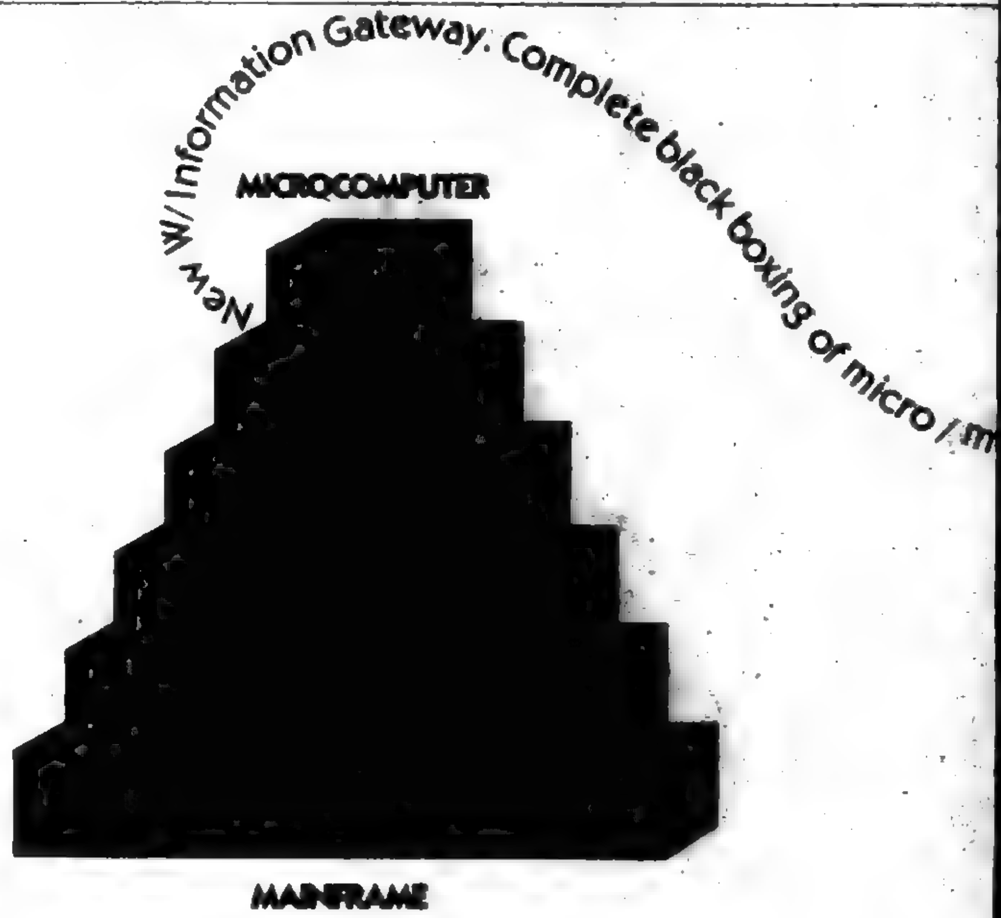
The Novo Drive 1000 was designed as an I/O device. This allows data to be transferred via direct memory access.

It also means that main memory is available for large programs and data files.

It is possible to boot up directly from the Novo Drive 1000. The drive can be physically transferred from one system to another without a loss of data.

The Novo Drive 1000 is priced at $395.

Kapak Design, 18784 Cox Ave., Saratoga, Calif. 95070.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NEW PRODUCTS/MICROCOMPUTERS

Printers/plotters/peripherals

Epson America, Inc. has introduced the **LQ-800** and the **LQ-1000** 24-pin dot matrix printers.

Both print in draft mode at 180 char./sec. and in letter-quality mode at 60 char./sec. They offer a resolution of 360 dot/in. horizontally and 180 dot/in. vertically. Both models come with built-in serial and parallel interfaces and friction paper feed. The LQ-800 accommodates 80-column width, and the LQ-1000 offers 136-column width.

The LQ-800 costs $799, and the LQ-1000 is priced at $995. Optional tractor and cut-sheet feeders for the LQ-800 cost $49.95 and $129.95, respectively. For the LQ-1000 they cost $59.95 and $169.95, respectively.

Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505.

Nissho Information Systems has introduced the **NP-2410** and the **NP-910**, two dot matrix printers.

The NP-2410 prints letter-quality text at 180 char./sec. and draft copy at up to 540 char./sec. The NP-910 prints letter quality at 58 char./sec. and draft quality at 350 char./sec. Both models use interchangeable RS-232 or Centronics Data Computer Corp. parallel interfaces.

The NP-2410 can emulate the Epson America, Inc. LQ-1500, and the NP-910 can emulate the IBM Graphics Printer and the Epson FX-100+ so they can operate with word processing and spreadsheet software, according to the vendor.

Model NP-2410 costs $1,845. Model NP-910 is priced at $1,595.

Nissho Information Systems, Suite 105, 3838 Carson St., Torrance, Calif. 90503.

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Controllers

Xyplex, Inc. has introduced versions of its **host interface unit** and **cluster controller** designed to add Ethernet compatibility to its family of communications subsystems for Digital Equipment Corp. VAX computer systems.

The host interface unit serves as the interface between the host computer and the Xyplex system's communications channel. It is a single board and supports up to 64 simultaneous terminal connections.

The cluster controller handles terminal data processing to the VAX. Each controller can support up to eight terminal connections.

The host interface unit and cluster controller cost $3,700 and $2,575, respectively.

Xyplex, 100 Domino Drive, Concord, Mass. 01742.

Voice/data communications

Northern Telecom, Inc. has introduced the **Meridian M2009**, a digital telephone for use with the Meridian SL-1 integrated services network.

The Meridian M2009 has nine programmable keys for lines and features and can be programmed for four different rings. It can handle simultaneous digital voice and data transmissions at speeds up to 19.2K bit/sec. over standard telephone wiring.

The Meridian M2009 costs $172.

Northern Telecom, 200 Athens Way, Nashville, Tenn. 37228.

Protocol converters

Wizard Computer Products has introduced the **Wizard Protocol Converter**, designed to connect an IBM 3274 controller and Digital Equipment Corp. Dectalk voice synthesizer.

The combination of the protocol converter, Dectalk and a Touch-Tone phone allows users to add computer-generated voice output to sales data, financial information, customer service assistance and electronic mail.

The Wizard Protocol Converter and Dectalk units can be purchased as a package for $5,500.

Wizard Computer Products, P.O. Box 1867, Greenville, S.C. 29602.

Multiplexers/modems

Telenetics Corp. has added the **Expressdata 24S** and the **Expressdata 12S** full-duplex modems to its Expressdata family.

The Expressdata 12S is a 1,200 bit/sec. external model modem that offers 1,200/300 bit/sec. data rate and can be upgraded to a 2,400 bit/sec. model. The 24S model has a 2,400/1,200/300 bit/sec. data rate. Both are Hayes Microcomputer Products, Inc. compatible. Other features include autoanswer, autodial, call monitoring, phone number storage and remote diagnostic over toll-free lines with synchronous or asynchronous transmission modes.

The Model 12S costs $495, and the 24S is priced at $695.

Telenetics, 895 E. Yorba Linda Blvd., Placentia, Calif. 92670.

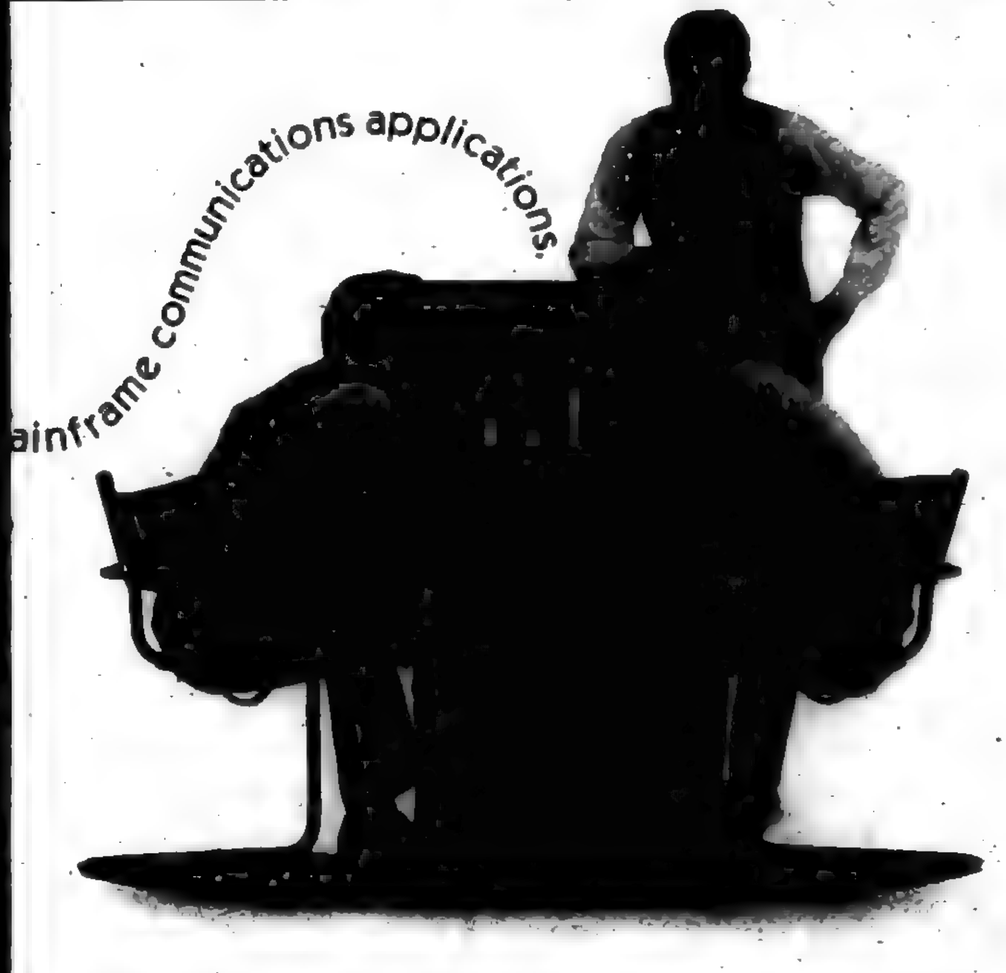
■

A line of **3270 series multiplexers** that operate transparently between the controller and end-user devices to support point-to-point, multidrop and star network configurations is available from **Raycom Systems, Inc.**

The multiplexers use one coaxial or fiber-optic cable to replace up to 32 coaxial cables conventionally used to link IBM 3274 and-compatible controllers with Category A devices such as 3270 terminals, personal computers and printers.

Rack-mountable devices range in price from $1,508 for an eight-channel coaxial multiplexer to $3,245 for a fully configured 32-channel fiber-optic unit. Stand-alone units range from $1,235 for an eight-channel device to $2,195 for a 16-channel fiber-optic multiplexer.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.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(408) 496-0111.

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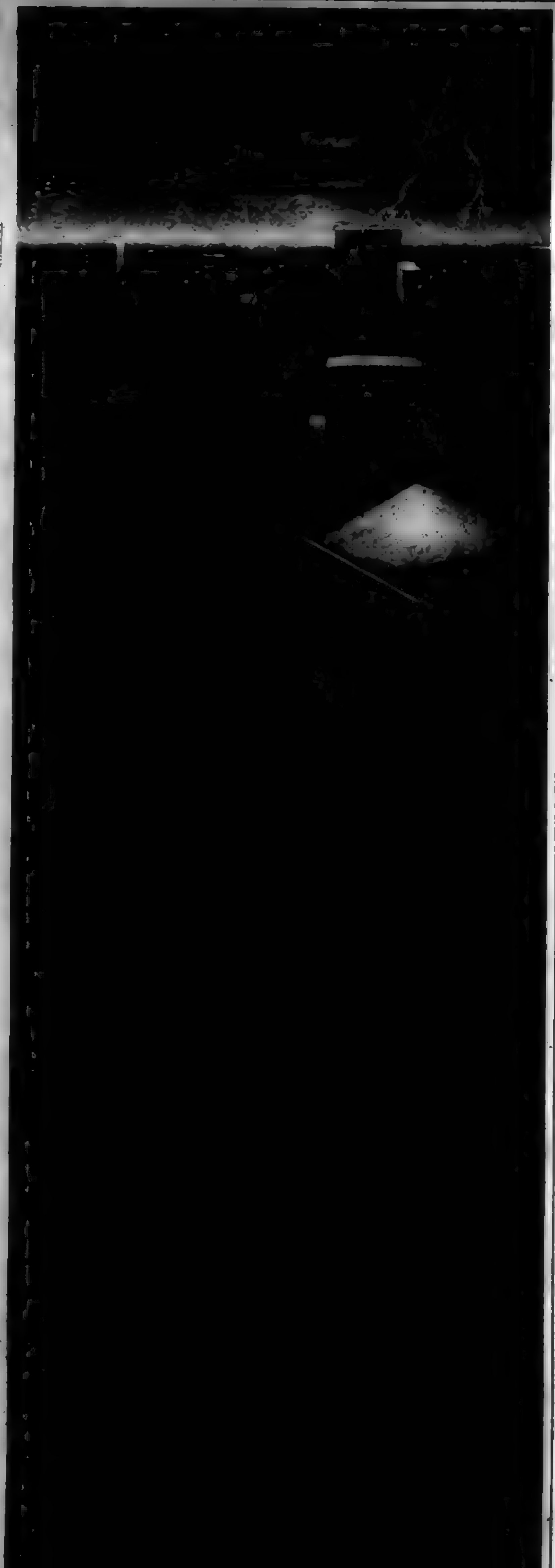

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Data storage

Bering Industries, Inc. has added the **Series 8000-EP** to its Series 8000 Winchester disk subsystems.

The Series 8000-EP hard-disk subsystems offer capacities ranging from 65M to 190M bytes. The data transfer rate averages 700K bit/sec. The average access time is 30 msec. The EP line is fully compatible with Hewlett-Packard Co.'s hardware and software. Non-HP computers may interface with the Series 8000-EP by customized IEEE-488 device drivers.

The Series 8000-EP ranges from $5,990 for a 65M-byte subsystem to $11,890 for a 190M-byte subsystem.

Bering Industries, 1400 Fulton Place, Fremont, Calif. 94539.

■

Keyword Office Technologies Ltd. has introduced modular disk drive configurations for the **Keyword 7000** office automation hardware/software product that integrates incompatible word processing systems.

The Keyword system is now available as a single disk drive unit or with any combination of two, three or four disk drives. It performs single or two-way document exchange among 28 different incompatible systems such as Lanier Business Products, Inc. and IBM.

Prices range from $3,795 for a one-drive configuration to $9,500 for the four-drive system.

Keyword Office Technologies, 2816 11th St. N.E., Calgary, Alta. T2E 7S7.

Terminals

IBM has announced the **IBM 3179 Model 2** color display station for use in 5250 Information Display Systems Networks.

The 3179 Model 2 is attachable to the IBM System/36 or System/38 either directly or through the IBM 5294 Remote Control Unit. It is plug compatible with the IBM 5292 Model 1 color display station and will execute application programs written for the IBM 5251, 5291, 5292 Model 1 or 3180 Model 2.

The 3179 Model 2 costs $2,195. The annual minimum maintenance charge ranges from $50 to $94.

IBM, Old Orchard Road, Armonk, N.Y. 10504.

■

Liberty Electronics Co. has announced the **Unilink Terminal** that features Sperry Corp. UTS 20 terminal emulation.

The product also has a 14-in. display, detached keyboard, tilt-and-swivel pedestal, 10 programmable function keys as well as serial and parallel printer interfaces, according to the vendor.

The Unilink comes in two versions. One supports 80-column display formats with a green phosphor screen, and the other supports 132-column formats with an amber screen.

The 80-column format costs $995, and the 132-column format is priced at $1,095.

Liberty Electronics, 65 Third St., San Francisco, Calif. 94107.

Electrohome Ltd. has introduced the **ECM 1901**, a 19-in. color data display monitor for large computer-aided design and manufacturing applications.

The monitor offers brightness, contrast, horizontal and vertical hold, reduced scan, video on/off, horizontal frequency select and phase controls. It displays 1,100- by 800-pixel resolution at 25 kHz. It will accept a choice of red-blue-green RS170 to IBM's RGB TTLI signals via an interchangeable module system.

The ECM 1901 costs $2,160.

Electrohome, 809 Wellington St. N., Kitchener, Ont. N2G 4J6.

■

Sperry Corp. has introduced the **Sperry Video Terminal 1120 (SVT 1120)** editing terminal.

Features of the SVT 1120 include a 14-in. screen, 132-col. display, two levels of menu-driven control pages, CRT saver for timed display shut-off, setup menus in six languages, keyboard-selectable national character sets, communications interface support for up to 19.2K bit/sec. and full-duplex asynchronous printer interface.

The SVT 1120 costs $895.

Sperry, P.O. Box 500, Blue Bell, Pa. 19424.

■

Carroll Touch has unveiled **Smart-Y**, an RS-232C serial splice controller for use with its Smart-Frame scanning infrared touch-input systems.

Smart-Y allows touch to be added to a terminal without introducing a serial splice within the terminal's electronics. Instead, the splice is done outside the terminal in an intelligent controller that splits touch data from terminal data.

In an environment where applications software runs on a host computer with multiuser capability, Smart-Y allows data entered through the terminal keyboard and the touch system to share the RS-232C line to the host.

The single-quantity price is $425.

Carroll Touch, P.O. Box 1309, Round Rock, Texas 78680.

■

Datapoint Corp. has added the **Model 8215** terminal, **Model 8242** workstation and **Models 8600** and **8200** keyboards to its Starship product line.

The terminal and workstation consist of a tilt-and-swivel, 14-in. monitor and an 80-char. by 24-line display. Two serial ports for processor and printer connections, an adjustable brightness control and a detachable keyboard are included.

The 8242 runs under the Datapoint DOS functioning as an interactive terminal and under RMS running applications programs written in any RMS-compatible language. It reportedly accommodates the two keyboards.

The 8215 terminal works with Datapoint's 32-bit microcomputer, the 3200, which runs an AT&T Unix-like operating system called Unos, according to the vendor.

Prices are $1,395 for the 8242, $599 for the 8216 and $400 each for the 8600 and 8220.

Datapoint, 9725 Datapoint Drive, San Antonio, Texas 78284.

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Printers/plotters

Standard Register Co. has introduced the Series 1200 Label Laminator for applying a clear plastic laminate over pressure-sensitive or other label products.

The Label Laminator runs at adjustable speeds from 30 to 120 ft/min. It is designed for roll feeding the laminate and pack feeding the label forms. It has an automatic shutoff safety feature.

The Label Laminator is priced at $4,495.

Standard Register, P.O. Box 1167, Dayton, Ohio 45401.

■

Rutishauser of America, Inc. has added a sheet feeder for Juki Industries of America, Inc. printer models 5510 and 5520 to its line of Paperpro sheet feeders.

The Juki model holds up to 80 sheets of paper. It is a mechanical unit and requires no software for operation.

Paperpro models range in price from $395 to $425 and come with a one-year warranty on all parts and labor.

Rutishauser of America, 103454 Brockwood Road, Dallas, Texas 75238.

■

Printmanager has introduced the Printmanager 128, a controlled switch and printer spooler.

Printmanager 128 is a software-controlled six-port switch and printer spooler that features a 128K-byte buffer to store outputs from up to five CPUs. It transfers all data at 19.2K bit/sec. in and out simultaneously. Six-port models are available for four or five CPUs and one or two serial or parallel printers, and they can be cascaded for larger configurations.

The Printmanager 128 costs $945.

Printmanager, 108 Water St., Watertown, Mass. 02172.

■

Tektronix, Inc. has enhanced its 4510 rasterizer, calling the new product the 4510A Color Graphics Rasterizer.

Enhancements include support of the Tektronix 4695 copier as well as Tektronix 4100 command set features, including 32-bit coordinate space, segment transforms and multiple viewpoints. It now interfaces with the 4110 series computer display terminals and 4120 series color graphics workstations.

The 4510A can be ordered with varying amounts of memory. With 128K bytes of memory, the price is $4,495. With 512K bytes, the price is $5,995, and with 2M bytes of memory, the price is $9,995.

Tektronix, P.O. Box 1700, Beaverton, Ore. 97075.

■

Bantec, Inc. has added the 2700 and the 2795 to its 2000 series of reader/sorters.

The 2700 operates at speeds up to 1,000 documents per minute. It is available with up to 36 sort pockets and provides the capability to off-load peak-period serial or account number fine sorting from larger systems. The 2795 combines the 2700 with an IBM 3890 emulation package that allows direct connection to any IBM 370, 3030, 3080, 3090 or 4300 series computer.

The 2700 reader/sorter, available in January, is priced at $80,000. The 2795 will be available in June 1986 at a starting price of $170,00.

Bantec, 4435 Spring Valley Road, Dallas, Texas 75244.

■

Infoscribe, Inc. has introduced the Model 14XX IBM-compatible dot matrix printer for multifunction applications with System/34, 36 and 38 and Personal Computer systems.

The printer provides both IBM twin-axial and standard parallel interfacing. It features an 18-wire pin print head that prints at speeds of 400 char./sec. in draft-quality mode, 200 char./sec. in correspondence mode and 80 char./sec. in near-letter-quality mode.

The Model 143X costs $2,995.

Infoscribe, 1808 Michael Faraday Court, Reston, Va. 22090.

■

Fujitsu America, Inc. has introduced the DX2100 and the DX2200, two nine-wire dot matrix printers.

The DX2100, 80 columns, and the DX2200, 136 columns, both offer a 55-dba noise level, a print speed of 220 char./sec., built-in tractor feed, 11 languages, 16 ASCII characters and 32 international characters.

The DX2100 is priced at $545, and the DX2200 is priced at $695.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

■

Dataproducts New England, Inc. has unveiled the TCG-202, an enhancement of its TCG-200 Tempest color graphics printer, to emulate the IBM color and IBM graphics printers.

The TCG-202 is a letter-quality dot matrix printer with 165 by 82.5 dot/in. resolution. It costs $3,395.

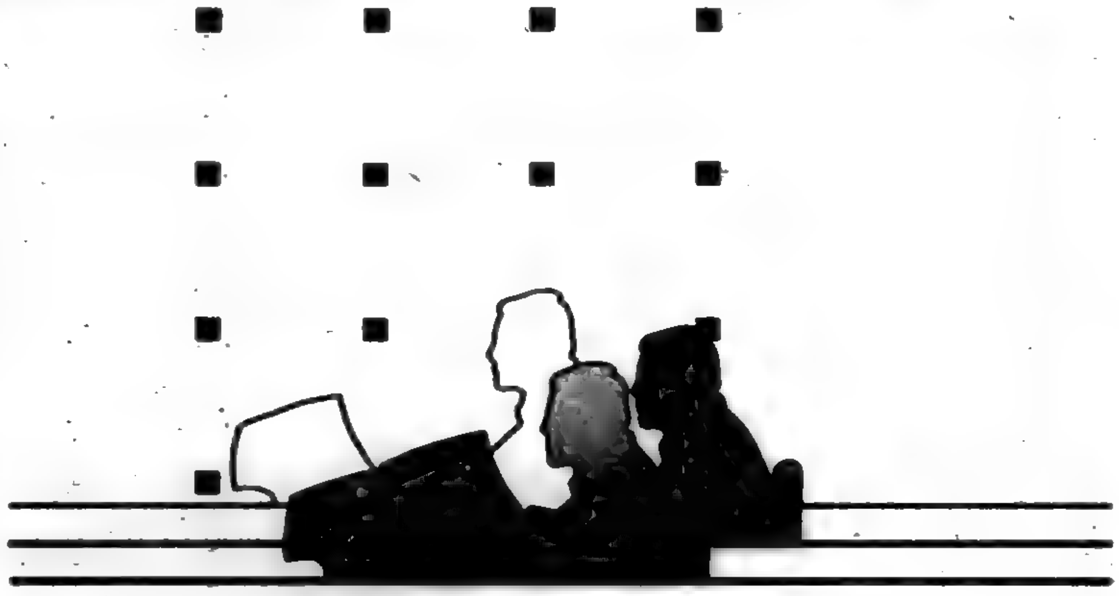
Dataproducts New England, Barnes Park N., Wallingford, Conn. 06492.

■

Wallace Computer Services, Inc. is offering the Laser Max 40/50 on-line roll feeder and form folder for high-speed laser printers.

It works with various continuous-feed laser printers, including the IBM

Continued on page 92



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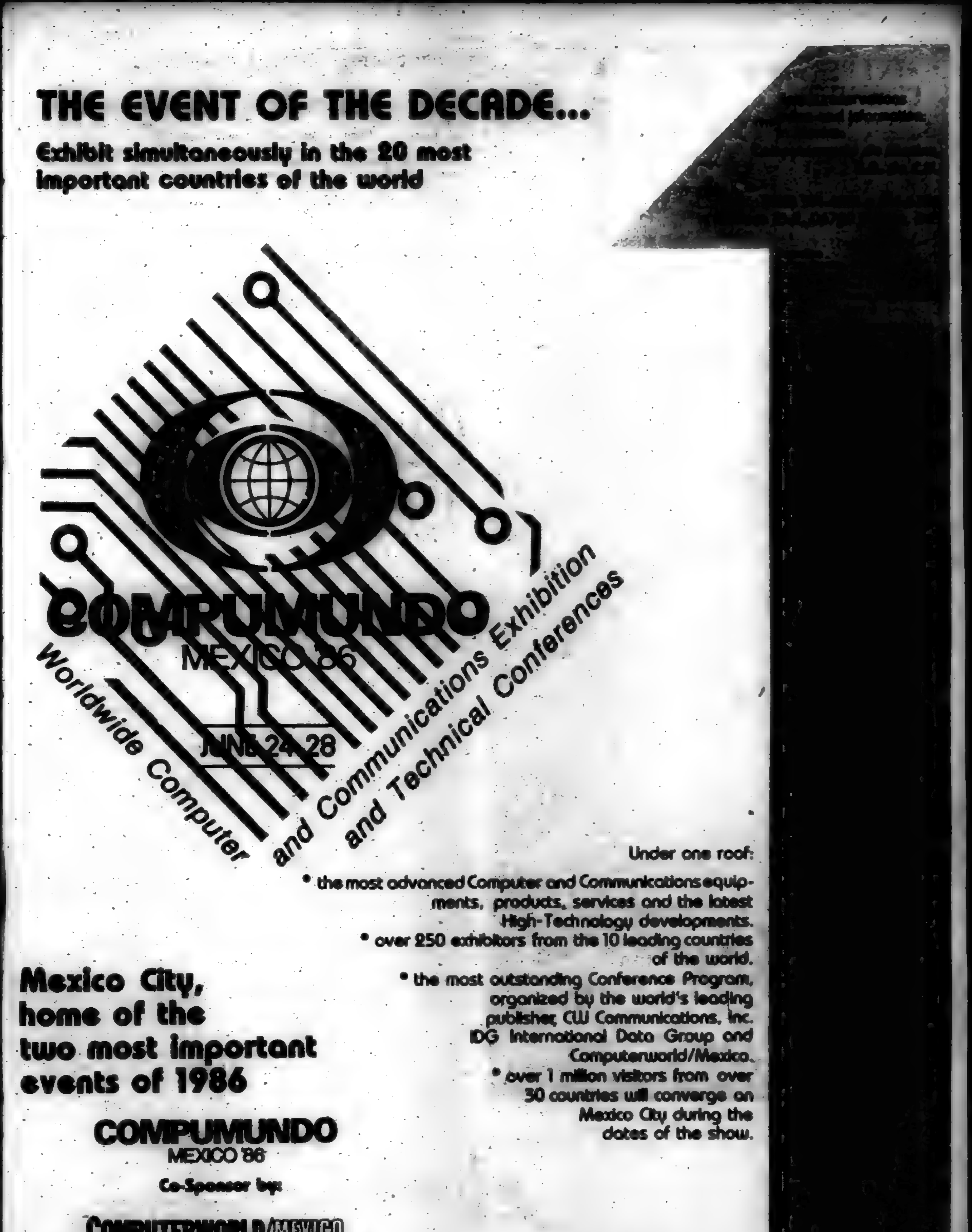

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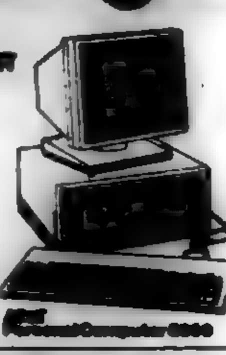

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 90

3800. Printers can be used nonstop for up to five hours.

While printing occurs, Laser Max continually monitors the paper path, checks all splices and, if a jam occurs, shuts down automatically. Using a photocell control, the form folder synchronizes with the printer.

The system costs approximately $85,000.

Wallace Computer Services, 4600 Roosevelt Road, Hillside, Ill. 60162.

Graphics systems

Encode Technology, Inc. has announced **Encographics 3000**, a computer-aided manufacturing system for the creation and maintenance of manufacturing engineering drawings and related shop floor documentation.

The system includes a complete hardware system with 768K bytes of memory, a color graphics console, a 15M-byte hard disk, a digitizing tablet and a dot matrix printer, the vendor said.

The Encographics 3000 costs $29,900.

Encode Technology, 12 Cotton Road, Nashua, N.H. 03063.

■

Pericom, Inc. has added the **MG 600** series to its Monterey family of monochrome graphics terminals.

The MG 600 offers 1,024- by 780-pixel noninterlaced resolution and a 15-in. screen. The MG 620 offers a 20-in. screen as well as a 132-column display and a video printer interface. The Flexible Graphics System is available on all models of the MG 600 series, and it supports features such as up to four screens of graphics storage and display, locally stored large vector lists and picture segments.

The MG 600 costs $2,695, and the MG 620 is priced at $3,995.

Pericom, Digital Drive, Novato, Calif. 94947.

■

Interactive Machines, Inc. has announced the **IMI-300 Hybrid Graphics Mixer** system.

The system features the IMI-300 mixer plus the IMI-455 stroke generator with hybrid monitor. It supports RS-343, RS-232 and RS-170A red-green-blue (RGB) input formats. It is available in one-, two-, three- or four-channel configurations. It offers 24-bit color monitors, and the hybrid monitor incorporates both random deflection for stroke and wide-band RGB for raster.

The price of the IMI Hybrid System starts at $31,500 for one channel. Additional channels cost $16,000 each.

Interactive Machines, 733 Lakefield Road, Westlake Village, Calif. 91361.

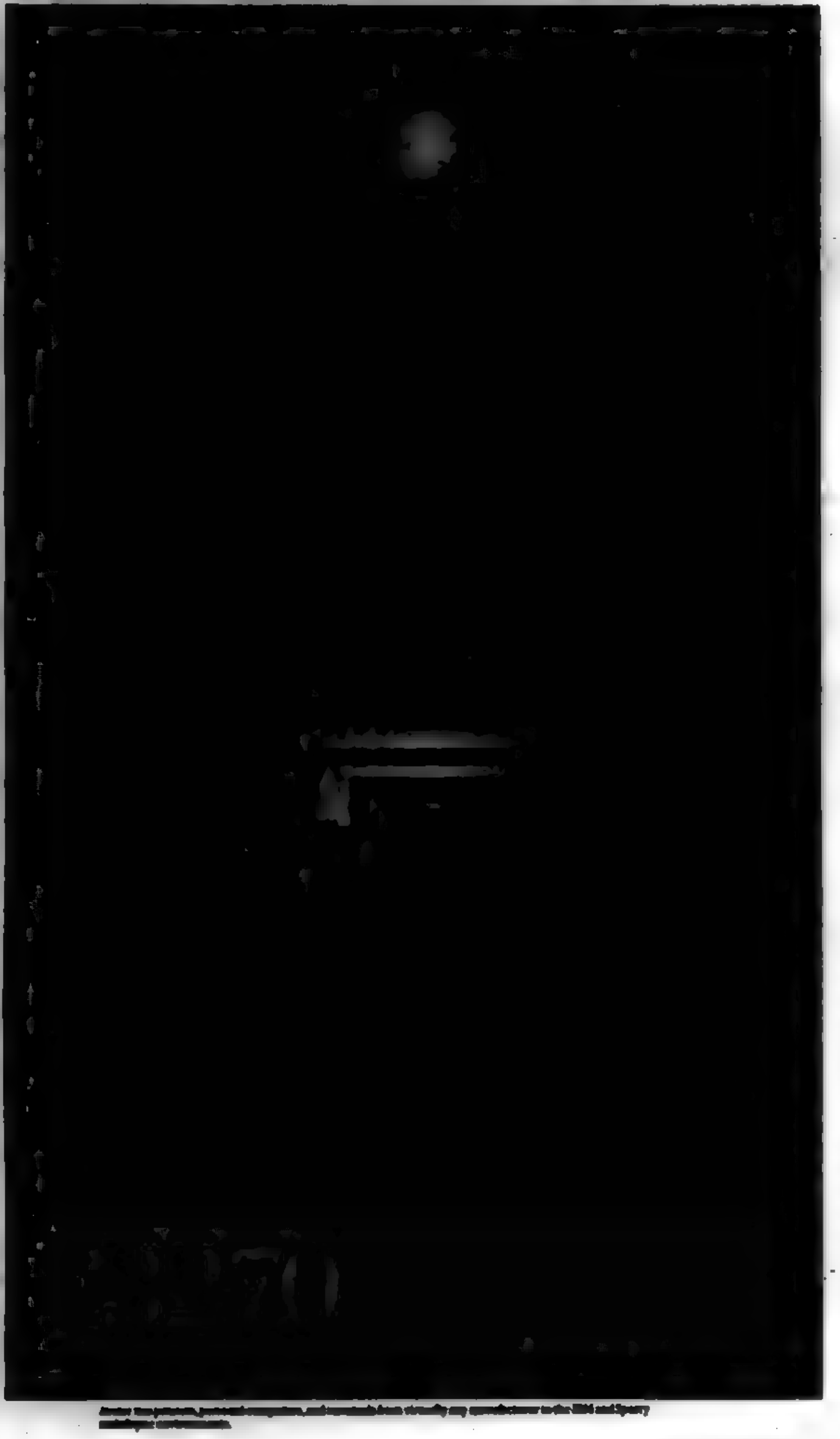
Board-level devices

Systech Corp. has introduced its **DCP-8804 data communications processor**, a four-channel, general-purpose communications processor on a single printed-circuit board.

The DCP-8804 enables Intel Corp. Multibus-based computer systems to operate in asynchronous, bisynchronous, synchronous data link control, high-level data link control, X.25 and systems network architecture communications protocols. Other features include sockets for up to 64K bytes of erasable programmable memory, four multiprotocol serial communications channels and two dedicated direct memory access controllers.

The DCP-8804 costs less than $2,000 in quantities of 100 or more.

Systech, 6465 Nancy Ridge Drive, San Diego, Calif. 92121.



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COMPUTER INDUSTRY

INDUSTRY INSIGHT
Clinton Wilder
CW Senior Writer

Comdex/Fall's high-tech party

There are few better places on earth to widen the gap between hype and reality than in Las Vegas, where everything from slot machines to 24-hour breakfasts served on floodlit hotel balconies constitute an attempt to disorient the end user.

So it was here that trade show impresario Sheldon Adelson and his heady band of followers took center stage 10 days ago for the annual computer circus known as Comdex/Fall. And like a naive reader trying to find true Comdex news among the corporate press releases in the local Las Vegas press, a show observer could easily become confused between style and substance.

To cite just two unrelated examples, one of Comdex's most heavily hyped products, Microsoft Corp.'s Power Windows, was essentially a long-delayed new version in an attractively priced package. And the moderator of the most important conference session, Esther Dyson, had seen her ballyhooed *Computer Industry Daily* project fail just a few months ago.

In short, despite a general lack of earthshaking product introductions as well as lower Comdex attendance, the microcomputer industry did not seem terribly serious about a long, hard look at itself. Certainly, there were exceptions. In a well-delivered keynote speech, Hewlett-Packard Co.'s John Young called for an end to broken vendor promises, while session panelists like Northbrook Computers' Carlos M. Frum blamed industry woes on too many products that appear on the market with little regard for who will actually buy them.

See COMDEX page 102

Uccel moves to sell its computer services business

By Clinton Wilder

DALLAS — In an attempt to sever the remaining, unprofitable ties to its corporate origins, Uccel Corp. last week announced that it is negotiating to sell most of its computer services business to Babcock & Wilcox Co., a New Orleans-based construction and utility equipment firm.

The companies hope to complete the sale by the end of the year. The divestiture would include virtually all of Uccel's timesharing and remote processing computer services to approximately 460 customers in the electric power and energy fields.

When it was formerly known as University Computing Co., Uccel focused primarily in the services business. But a recent spate of purchases in the micro, mainframe systems and mainframe applications software industries has positioned Uccel as an aggressive player in the much more profitable software products market [CW, Nov. 4].

"Ever since [Chief Executive Officer Gregory J. Liemandt] took over, they have made it clear that their service business will not be part of their future," said analyst Charles Frumberg of Mabon, Nugent & Co. in New York. "I think they want to go into 1986 clean."

The businesses to be sold, all based in Dallas, accounted for only $16.4 million of Uccel's $145 million in revenue in the first nine months of 1985. Although service revenue was up slightly from $14.3 million in the same period a year ago, Frumberg estimated that Uccel has lost about $2 million in the service business this year.

"It's an operation that doesn't mesh with our strategic plans as stated when Greg Liemandt joined the company in April 1983," Uccel spokesman Richard Hanlon said.

Uccel will continue to sell services running on its corporate data center's IBM

See UCCEL page 99

BUSINESS NOTES

Tandon gets IBM's Wilkie

Tandon Corp. has lured another prominent IBM employee to Chatsworth, Calif., this time to receive the presidential mantle from company founder Sirjang L. Tandon. Tandon, who will remain chairman and chief executive officer, named Dan H. Wilkie president, chief operating officer and director. Wilkie had been site general manager at IBM's Personal Computer operation in Boca Raton, Fla., and had been with Big Blue for 18 years.

See BUSINESS page 102

Micro products flood industry

By James A. Martin

LAS VEGAS — Channel conflict exists within the personal computer industry because there are too many vendors attempting to sell similar products through a variety of distribution channels, according to a panel of computer retailers and vendors at Comdex/Fall '85.

Carlos M. Frum, president and founder of Northbrook Computers in Northbrook, Ill., said a flood of micro products has caused both customer confusion and tangled distribution. "There are too many products in the industry created without any regard to what the market needs," Frum said. There are too many vendors trying to do too many things. Board manufacturers are getting into the printer busi-

See MICRO page 102

INSIDE

A recent survey found high-stakes computer mergers and acquisitions growing at a rapid rate/94

A French CAD software firm is flying high on the latest solid image modeling technology/102

INSTANT ANALYSIS

"We already have a name for the new company: NADM. It stands for 'Never a Dull Moment.' "

— Convergent Technologies' President and CEO Paul C. Ely, Jr. on the new firm formed by Convergent's merger with 3Com Corp.

IBM halts growth of its retail dealerships

By Clinton Wilder

Reflecting slackened demand for personal computers as well as increasing concern about unauthorized gray market distribution, IBM recently announced a freeze on authorized retail dealerships in the U.S. for an indefinite period.

The move caps authorized IBM outlets at about 2,500, but an estimated 2,900 stores sell at least some IBM equipment, according to a September 1985 survey by Richardson, Texas-based market research firm Future Computing, Inc. There are approximately 4,600 computer retail outlets nationwide, according to the survey.

"When we first announced the Personal Computer, we wanted to have enough dealers geographically within driving distance of our potential customers," said Jeannette Mahre, a spokeswoman for IBM's Entry Systems Division. "Our current locations now meet those requirements."

Although most IBM competitors interviewed at the Comdex/Fall '85 show in Las Vegas praised the dealer limit as "long overdue," the announcement could squeeze both independent dealers hoping to sell IBM hardware and large chains hoping to expand.

"I can't even fathom the difficulties of a chain where some stores sell IBM and some don't," Future Computing Vice-President Alice Brown said. "How could you run a national ad campaign for prices on IBM products? The multilocation chains may have to reconsider their expansion plans. There should be an increase in merger and acquisition activity rather than simple expansion."

"I think dealers feel strongly about IBM's lack of controls to date and its 'volume-at-all-costs' approach," according to John E. Boyd, sales vice-president of the Computer Systems Division of AT&T Information Systems. AT&T currently authorizes about 1,200 retail dealers.

John Frank, vice-president of marketing for Zenith Data Systems Corp., said he expected the IBM announcement but was pleased that it coincided with Zenith's plans to expand its own dealer network.

IBM said no new dealership applications were allowed to be filed after Nov. 18 but that dealers with outstanding applications or other exceptional situations could submit information until Dec. 6.

Hitachi to add U.S. plant

OKLAHOMA CITY — Hitachi Ltd. announced last week that it will begin manufacturing mainframe disk storage units at a $9 million plant in Norman, Okla., in 1987.

The Japanese computer and electronics giant will form a U.S. subsidiary, Hitachi Computer Products America, Inc., to make the units. The plant may produce optical disk storage products in the future, Hitachi President Katsushige Mita said.

Separately, Hitachi announced an agreement with Sperry Corp. to explore mutually beneficial research and marketing ventures. Sperry will consider using Hitachi technology in its 1100 series systems and selling Hitachi peripherals on an OEM basis.

FCC proposal backed

Regionals approve Inquiry II revisions

By Bryan Wilkins

WASHINGTON, D.C. — The seven regional Bell holding companies enthusiastically endorsed the recently proposed revision of the Federal Communications Commission's Second Computer Inquiry rules separating enhanced services from basic telecommunications. By contrast, the major computer and telephone hardware associations said the regulatory regime does not need revision.

More than 90 parties filed comments by a recent deadline set by the FCC on its plans to loosen Computer Decision II separation guidelines to let market forces dictate when to apply regulations. The FCC said that enforcing the barrier between enhanced services and basic telecommunications has resulted in a chilling effect on innovation, exemplified by vendors' failure to introduce voice-activated communications.

Significantly, the U.S. Department of Justice signaled its cautious approval of the FCC's proposed regulation, dubbed "Computer Inquiry III," calling it "an appropriate response" to changes in the market since the breakup of AT&T in January 1983.

The Computer and Business Equipment Manufacturers Association, the North American Telecommunications Association and the Computer and Communications Industry Association all said they oppose relaxing the regulatory separations of Computer Decision II.

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Value of industry mergers increases

By Clinton Wilder

FRENCHTOWN, N.J. — The value of mergers and acquisitions in the information industry in the first six months of 1985 more than doubled from the year-earlier period, according to the Cerberus Group, Inc.'s annual merger activity analysis.

The Cerberus Group reported that while the 102 corporate transactions whose financial terms were disclosed equaled approximately the same number (104) as in the first half of 1984, the value of those deals soared 119% from $3.62 billion to $7.94 billion.

Led by General Motors Corp.'s estimated $5 billion buyout of Hughes Aircraft Co., the value of the industry's top seven deals reached $7.43 billion, a 117% jump over $3.4 billion in the first six months of 1984. Except for Eastman Kodak Co.'s $175 million purchase of Verbatim Corp., all of the top seven "megadeals" ($145 million or greater) in the period involved vendors of telecommunications equipment or services.

Perhaps the most significant of those was IBM's estimated $1 billion purchase of 16% of MCI Communications Corp., considered Big Blue's most aggressive move to date in its battle with AT&T.

Citing that historic agreement, the Cerberus Report said that IBM, AT&T and GM (with its 1984 purchase of Electronic Data Systems Corp.) can be considered "sovereign information states" — powerful, monopolistic corporations with more influence and more revenue than most nations. According to the report, such companies control the bulk of the most valuable commodity in today's economy — information.

"Information and wisdom have become the new high ground for our information society," Cerberus publisher Charles C. Varga wrote in the report's introduction.

In the software and services business, the largest companies are increasingly dominating the market, according to Cerberus. Comparing full-year 1984 statistics with those of 1983, the number of firms with revenue of $500 million or more grew from nine to 13, and the percentage of industry revenue accounted for by those firms jumped from 49.3% to a majority 60.1% ($14.3 billion).

"Our industry's composition is changing," Varga said. "We see a threat in this change — the threat of a new form of imperialism, no longer based on acquisition of earth-bound territories but on acquisition of information."

Telephone distributors to decrease

WASHINGTON, D.C. — The number of independent telephone distributors will be reduced drastically over the next two years as the interconnect industry goes through a period of retrenchment and consolidation, according to an independent distributors' trade group.

The North American Telecommunications Association said recently that its member firms are losing market share to the seven regional Bell holding companies and AT&T.

The association predicted that the independents' market share will decline from 52.5% of annual aggregate customer premises equipment sales in 1984 to 45.3% in 1985 and 34.9% in 1989. Regional holding companies' sales will increase from 12.5% in 1984 to 16.7% in 1985 and 25.2% in 1989.

It also predicted that AT&T's share of sales will rise from 26.6% of the market in 1984 to 29.9% in 1985 and to 32.2% in 1989.

Total sales revenue for the independent interconnect industry, which peaked at $3.9 billion in 1983, dropped to $3.5 billion in 1984.

— Bryan Wilkins

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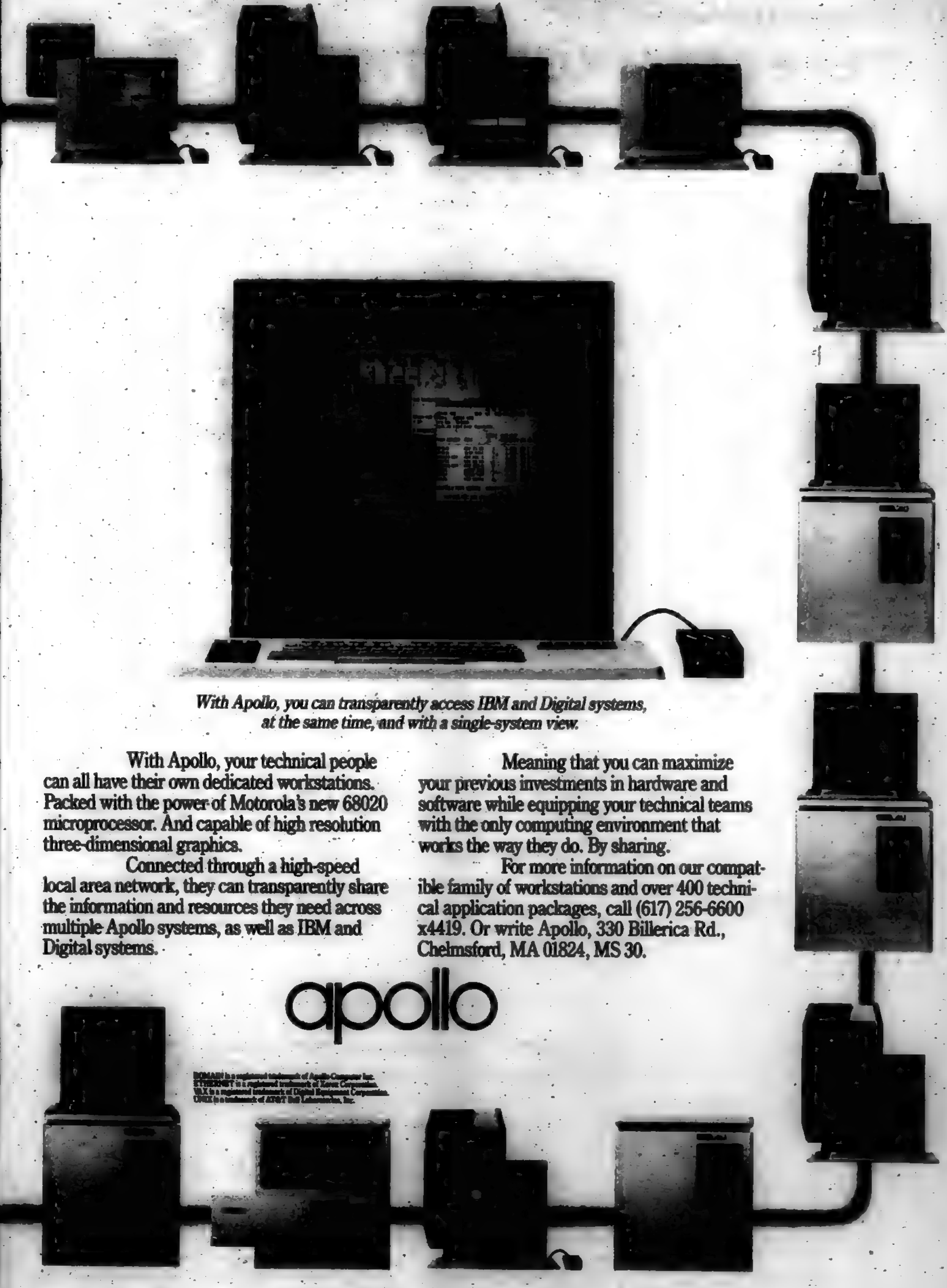*With Apollo, you can transparently access IBM and Digital systems, at the same time, and with a single-system view.*

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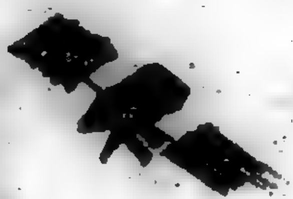

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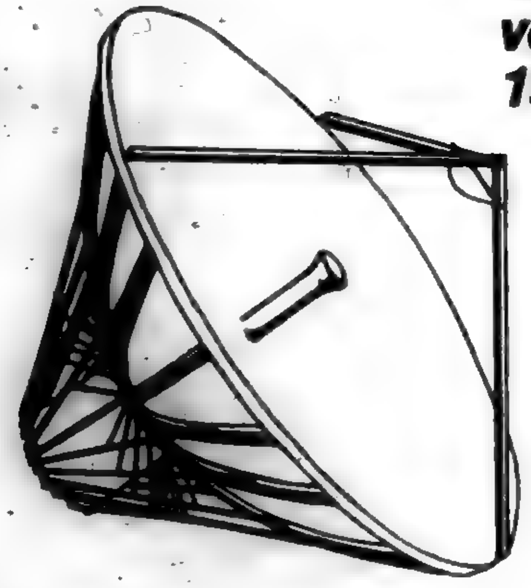

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Royalty fee cuts please dealers

By Maura McEnaney

HAYWARD, Calif. — Franchisees at Computerland Corp. retail stores say the recent reduction in franchise royalty fees is an indication that things at the troubled retail chain are changing.

In a videotaped announcement released to franchisees, Computerland Vice-Chairman Edward Faber, who returned to the organization after a two-year absence, outlined several changes in the structure of the financial relationship between the Computerland corporate organization and its 500 franchisees.

Those changes include a 1% reduction in the royalty fees that franchises must pay the corporate organization for the right to be a Computerland store. Store owners will now pay the corporation approximately 7% of annual sales.

Royalty fees have been a sore issue for Computerland dealers, who have been suffering through a depressed retail market. Lagging sales and dissatisfaction with management have put franchisees at odds with the corporation, which has been consumed in a multimillion-dollar suit with an investment group for more than five years.

However, the new management and the recently announced fee structure is a signal that things are warming up between the two groups. "The corporation now has a renewed interest in the business success of the franchisees," said Richard Mandel, general manager of three stores in the Sacramento, Calif., area.

Mandel, former director of development at Computerland corporate headquarters, said he is encouraged by the new direction that Faber brings to the organization. In the weeks since he took control, Faber eliminated Computerland's divisional structure and trimmed job functions. Along with the royalty fee reduction, Faber announced that Computerland will pick up inbound freight charges and insurance costs previously split among franchisees.

IBM, Agri-Data ink pact

MILWAUKEE — IBM and a small agricultural reporting service, Agri-Data Resources, Inc., last week announced that they will jointly develop new farm information services to be offered over IBM's Information Network.

IBM reportedly is committed to investing an undetermined amount of cash toward the development of information services by Agri-Data that will be targeted at the agribusiness sector.

Agri-Data will also be able to market its services in conjunction with IBM hardware products.

Richard Weening, president of Agri-Data, said that there are approximately 300,000 to 500,000 micro terminals currently used in the farming sector, of which 100,000 are located in agribusiness companies.

Strategic move

Weening called the joint development agreement with IBM a strategic move for both companies.

Agri-Data's Network Service was started in 1983 and offers agricultural sector news, electronic mail, commodity quotes, advertising and sales outlets to farmers and agribusinesses.

Agri-Data previously reached a joint marketing agreement with MCI Digital Information Services to deliver its information services over MCI Mail's network.

Uccel plans to sell services business

From page 93

4381 and will retain its Sperry Corp. Univac-based systems software business. Uccel held the latter business when it sold its $9 million Univac data processing services unit to Bechtel Power Corp. in October.

Uccel also retains its profitable Zurich-based international services unit, estimated to be a $30 million to $35 million per year business.

Frumberg praised the sale to Babcock & Wilcox as a positive financial step for Uccel. "They're getting out of a business that was bleeding," he said. "It takes a lot of the uncertainty out of the intermediate term as far as earnings are concerned. Uccel is now a much more streamlined, lower risk company."

Brian Mutert, an analyst with San Francisco-based Robertson, Colman & Stephens, said Uccel plans to write off most of the services business at year'send if the sale to Babcock & Wilcox does not go through. He predicted the sale price will be "minimal — book value or slightly above."

"MSA showed the way last year by reporting [Peachtree Software, Inc.] as a discontinued operation before they sold it," Mutert said, referring to Atlanta-based Management Science America, Inc.'s divestiture of its slumping microcomputer software unit. "Services are excess baggage that Uccel does not want to carry into 1986. If they can sell it, that's just gravy, and they can use the cash."

Uccel's moves to expand its software business have resulted in some $52 million worth of acquisitions in the last two years.

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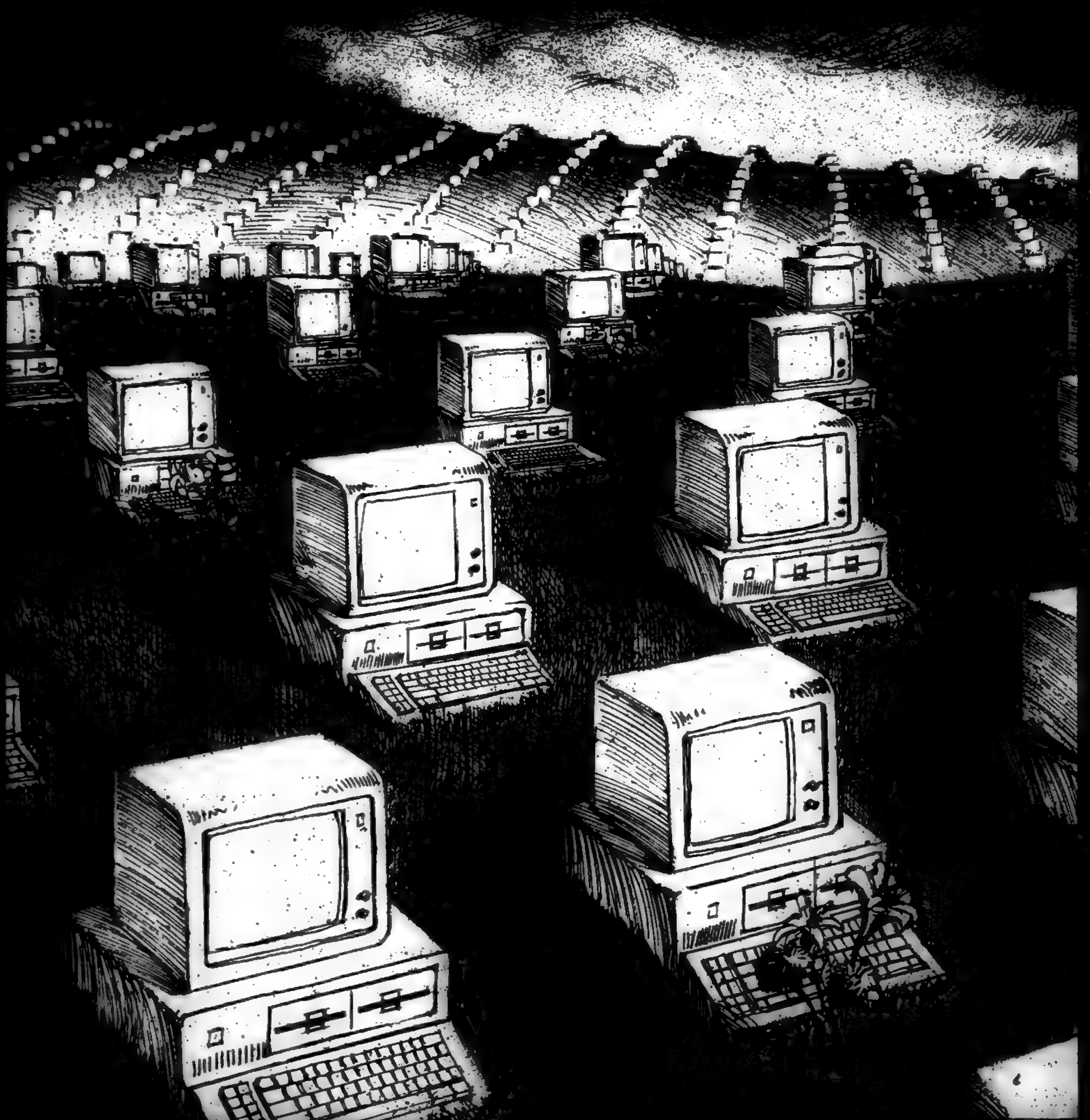

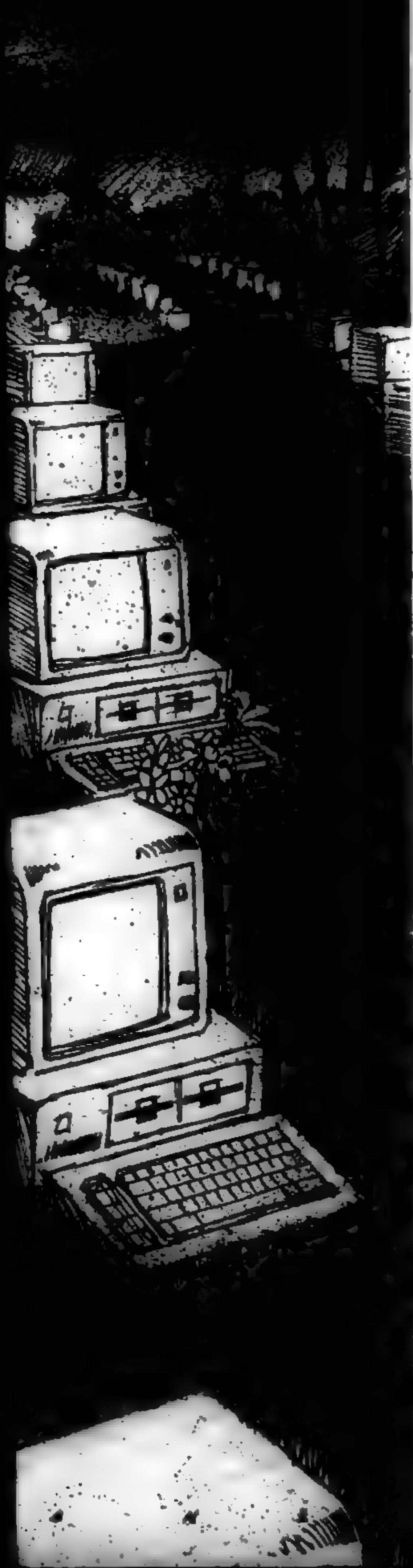

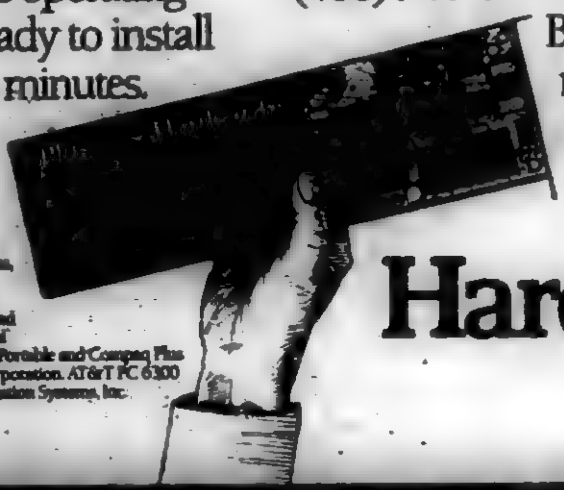

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Solids modeling shapes European CAD mart

Advantages cited over wire-frame technology

By Edward Warner
Computerworld News Service

Blame it on Pierre Bezier.

A relatively unknown French mathematician, Bezier developed the mathematical concept that made possible the modeling of solid images on a computer-aided design (CAD) system. European CAD vendors have since taken the lead in solids modeling, and now solids modeling technology is a hot item in what is otherwise a very cool U.S. market for CAD software.

A measure of the success that solids modeling is bringing to European CAD software vendors came at the Autofact '85 Conference and Exposition, the recent international factory automation trade show in Detroit. There, Matra Datavision, the U.S. subsidiary of the French electronics firm Matra S.A., announced a 76% increase in sales for its third quarter, giving it a 103% increase so far this year.

At that rate of sales increase, according to Vice-President of Eastern Operations John Olszewski, Matra Datavision will at least match its 1984 revenue increase of 130% by the end of this year.

Though CAD was developed in the U.S., CAD software vendors in the U.S. have suffered through the 1985 slump with layoffs, cutbacks and quarterly statements awash in red ink.

The difference, according to Olszewski, is not due to the oft-cited sluggishness in the manufacturing sector but instead is due to the preference of manufacturers for the newer solids modeling technology over the wire-frame modeling technology that was pioneered by U.S. vendors.

U.S. vendors recognizing trend

Recognizing this, three U.S. CAD software vendors are marketing solids modeling software from either of two British firms, Shape Data, Ltd. or Interactive Data Systems. Other U.S. vendors have introduced solids modeling options for use with their mainline wire-frame CAD packages.

Solids modeling offers users several advantages over wire-frame modeling. In wire-frame modeling, a part is designed by connecting lines together at points; images drawn on wire-frame modeling systems show perspective but do not have solid walls.

"If I put a cylinder into a box [while using] a wire-frame [modeling package], the wire frame does not know there is a cylinder there," according to Bernard Jeffroy, Matra Datavision's vice-president for technical support.

Other solids modeling advantages, Jeffroy said, include the ability to let users measure an image's volume and surface area, a particularly useful feature if the product under design is to be painted.

Matra unveiled option for Euclid

At Autofact '85, Matra introduced a leading-edge option for its Euclid solids modeling software that permits users to send a solid image directly from a Euclid CAD display to a programmable milling machine for production. The display-to-milling machine option, named Surfapt, was developed over 10 years by the French automaker Renault and contains almost as many lines of code as Euclid itself. Surfapt, priced in the $20,000 to $60,000 range, will reside as a module inside the Euclid software, making it readily available for users who want to cut the time it takes to create a product or part, Jeffroy said.

Though several U.S. firms now market solids modeling options for their CAD packages, Matra's Olszewski claimed his firm's 10-year-old Euclid program still holds an advantage in its ability to store all of its images in a central data base, something which most CAD packages do not offer. Olszewski believes that in an era when manufacturers are seeking to centralize factory automation, central storage of CAD images may be almost as attractive as solids modeling itself.

Micro products flood industry

From page 93

ness and so forth. Because there are too many products, prices tumble and customers realize they can go directly to the manufacturer if they want. This creates too many channels and too many dealers."

Part of the channel conflict can be attributed to what one retail executive called the "greedy growth rate" among vendors. "So many vendors want to get into a section of the business first and block everyone else out," according to M. Leonard Simon, regional president of Inacomp Computer Centers, Inc. in Garden Grove, Calif.

Because of this, vendors often create more of a product than the market will support. "Then they've got to find a way to shove it into the market, and the way to do that is to open any channel of distribution they can," according to Bill Murto, vice-president of sales at Houston-based Compaq Computer Corp.

As a result, dealers are often saddled with more products than they can sell, which creates another industry problem: the gray market.

"Very large delivery orders can cause dealers to try and move some product sideways to unauthorized dealers," according to Bill Murphy, group marketing manager of Hewlett-Packard Co.'s personal computer group in Cupertino, Calif.

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Business notes: ADP acquisition

From page 93

Automatic Data Processing, Inc. aggressively increased its stake in the on-line financial services market by acquiring Bunker Ramo Information Systems from Allied-Signal, Inc. Terms of the acquisition were not disclosed.

Bunker Ramo, a Trumbull, Conn.-based terminal and services vendor, trails only Quotron Systems, Inc. in the stock quote information business with a 30% market share.

Reversing its earlier assurances to shareholders, Control Data Corp. omitted its fourth-quarter dividend of 18 cents per share of common stock. The omission was apparently part of CDC's negotiations with its creditor banks on debt restructuring.

■

With an estimated $1.95 billion in sales, NEC Corp. slipped ahead of Texas Instruments, Inc. for the first time as the world's leading producer of noncaptive semiconductors in 1985, according to Integrated Circuit Engineering Corp.'s annual industry report. Next on the list were Hitachi Ltd.; Motorola, Inc.; Toshiba Ltd.; Fujitsu Ltd.; Intel Corp.; and National Semiconductor Corp.

Comdex/Fall's high-tech party

From page 93

But the general tone of the show was sounded by the banner headline on the first edition of the official show daily, which proclaimed, "Industry Rebirth Begins Today." Some who walked the show floor all day, including this reporter, must have missed it: But what other kind of self-aggrandizement would you expect from a trade show in which the "lock note" speaker chairs a company producing not hardware or software, but public relations?

Let's not be too hasty to criticize, however. Every industry deserves at least one occasion per year to come together, pat its collective self on the back and feel for at least four days that the go-go days of yesteryear — well, all of two years ago — are just around the corner. While no one is quite sure what 1986 will bring to the micro industry — except more IBM Personal Computer AT clones — we can be sure that there will be another great high-tech party on Nevada's most famous stretch of highway come November 1986.

Zenith Data Systems Corp. President Robert Dilworth, whose firm has solved the IBM Personal Computer-compatible riddle better than most, was asked about the supposed hot topics at Comdex — local-area networks, AT&T's Unix and the rumored IBM laptop model. Dilworth broke into a grin under his mustache.

"Every year at Comdex we say networks, every year we say Unix, and we've been wrong for three years now," he said. "In our company, we're just going to keep moving boxes."

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CWD-1

Ashton-Tate posts 92% increase in third-quarter profits

Framework II, Dbase III credited

By Clinton Wilder

Overcoming a sluggish industry with strong sales of its Dbase III and Framework II programs, Ashton-Tate recently reported a 92% increase in profits on a 16% gain in revenue for the third quarter ended Oct. 31. Separately, Uccel Corp. reported that third-quarter income, before extraordinary credits, rose 7.5% from the like year-earlier period.

Ashton-Tate, which recently moved its corporate headquarters from Culver City, Calif., to Torrance, Calif., reported sales of $28.6 million, compared with $24.7 million in the year-earlier quarter. Net earnings were $4.8 million, or 49 cents per share, compared with $2.5 million, or 27 cents per share, a year ago.

The 1984 figures exclude a one-time extraordinary gain of $1 million, or 10 cents per share.

President and Chief Executive Officer Edward M. Esber Jr. said sales of Dbase III continued to be healthy, and initial shipments of Framework II had been well received in the marketplace.

International sales up

He said international sales have also increased. Ashton-Tate signed an agreement during the quarter with Brazilian firm Datalogica to have Ashton-Tate products distributed in Brazil.

Ashton-Tate's sales for the first nine months of 1985 were $80 million, up 45% from $55.1 million in 1984.

Dallas-based Uccel reported that its profits for the third quarter ended Sept. 30 rose from $2.1 million or 13 cents per share a year ago to $2.3 million or 14 cents per share.

Income from operations, however, rose 58% from the year-earlier period, while earnings from investments dropped by 30%. Sales increased 18% from $42.7 million to $50.5 million.

A spokesman said the company's profits rose "significantly" during the period, despite a spending slowdown in the IBM mainframe software market.

House reviews market-opening measures

By Bryan Wilkins

WASHINGTON, D.C. — The U.S. House of Representatives Energy and Commerce Committee recently sent to the House membership two far-reaching trade bills designed to open foreign markets to U.S. goods by threatening to bar entry of imports to the U.S.

The Trade Law Modernization Act (H.R. 3777) calls for a much stronger U.S. response to perceived foreign trade barriers and unfair export practices targeted at the U.S.

It is staunchly opposed by Reagan administration officials who argue that it promotes protectionism.

Greater presidential authority

The bill would give greater authority to the president to assess surcharges on imports that are determined to be subsidized by foreign governments before entering the U.S.

Additionally, the Department of Commerce would be authorized to take action against foreign governments using discriminatory procurement practices and regulatory requirements.

Tough retaliatory measures also accompany the bill, which is expected to reach the full House for a vote next month.

A foreign firm would be barred from exporting to the U.S. if it were found to have violated fair trade laws three separate times within 10 years.

Law would require action

Additionally, the law strengthens Section 301 of the 1974 Trade Act by requiring a new administering authority to take action when foreign industrial targeting of specific markets has been found to exist by the International Trade Commission or by the Commerce Department.

The second bill approved by the House Commerce Committee, the Telecommunications Trade Act of 1985 (H.R. 3131), would require the Reagan administration to determine whether unfair trade barriers exist in international telecommunications markets.

The Federal Communications Commission would be authorized to deny equipment approval and registration should a foreign country decline to loosen import restrictions.

U.S. Rep. Timothy Wirth, (D-Colo.), chairman of the House Telecommunications Subcommittee, said such provisions are needed because of the deteriorating U.S. balance of trade in telecommunications products.

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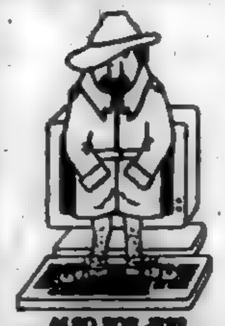

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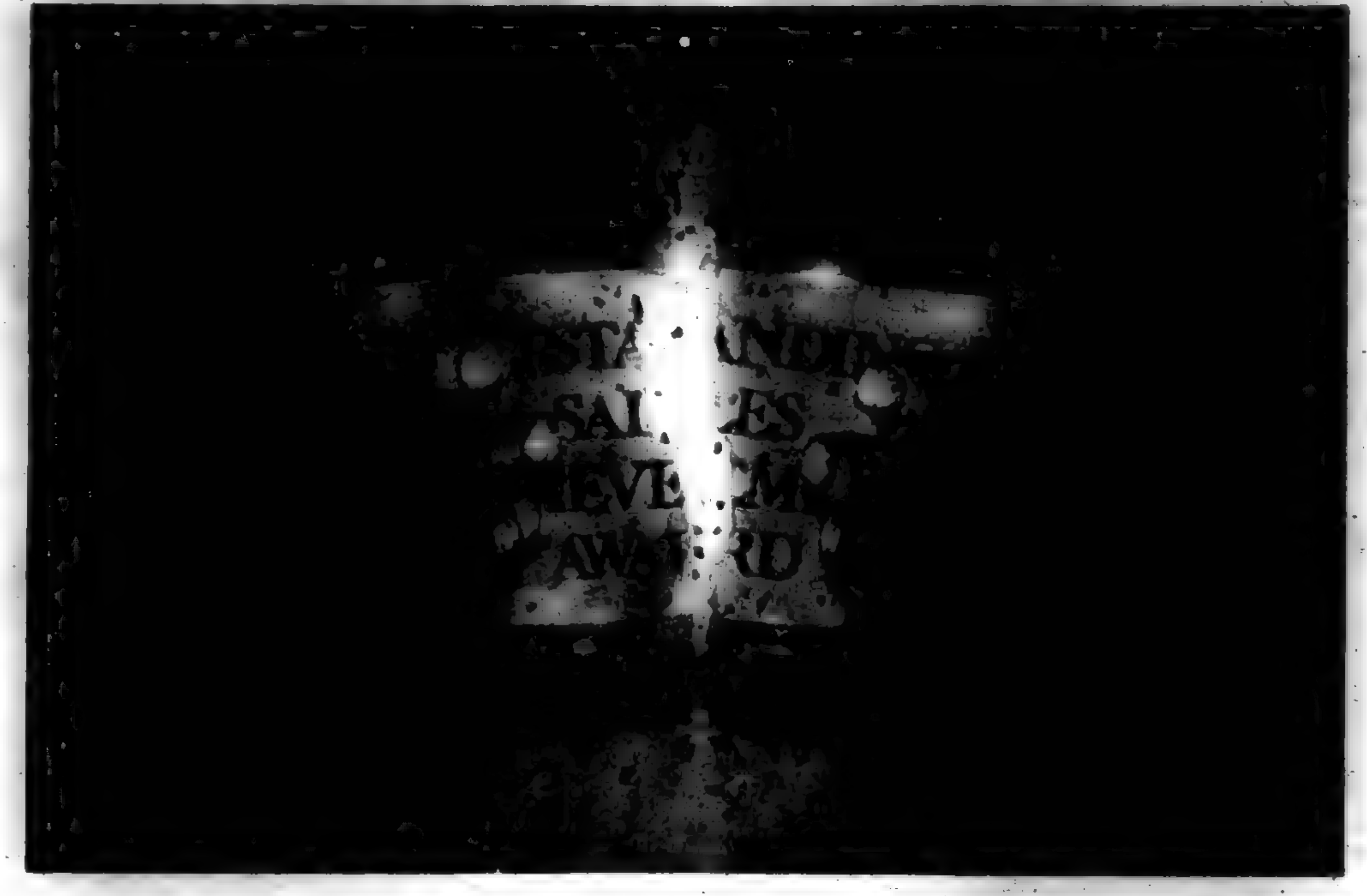

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FACULTY POSITION COMPUTER SCIENCE

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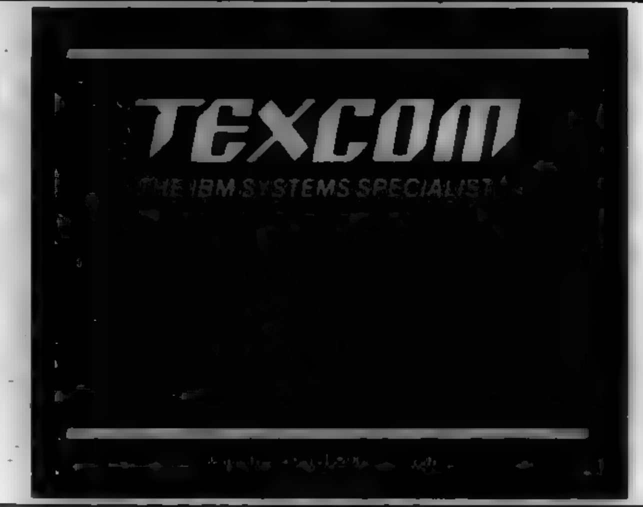

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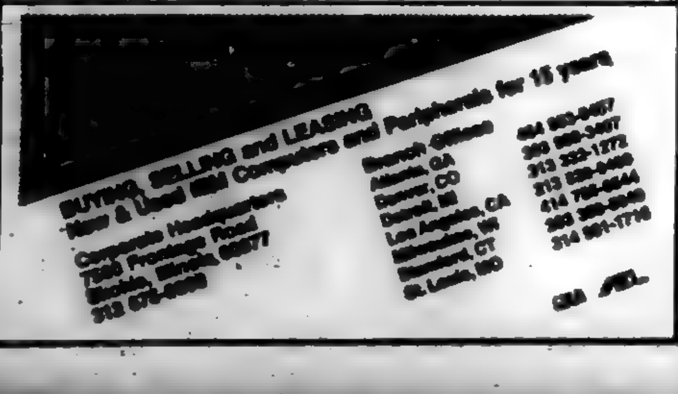

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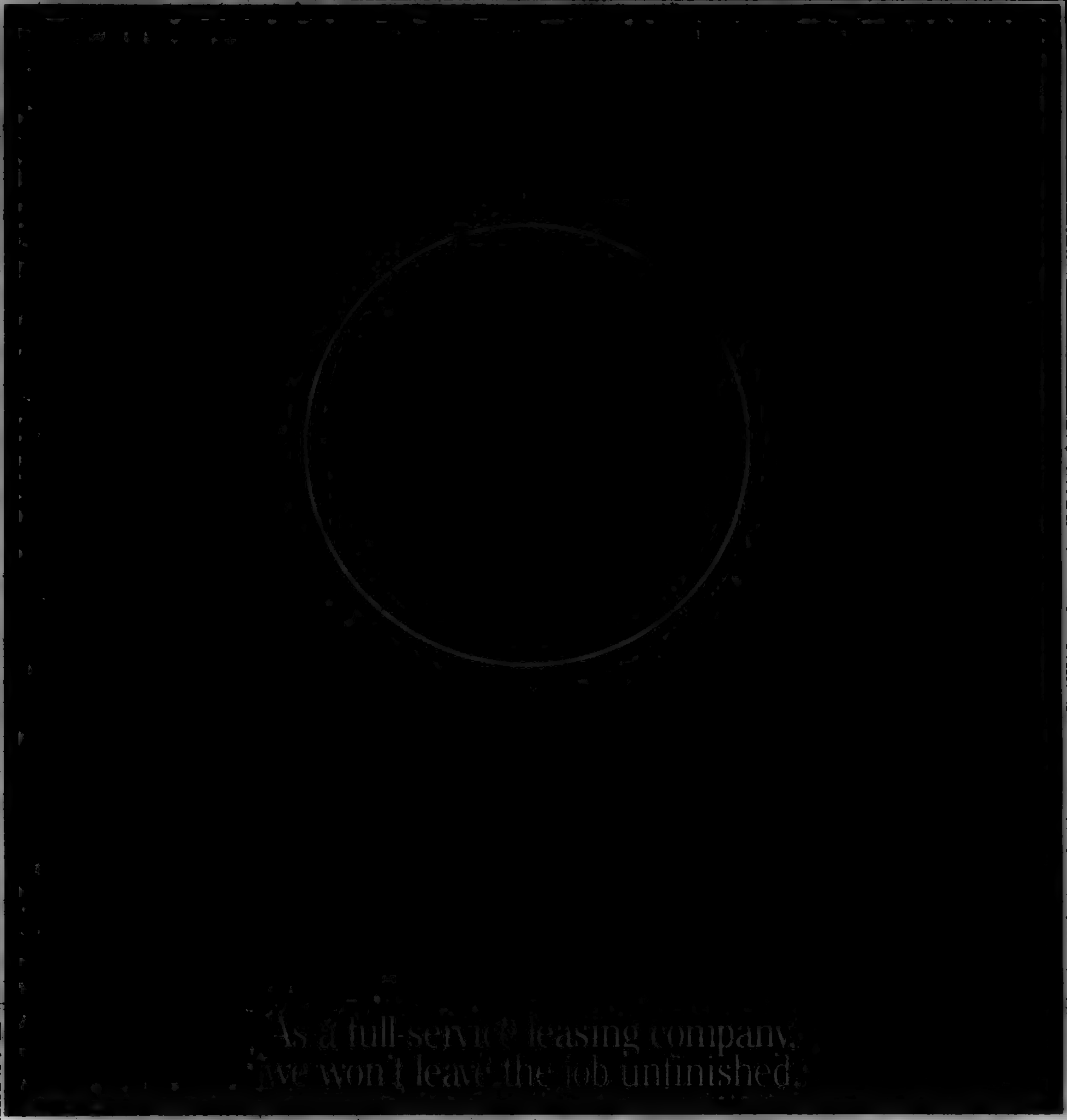
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Request for Proposal No. 1034, due Tuesday, December 17, 1985 at 3:30 p.m. for the acquisition of a telephone system for the Rankin County Prison Facility of the DEPARTMENT OF CORRECTIONS.

Request for Proposal No. 1035, due Monday, December 23, 1985 at 3:30 p.m. for the acquisition of a multiprogramming minicomputer for COAHOMA JUNIOR COLLEGE.

Request for Proposal No. 1036, due Tuesday, December 10, 1985 at 3:30 p.m. for the acquisition of a front end communications processor and system printer for the Gulf Park Branch of the UNIVERSITY of SOUTHERN MISSISSIPPI.

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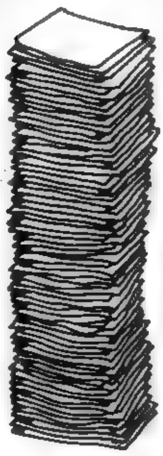

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

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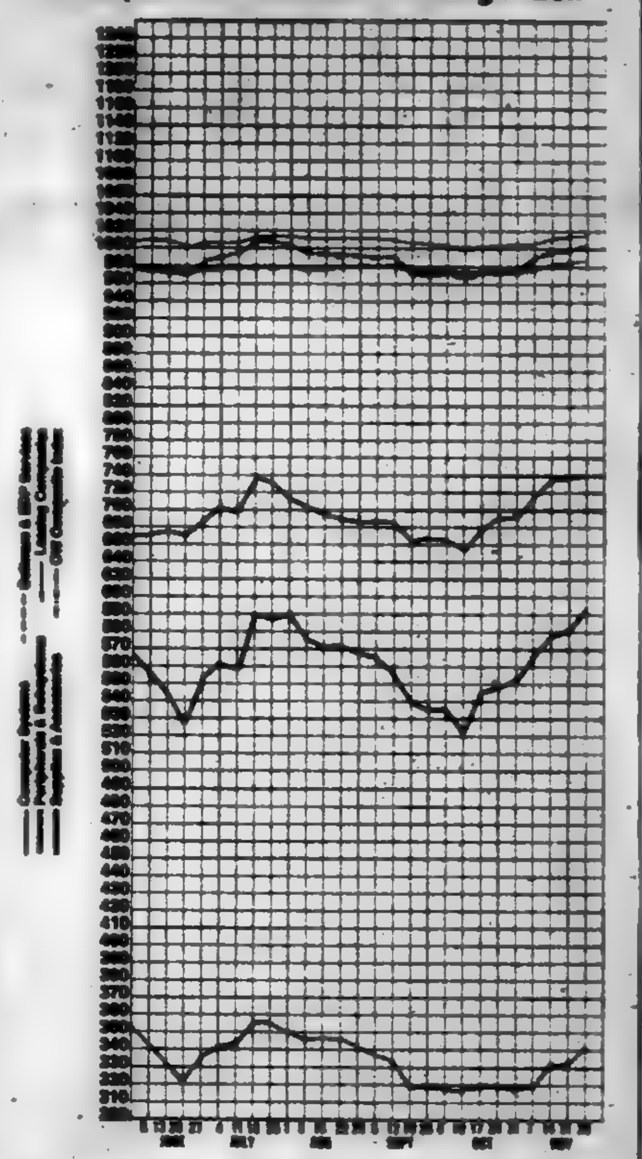

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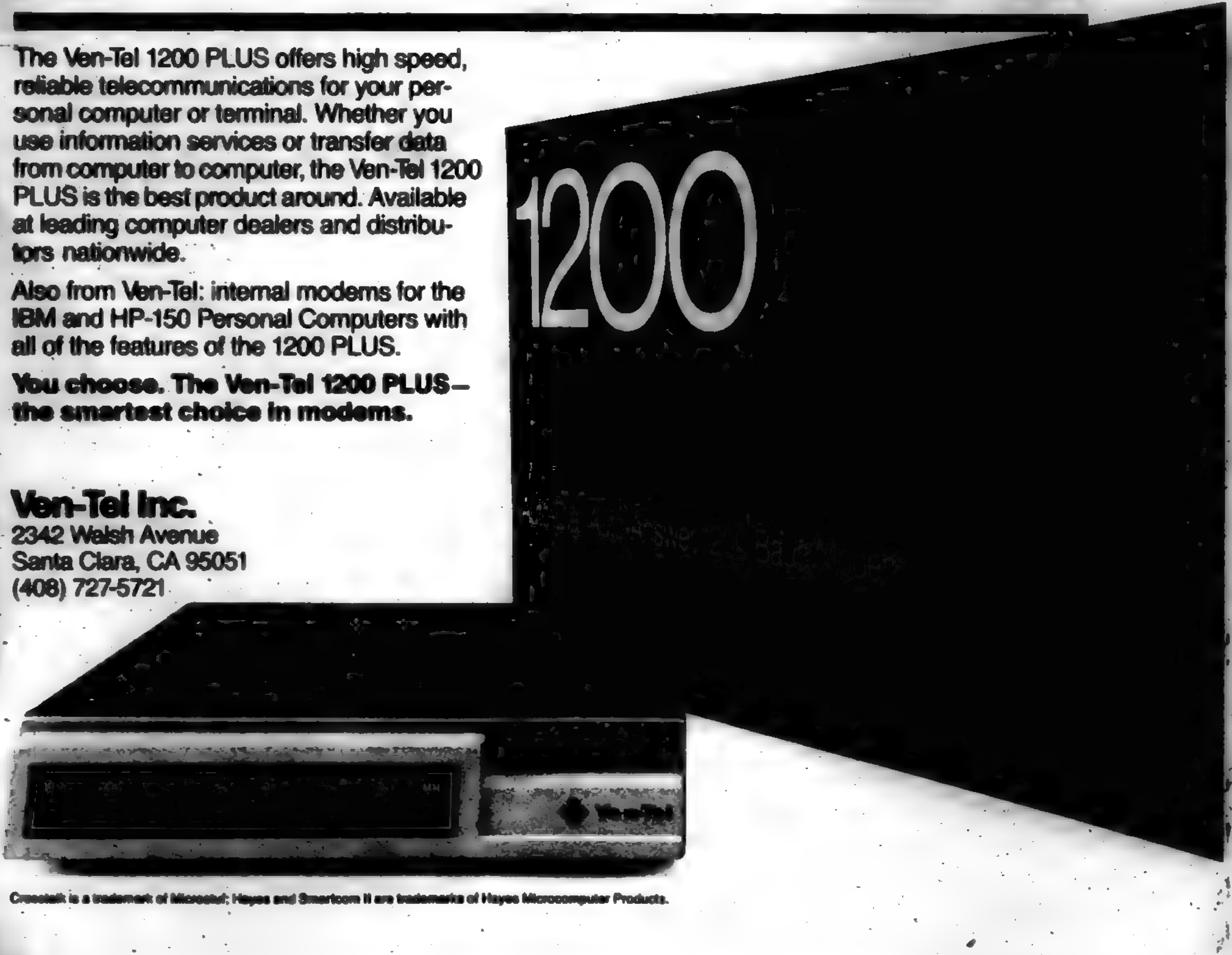

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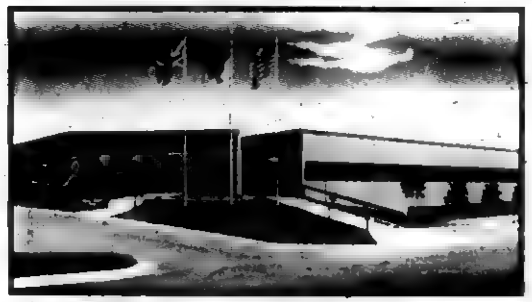

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Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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Computerworld subscription prices: $2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). *Computerworld Extra!* single copy price: $5.00. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

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POSTMASTER: Send Change of Address to Computerworld, Circulation Department, P.O. Box 1016, Southeastern, PA 19398-9984.

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Catching up with IBM

[illegible] the entire industry to the IBM [illegible] best observers can do is take a good shot of the [illegible] target and then analyze what they see.

That's what we asked our writers — including Gideon Gartner, Frank Gens, George Colony and Paul Hessinger — to do.

This Computerworld Extra is broken into three main sections: The Company, Products (and Alternatives) and Strategies. Remember the alternatives — our authors mention many. The issue is all about IBM, but we're not implying that the best products or services are necessarily IBM's. Then again, we're not implying that they aren't either. (That's our disclaimer.)

We tried a radical approach to IBM in this issue: We asked questions and actually expected answers. "Ask IBM" runs on page 116. You don't often see those two words — "Ask IBM" — together because no one (no journalist, anyway) expects the folks at Armonk to answer a direct question. We decided to ask anyway, as kind of an experiment. Executives at Citicorp, Amoco, Cornell University, Western-Southern Life Insurance Co. and Cities Service furnished the questions. You judge whether IBM answers.

[illegible] going to [illegible] on page [illegible] analyze IBM's NTT [illegible] in Japan, its shipping [illegible] in France, the ending of [illegible] to its doing business in Brazil, discounting in Australia and more.

In "Comment," we present Gartner's overview of IBM's recent hunger for mergers and acquisitions. Also, International Data Corp.'s Gens takes apart IBM's distributed processing strategy and finds a mainframe inside.

In the Strategies section, Colony writes that the Personal Computer is looking a bit shabby these days and predicts the imminent arrival of a dressed-up PC2. In the Products section, Hessinger tells where IBM is taking users of IMS and DB2, like it or not.

Finally, if you have your own comment about IBM, Computerworld Extra or the computer industry in general, drop us a line. We'll respond.

Comment

Buying big to grow big

By Gideon Gartner

During the late 1970s, IBM decided to raise its internal growth objectives. The company, which by ordinary business standards had achieved a fairly steady growth in revenue and earnings of 13% per year for five years, was going to attempt an extraordinary feat — increasing its trendline growth by three percentage points or more to a minimum of 16% per year.

Anybody with a calculator could compute the mind-boggling implications immediately. Over the next 10 years, the difference in aggregate IBM revenues between the new 16% objective and the old 13% actuality would exceed $150 billion. By the end of this 10-year period, IBM would be generating $50 billion more in revenue per year — a sum equivalent to the size of IBM today.

Fundamental to this increase in expectations was IBM's belief that the industry at large was growing at approximately a 16% rate. With the shackles of antitrust behind it, IBM management realized that its fiduciary duty was to attempt to grow at least as fast as the market as a whole. This attitude stood apart from the company's performance in recent decades, when it customarily lost market shares year after year.

How was IBM to achieve this huge and discontinuous expansion in growth rate?

Its first strategic thrust came in a substantial increase in capital investments. Throwing dollars at plant expenditures and creating production capacity at a rapid rate, IBM put itself in a position to produce the volumes necessary to meet its new objectives.

Make vs. buy

Of course, this indulgence was to result in significant competitive implications, such as an aggressive cost structure and shorter delivery cycles that produced a bigger market share for IBM. Its objectives were, at least from its internal viewpoint, rational and responsible.

Gideon Gartner is president of Gartner Group, Inc. in Stamford, Conn.

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Comment

IBM rapidly found that with an increasingly diverse product line and larger business volumes, it would have to depend more on outside suppliers for components and peripherals. Thus, the company accelerated its diversification activities, primarily in the area of joint ventures, licensing agreements, OEM arrangements and so forth.

But soon IBM saw that its frequent make/buy decisions with respect to a component or system peripheral would have to be enlarged in concept. The issue of 16% growth hangs on a myriad of decisions that IBM had to make in succeeding years: whether the company could develop its system diversification in-house through innovation or whether it needed to make direct investments leading to possible buy-outs of other firms to meet its goals.

For three principal reasons, as IBM looks at the broader issues of make/buy, it has been slipping into the buy mode — apart from the obvious fact that diversification into businesses where IBM had relatively little expertise required direct investment in external organizations.

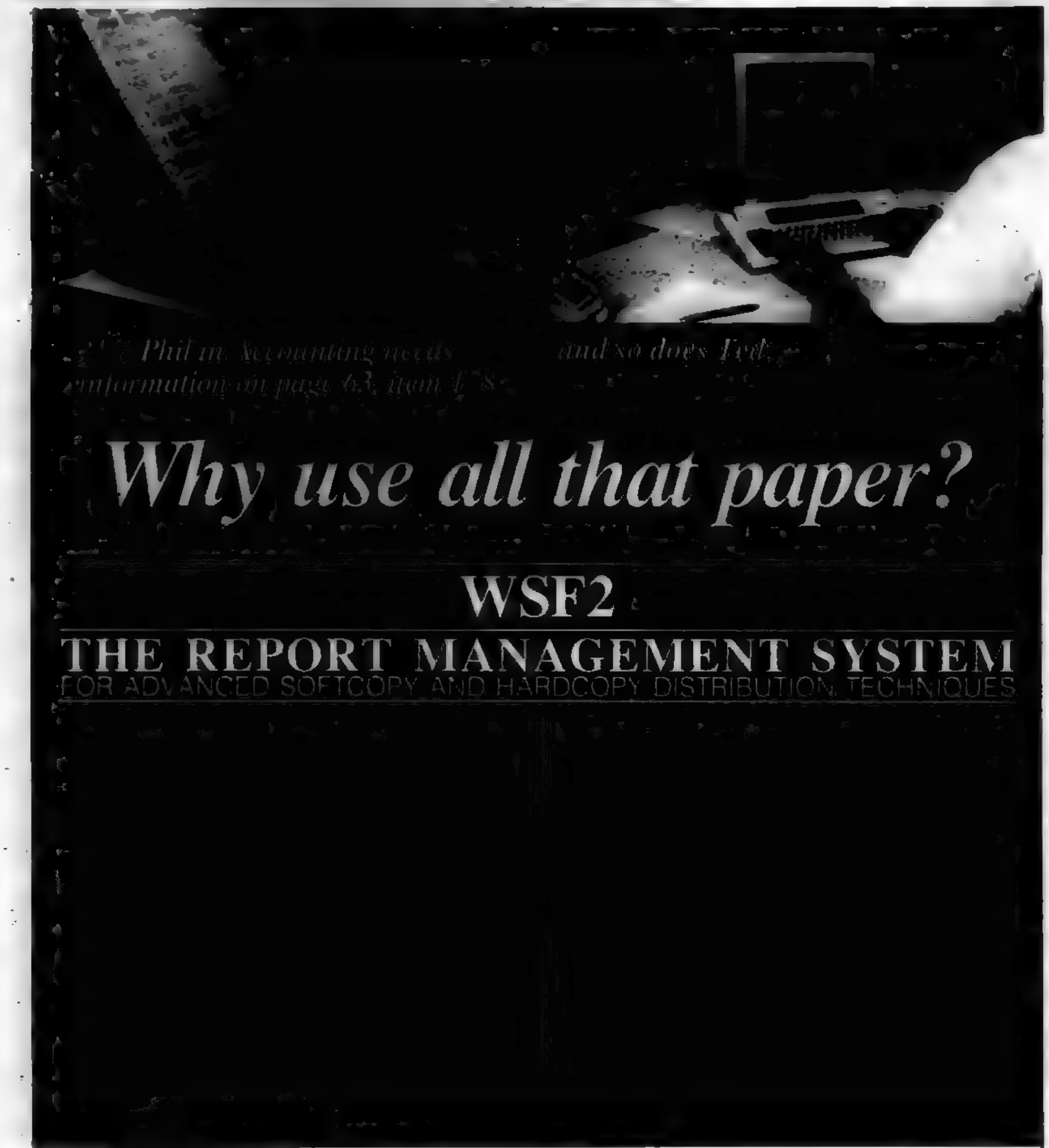
First, IBM has been forced to rethink its earlier assumption that the market, overall, was growing at 16%. What if the market didn't continue to grow? Then, clearly, IBM would find it strenuous — and the rest of the industry would find it exceedingly debilitating — to watch IBM attempt to grow at a rate substantially faster than the overall market.

This logic led to IBM's move to hedge its bets by buying. In the event that the overall market was to grow more slowly than its newly set 16% objectives, IBM could still meet its goals by absorbing revenue streams that other firms had built earlier.

Second, IBM's attempts at innovation in the 1970s did not go well. Except for the Personal Computer activity, the honeymoon with IBM's independent business units was ending fast.

As IBM failed, for a variety of reasons, to assimilate these units into the mainstream or to convert them into sizable businesses that could contribute meaningfully to IBM's goals, the company shifted gears toward the

> ***As IBM looks at the broader issues of make/buy, it has been slipping into the buy mode.***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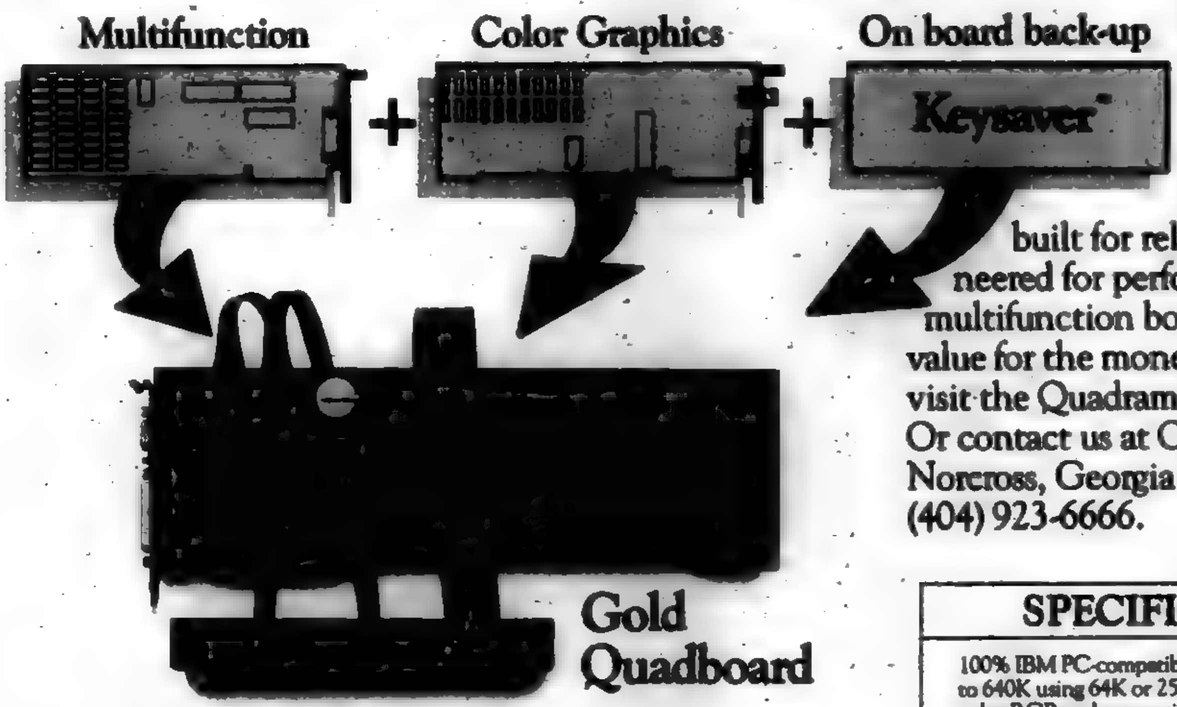

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need to accumulate revenue through external acquisition rather than through internal development.

Third, along these same lines, IBM recognized that there is an inherent conflict between achieving fast growth and maintaining high profit margins. All else being equal, these corporate objectives are mutually exclusive.

In terms of the margin, the next product being developed encompasses greater risk than the product before it. The company would naturally pursue its highest profit opportunities first. But as IBM jumps into diverse market opportunities, it is forced to embrace lesser product opportunities.

In this context, IBM found that some of its diversification adventures were achieving minimal profitability or, worse, losing bushels of money.

> ***IBM found that some of its diversification adventures were achieving minimal profitability or, worse, losing bushels of money.***

It appeared then somewhat more attractive to focus on external companies with visible profit functions as part of an overall diversification strategy.

Let's size up the problem for a moment. Referring back to our assumption that IBM would have to take in $50 billion by 1995 to achieve its new growth goals, how much of that might come from acquisition activities?

If the percentage is 25%, IBM would have to find $12.5 billion in 1995; if 50%, $25 billion.

So who must IBM go after? Obviously, the big companies. This explains IBM's sizable investments (from 20% to 100%) in Intel Corp., MCI Communications Corp. and Rolm Corp.

MCI and Intel are both $2 billion firms. While IBM has taken a minority interest in these (as it once had with Rolm Corp.), it clearly has a future call to expand its interest in those companies.

The most interesting concept to contemplate in light of IBM's new strategies is the scenario whereby IBM forces its growth at a faster rate than the rest of the industry's.

One is reminded of the French forecasts of the early 1970s, when that (acknowledgedly often paranoid) country foresaw IBM soaking up the entire infrastructure of the data processing and communications worlds on the company's inexorable path to industry domination.

The view of the French then, which still rings somewhat true 15 years later, held that the trend of complexity, combined with severe shortages of qualified manpower, would make the job of implementing information processing systems too difficult for most firms to handle.

In any case, implementation would be exceedingly expensive, even for companies on the bleeding edge.

Viewing informational power as similar to electric power, the French foresaw that, in the long run, users would be disinterested in the hassles of implementation and would pay a premium to buy computing power from huge utilities.

But at that point, the only firm in a position to offer such an information power utility was IBM.

While IBM's Information Network Service (INS) did not exactly set the world on fire when it was announced, it was a first step in IBM moving back into the service business.

Through INS, IBM has been learning how to deliver a variety of solutions, such as information centers and development centers based on very high-function and complex architectures, directly to the end user.

While it is beyond the scope of my comments to delve into the probabilities of success for such utility practices, this activity should be understood as one piece in IBM's long-term diversification puzzle.

In general, one should view IBM's thirst for acquisitions in the broader context of its natural competitive inclinations to sop up as much of the basic industry demand for information horsepower as possible.

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'Can we sell you a mainframe?'

By Francis Gens

> *If IBM does not adequately and quickly address distributed processing, it may well miss the opportunity to grab a large piece of the end-user computing market. Ironically, the Personal Computer has been the major catalyst in this area.*

Consider the following simple business problem: You are the chief executive officer of a major computer company that holds a near-monopoly of large-computer sales and achieves very high margins (80%).

To maintain growth and help smooth out revenue cyclically, your company diversified into other products, such as minicomputers and peripherals. However, large-computer sales continue to dominate revenue and, of course, earnings.

One day you are in a meeting, reviewing the company's growth strategy, when a vice-president from the minicomputer division notes that other minicomputer vendors are maintaining greater market share than your company, which has greater industry visibility, financial resources and technological muscle to throw at the market. And, he points out, "Who knows? With all the talk about distributed processing, the growth of the minicomputer market might rocket past that of large computers."

Here is the simple resource management problem:

■ Do you pour a large amount of capital into broadening and improving your minicomputer products and marketing effort, knowing that competition is more vigorous and margins are substantially less, on the chance that volume will compensate for lower margins and a stronger product position in minicomputers may yield strategic benefit several years hence?

■ Or do you continue to invest in the large-computer line, recognizing that its profitability and growth rate is sufficient to maintain earnings growth without the exposure that selling less profitable products against more skillful competitors would entail and adding in the risk that a successful minicomputer division might draw away demand for your large computers?

Crowd pleasers

If you were interested in maximizing growth and pleasing stockholders, you would probably do what IBM did during the rise of such companies as Digital Equipment Corp. and Data General Corp.: essentially limit involvement in the minicomputer/distributed processor market in favor of investing in a more profitable activity — selling mainframes.

During the past two to three years, however, IBM has invested heavily in the minicomputer "office automation" area. What has prompted the ever-prudent, financially sound computer giant to channel funds into what is, at this point, a less profitable business?

IBM is rapidly approaching the point at which the growth of the mainframe business (in dollars, not machine speed) will not keep up with IBM's growth requirements unless there are some changes in the application of mainframes — changes that acknowledge the existence of distributed processing.

In the past several years, a large part of IBM's incremental revenue growth has come from nonmainframe products, including its Personal Computer and program products. In the next four to five years, the growth of departmental systems promises to be very strong.

Many large corporations are now ready — with or without IBM — to implement corporatewide distributed processing systems (sometimes lumped together as "office automation" projects).

If IBM does not adequately and quickly address distributed processing, it may well miss the opportunity to grab a large piece of the end-user computing market. Ironically, the Personal Computer has been the major catalyst in this area, helping to create demand for departmental systems.

An about-face

Faced with an inadequate growth rate in the traditional mainframe market and an inexorable industry drive

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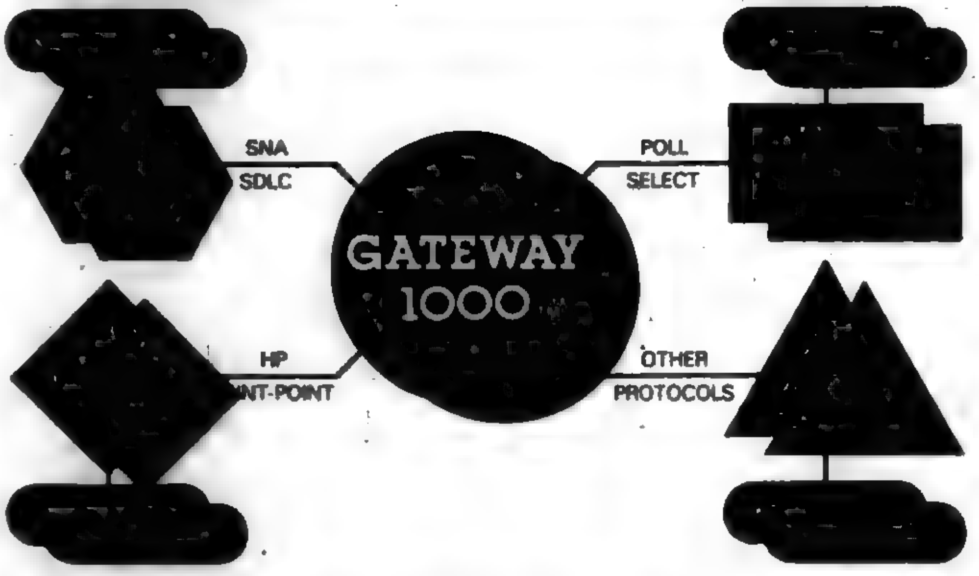
Francis Gens is Director of the IBM Systems Advisory Service at International Data Corp., a market research and consulting firm in Framingham, Mass.



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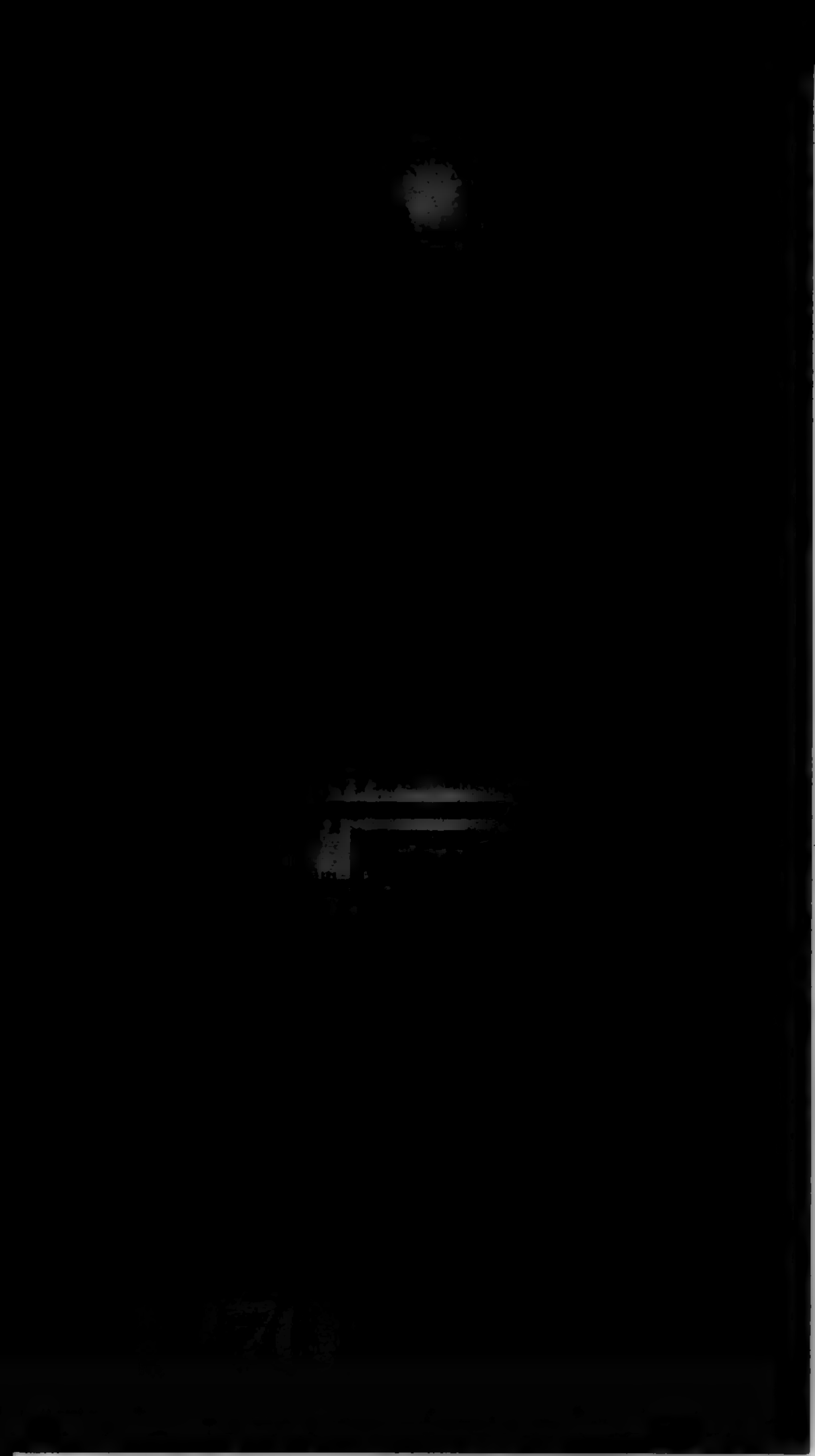

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toward distributed end-user computing, IBM has done an about-face and has begun to promote distributed processing. Not surprisingly, however, IBM's version of "distributed processing" is one that includes mainframes in a pivotal role — as providers of distributed processing services.

By establishing strong linkage between distributed processors and mainframes, IBM is attempting to hitch its relatively slow-growth but highly profitable mainframe business to the distributed processing market star. In the process, IBM also set industry standards — Systems Network Architecture (SNA), Distributed Office Support System (DISOSS) — for distributed processing networks, moving into the position of calling the tune for other vendors who attempt to sell distributed processors in large IBM accounts.

Critical to IBM's attempt to dominate the distributed processing market is the establishment of IBM-defined standards. IBM has a stranglehold on the mainframe market, owing to its control of the de facto 370 architecture and operating system standard. While IBM is not likely to dominate the actual distributed application environment so thoroughly, it is already on its way to controlling the communications links between distributed sites.

At the heart of IBM's distributed/mainframe linkage strategy are its SNA communications network control/diagnostics products. Virtually every large IBM account — including most of the largest corporations in the world — have installed at least one SNA-based network. Most such customers are committed to migrating existing multiple corporate networks into one coherent SNA network. Thus, SNA is emerging as the backbone for large corporations' networks.

The SNA standard

Most significantly, every major IBM competitor in the distributed processing market has accepted, if not endorsed, the SNA standard, and announced, at minimum, the ability to interface to the networks by 3270 SNA emulation.

As IBM introduces enhancements to SNA, such as non-host peer-to-peer communications (LU6.2), DEC, DG, Wang Laboratories, Inc. and AT&T are committed to following the leader.

With all distributed systems required to interface (either directly or indirectly) to mainframe-based SNA monitoring, control and diagnostic software, the more distributed systems added to the SNA nework, the more host resources required to support the network. This is the link IBM seeks to establish: For every distributed system added, there should be a concommitant increase in host computer speed required to support the distributed system.

Surely the amount of host resource required to monitor an SNA node does not come close to equaling the amount of processing resource in the distributed node; if this were so, distributed systems on an SNA network would be uneconomical. However, IBM will surely attempt to raise the host processor cost of distributed systems by layering many more mainframe-based distributed processing services on top of SNA networks. IBM's DISOSS is an excellent example of such a host-based service layered on top of SNA.

DISOSS — an IBM MVS program — provides document distribution and library services for distributed systems, including the System/36, Personal Computer and 8100 processor. DISOSS requires SNA software to perform its distribution functions. In fact, it uses IBM-defined architectural extensions to the SNA architecture, the Document Content Architecture (DCA) and the Document Interchange Architecture (DIA). In a sense, DISOSS provides a logical, application-oriented network that utilizes the SNA abilities to manage lower level network functions.

DISOSS' prominence

While DISOSS is still far from being as widely installed as SNA, it will emerge as the standard for communication of documents and electronic mail between multiple vendors' distributed systems and between non-IBM vendors' distributed systems and IBM hosts.

Some non-IBM vendors may actually use DISOSS to communicate between their own distributed systems in large IBM accounts. Indeed, both Wang and DEC already have introduced DISOSS interfaces for their office systems.

As a host-resource-intensive distributed processing service, DISOSS plays a role similar to SNA in tying mainframe growth to distributed processing network growth. And although IBM has indicated that some DISOSS-like services will eventually be provided for some IBM distributed systems, it is likely that IBM will enhance DISOSS with new features that still require its frequent use. Support of other forms of information (such as image, voice) and tighter integration with DB2 will be among these enhancements.

Data base access and management will be marketed as another mainframe-based distributed processing service. During the next several years,

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IBM will market DB2 as the central data base manager for its large accounts. Even with the introduction of distributed data base management systems from IBM and other vendors, IBM will continue to promote the maintenance of a central data base as either the primary repository or backup to distributed data bases.

To support this position, it is very likely that DB2 will be enhanced to provide services unavailable at distributed sites, such as data distribution services and maintenance of a global data dictionary/directory. In fact, DB2 and DISOSS could be integrated to share directories and support storage and retrieval of voice, data, text, images and graphics.

Although no IBM competitor has announced support for the DB2 standard, some vendors, including DG and several independent DBMS vendors, have announced support for IBM's SQL, DB2's query language. Support of SQL by these vendors implies that they believe DB2 will be the corporate data base management system for many large IBM accounts.

IBM's success with SNA, DISOSS and DB2 (to a lesser extent thus far) points out several things:

- IBM is intent on linking mainframes to the growth of distributed processing, expanding the role of the mainframe beyond traditional DP production jobs to include distributed processing services.
- Critical to IBM's effort to link distributed and host systems is the establishment of IBM-defined standards, which put IBM "in the driver's seat" and keep IBM competitors back on their heels.
- IBM competitors and users are rushing to embrace IBM-defined distribution processing network standards; to wit, independent standards efforts have had limited success thus far.

These facts suggest that IBM's linkage approach to distributed processing is working thus far. How will its ability to call the shots in distributed processing networks affect its users and competitors?

Good news, bad news

The good news is that standards for implementing multivendor distributed networks are emerging quickly.

The bad news is that IBM controls most of the new standards.

The drawback of IBM-defined standards for IBM competitors is that whenever IBM introduces enhancements to the standards — such as LU6.2 definition, support of images in DISOSS — IBM typically is able to deliver support of the enhancements six months to several years before other vendors. In most cases, however, the disparity becomes an important factor in sales only to users who require the new support immediately — a rare situation.

The bad news for IBM customers is that IBM-defined standards lock users into implementing distributed processing IBM's way — which is not necessarily the most efficient nor the least expensive way.

The good news for both customers and competitors is that IBM's imposition of standards at least provides some common basis for implementing multivendor distributed processing networks.

> ***Support of SQL by IBM's competitors implies that they believe DB2 will be the corporate data base management system for many large IBM accounts.***

The IBM-defined standards in networking and messaging, document formats and data base query/manipulation — along with de jure standards such as the IEEE 802 local-area networking standards (to which IBM adheres) — will allow users to put together clear "connectivity checklists" for distributed/departmental systems.

The final bit of good news for users and competitors is that IBM's role in establishing standards does not by itself guarantee it a dominant position in distributed processing. Competition in the distributed processing market has been vigorous, and IBM will be unable to establish a single operating system standard in that market as it has done in the mainframe market. Indeed, the departmental processor market in five years will feature six or seven dominant operating systems, including the proprietary VM (IBM 370), SSX (IBM System/36), VMS (DEC), VS (Wang) and MPE (Hewlett-Packard Co.), plus Unix (AT&T and others).

From the IBM perspective, however, the most critical goal is not domination of the distributed processor market but tightening the link between all vendors' installed distributed system and IBM mainframes, since mainframes remain IBM's most profitable products. That goal appears to be well within IBM's reach.

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Comment

IBM, Rolm and MCI vs. AT&T

By Charles Carroll

The long-awaited corporate battle between IBM and AT&T has been joined. IBM, virtually unchallenged in the data processing arena, has stormed into AT&T's domain — communications.

IBM accelerated this confrontation for a number of reasons. Its management is keenly aware of the strategic importance of communications for attaining dominance in the information industry. IBM must make a strong showing in communications if it is to reach its stated objective of annual sales in excess of $100 billion by 1990.

Gaining account control

Furthermore, establishing a strong communications program is essential to account control, the keystone of IBM's marketing philosophy. IBM wants to make its move while AT&T is still shackled by divestiture-related constraints and regulatory controls.

IBM's Corporate Management Committee endorsed a strong move into the communications arena in the early 1970s, when communications technology limited the deployment of distributed data processing.

After years of substantial research and development, experience in the European market and the frustrations of its Satellite Business Systems and Mitel Corp. involvements, IBM realized the limited window of opportunity and elected to enter the communications arena in a big way — through acquisitions and investments.

With sizable investments in MCI Communications Corp. and Rolm Corp., IBM now possesses the components it needs to pursue total business account selling in the information management industry. The challenge is twofold: IBM must integrate these components into a cohesive organization and at the same time continue to introduce new products that will meet customers' insatiable need for increasingly sophisticated technology.

IBM faces a powerful adversary in AT&T, the dominant player in the communications arena. AT&T is acutely aware of the IBM challenge and is deploying technology to combat it.

The battle fronts

Let's look at the critical battle fronts. Business users divide their communications spending into two areas: equipment and usage. Businesses spend by far the most on usage, the segment where IBM is relying on its 18% investment in MCI's long-distance service.

MCI, the second largest long-distance supplier in the U.S., started out by selling private lines to businesses. But nonexistent profit margins and central-office switching limitations forced MCI to concentrate on the residential market.

IBM wants to make its move while AT&T is still shackled by divestiture-related constraints and regulatory controls.

As a result, MCI faces several obstacles as it turns to business sales. First, it must compete against AT&T's impressive array of network usage offerings for business — T1, Software Defined Network and the anticipated Integrated Services Digital Network — which all entice large users to rely exclusively on AT&T. This is AT&T's strongest area.

Second, MCI must solve service problems. Large-volume users are less tolerant of transmission quality difficulties than residential subscribers. Quality is especially important if large businesses are to use MCI facilities for data communications.

Squeezed tight

Third, MCI's profit margins are being squeezed between rising costs on the one hand and competitive pricing on the other. Expenditures for expansion and quality improvements, access charges, equal-access marketing and marketing to large users are all rising, while AT&T's decreasing long-distance rates and anticipated discount programs mean prices are dropping.

Fourth, MCI must strengthen its marketing force to provide the kind of value-added service the large users expect and have traditionally received from AT&T. Finally, MCI must capture more of the equal-access market.

The other battle front is in the equipment area, where IBM captured 7% of the installed private branch exchange (PBX) base in one day by acquiring Rolm. However, IBM/Rolm faces several challenges of its own.

Charles Carroll is vice-president of research at Eastern Management Group, Parsippany, N.J., a research and consulting firm specializing in telecommunications and information systems.

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On a daily basis, CONSOLE-Master helps operations gain productivity since it allows multiple full screen or standard TSO applications to be run from one console. For example, a single terminal display can be switched from an operator's console to an operator application session and so on with fast, simple, one step commands...the touch of a key.

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Comment

The first is technological. Rolm's CBX was introduced in 1975, and despite Rolm's stated position that the CBX remains on the cutting edge, some users perceive the switch as old technology. Given a typical PBX life cycle of five to seven years, Rolm, with a PBX that is 10 years old, is excluded from a growing segment of the market.

The general availability of the overdue Rolmbus 295 is critical to Rolm's continued success as a stopgap product in this market until the company introduces a new PBX. The Rolmbus 295 high-speed bus will enable the older switch to handle much higher capacities, so the Rolmbus is essential in the large-end market for the short term. Also, Rolm needs a new switch to integrate its products into IBM's Systems Network Architecture world.

Delaying Rolm's announcements

Second, merging the two companies' technologies and organizations is taking more time than expected. IBM's product approval cycle has delayed Rolm's product announcements. The delay in the introduction of Redwood, its low-end PBX, hurt Rolm's competitive position.

Third, Rolm must gain market share in the voice networking area. Rolmnet has not loosened AT&T's lock on this field, which is also limiting the sale of Rolm systems.

Fourth, the IBM/Rolm connection must strengthen Rolm's marketing to national accounts. National accounts have experienced uneven marketing attention from Rolm operating companies and distributors. Rolm's recent announcement of an expanded National Accounts Program, to take effect Jan. 1, represents one step in the right direction.

Fifth, and perhaps most important, Rolm's service problems must be resolved. In a recent study, the Eastern Management Group found that users rank Rolm's service third, behind AT&T and Northern Telecom, Inc. Marketing and service rank with networking services as critical to success with large users.

Meanwhile, AT&T's PBX push is gaining momentum. Recovering from a disappointing performance in 1984, AT&T will be the No. 1 shipper of new PBX lines in 1985. The AT&T System 75 low-end PBX met a strong reception, and its customer access terminal stands as the industry standard. AT&T continues to enjoy users' perception of it as a purveyor of first-class service.

Now IBM must offer value-added services to communications departments, which historically it has overlooked.

Despite projections of decreases in private-line networks, users are installing new electronic tandem networks. Finally, joint AT&T Information Systems/AT&T Communications marketing, recently authorized by the Federal Communications Commission, will strengthen the company's efforts in the PBX/network area once organizational issues are resolved.

IBM clearly has the desire and the components needed to compete; the company also has the financial resources. Doing battle successfully will be a question of resolving the challenges outlined above and developing an integrated strategy of marketing and servicing large accounts — not trivial tasks.

To market and service the information management industry well, IBM must develop specialized personnel. IBM excels at providing value-added services to data processing users in large companies. Now it must offer similar services to the communications departments, which historically it has overlooked.

Senior managers will decide

AT&T uses telecommunications managers, who are largely Bell system alumni, to provide value-added service. While the communications giant's service has suffered from the Information Systems/Communications separation, the recent FCC joint-marketing ruling should reduce this limitation. The positioning battle will be fought finally at the users' senior management level. Both IBM and AT&T realize this particular battle's importance.

IBM must not underestimate its adversary. Like IBM, AT&T has the desire, the components and the financial resources to succeed. AT&T also enjoys more than a century of experience in the communications arena as well as legions of satisfied customers. AT&T will be an even stronger competitor when it is freed from the divestiture and regulatory shackles.

IBM has never faced as powerful a foe as AT&T and certainly not on its opponent's turf. Large-volume users will not discard AT&T to switch to Rolm and MCI products just because IBM joint-markets with them. End users will assess the offerings, strategies, marketing and service of the IBM/Rolm/MCI triumvirate; then they may try a pilot program of end-to-end service. Only if the pilots are successful will they implement IBM's systems — gradually.

The outcome of this confrontation is years away.

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a portrait of success

By whatever means you use to judge a corporation, IBM comes out on top. Yet the company's success inspires its greatest criticism.

ILLUSTRATION BY P. CHARLES LADOUCEUR

By Harry Bunn

Often criticized but always admired, IBM has made itself the very model of a modern corporation.

Its revenue growth has kept pace with or outpaced that of the computer industry as a whole. The company's commitment to its customer base — demonstrated in outstanding postsales service — outshines most of its rivals in the information technology market and most other corporations of its size. IBM will fly representatives to a site for training or suggest application solutions tried by other customers. The attitude is important: IBM wants to ensure that its systems run.

IBM's social conscience also stands out, measured in charitable donations, environmental concerns and good citizenship. IBM consistently employs local labor forces and led in hiring disabled workers long before legislation required it.

From a business standpoint, the company flatly outsizes its rivals. IBM invests more in research and development each year ($4.2 billion in 1984) than the revenues of all but four of its competitors. A rule of thumb says that in a mature market, a corporation must reach a minimum of 15% of the market leader's share to operate by anything but a niche strategy. Besides IBM, only Digital Equipment Corp. can claim this success in the computer industry. AT&T qualifies if we include the entire information technology industry.

By whatever means you use to judge a corporation, IBM comes out on top. And yet, the company's success inspires its greatest criticism. Someone is always accusing IBM of being predatory. How did IBM attain such strength?

In the early days, IBM emphasized sales backed by customer training. The company also took great pains to ensure sound maintenance and courteous service for all its products. IBM still emphasizes these qualities in its sales and services branches.

On the other hand, few credit IBM with announcing revolutionary products. Even fewer say it pioneers new markets. The company prefers to travel the safe, evolutionary path and leaving the trailblazing to others. For example, when Apple Computer, Inc.'s first Apple came out, IBM watched and waited, moving in with the Personal Computer only after Apple developed the market to the point where demand was truly strong.

While waiting for markets to open up, IBM vigorously researches developing information technology markets throughout the world. The company's forecasts of economic conditions in specific areas turn out to be substantially accurate because its economists are arguably among the best in both the public and private sectors.

Accurate forecasting enables IBM to respond promptly to favorable market conditions. Normally, only small organizations can react quickly to a dynamic environment because they are entrepreneurial. In a firm of IBM's size, one would think reaction to change would resemble a supertanker changing course.

But in fact, through internal discipline, a well-formatted task force approach and a companywide commitment to achieve what's best for the corporation, IBM reacts quickly to market conditions.

In addition, IBM is its own largest and smartest customer. There is an adage that cobblers' children usually wear the poorest quality shoes in the village. It isn't so in Armonk, N.Y. The same internal commitment to seek the best for the company also encourages IBM to use its own state-of-the-art products throughout the organization.

IBM keeps telling its customers how to take full advantage of their systems. IBM's own managers are the best at taking this advice. In order to maintain its competitive advantage, IBM experts have developed a significant number of proprietary systems for its own use as well. For example, IBM performs logistical analysis to determine the most expedient manufacturing methods or locations, using logistics systems that are unknown to the rest of the industry.

IBM is as canny abroad as at home. With more than half the world computer market outside the U.S., IBM spends a considerable effort making a lasting and profitable impression in foreign countries. The company's gross income from operations outside the U.S. in 1984 totaled $18.6 billion, including manufacturing, research and development.

This success can be attributed to IBM's painstaking efforts to do as the local people do. The company recruits, trains and promotes the best local residents.

Michael Porter, noted Harvard Business School professor, cites IBM in *Competitive Strategy* (Free Press, New York, 1980) as an international marketing leader. He says "[IBM uses] local full employment, balanced intracompany transfers of goods among countries and local R&D as a key source for global competitive advantage."

Even IBM's great size and sound management do not ensure success, so the company

IBM 1984 revenue

Product	Revenue (dollars in millions)	% Total Revenue
370 series*	18,900	41.1
Series/3, 8100, Series/1*	3,200	7.0
Personal Computers*	4,700	10.2
Software	3,200	7.0
Maintenance	5,300	11.5
Federal systems	1,700	3.7
Office systems**	4,400	9.6
Other***	4,537	9.9
Total	45,937	100.0

*All system numbers include associated peripheral sales.
**Office systems include 5520s, Displaywriters, copiers and typewriters.
***Other includes supplies, services, application-unique terminals, communications equipment and other businesses.

Source: International Data Corp.

Harry Bunn is senior vice-president of PA Computers and Telecommunications, Princeton, N.J. PA provides consulting services internationally in all aspects of information technology.

has undertaken strategic alliances. After continued disappointments trying to develop private-branch exchange products internally, IBM acquired Rolm Corp. IBM also entered the long-distance telecommunications and microprocessor industries through partnerships with MCI Corp. and Intel Corp.

IBM's stake in these companies forms part of its long-term strategies. IBM watches over its acquisitions, careful not to destroy their entrepreneurial spirit with oppressive control. But at any time, IBM may move to bring the acquisition into the fold.

The key point here is that IBM readily admits that it doesn't know all the answers and is prepared to go outside for products and expertise when the situation arises. Seeking outside expertise may help IBM avoid repeating certain mistakes, such as the PCjr.

Taking care of its own

In his book, *A Business and Its Beliefs*, former IBM Chairman of the Board Thomas J. Watson Jr. wrote, "We are convinced that any business needs its wild ducks. And at IBM, we try not to tame them." Though some outsiders claim otherwise, IBM actively promotes individual expression and creativity within its corporate structure.

The development of the IBM Personal Computer is a good example of promoting entrepreneurship. In 1980, Frank T. Cary, chairman of IBM's corporate management committee, had a request for William Lowe and Don Estridge — develop a personal computer. Both men were given the freedom to use all resources at their disposal, including non-IBM products, to develop an efficient, marketable machine.

And so they did. Estridge and Lowe set up and ran the Entry Systems Division, which Lowe still leads. Estridge built a very high-speed, low-cost system for personal computer production, using significant amounts of automated assembling to keep the cost down. The result became an industry-standard computer, proving that an entrepreneur can succeed in a large corporation, given the right circumstances.

As a whole, IBM does not encourage the fame of individuals in the external world. But internally, employees are recognized through morale-boosting in-house awards and

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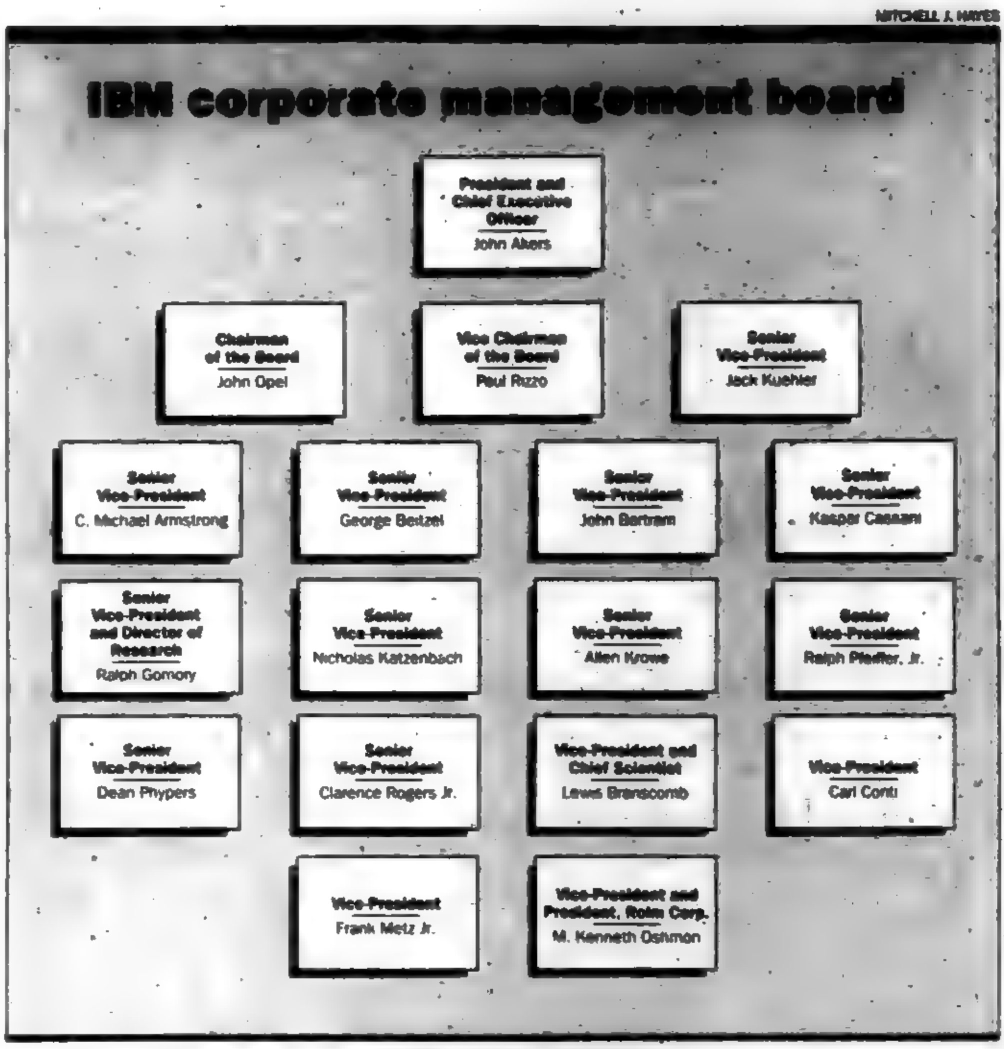
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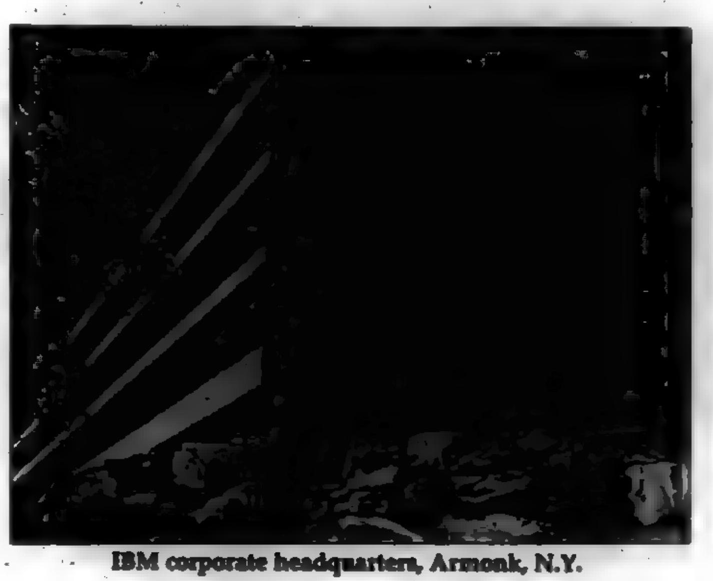
companywide activities. IBM consistently has been cited by its own employees as one of the best companies for which to work. It provides educational summer camps for employees' children, hosts family dinners for everyone from the janitor on up and provides internal counseling and appraisal services to let workers know where they stand.

Policies go beyond a good benefits package. IBM finds meaningful positions for workers who "burn out" on the job rather than putting them out to pasture. The Open Door policy for rectifying employees' complaints remains as active as ever.

The information technology industry as a whole is entering maturity as the growth rate begins to slow. The 16% growth rate for 1984 will drop to 10% in 1985, reflecting an industrywide slump. The industry will rebound to a 15% growth level in 1986, but over the next five years, the rate will slowly diminish to stick at 12%.

If IBM can keep pace with the computer industry, its revenues will top $139 billion by 1991.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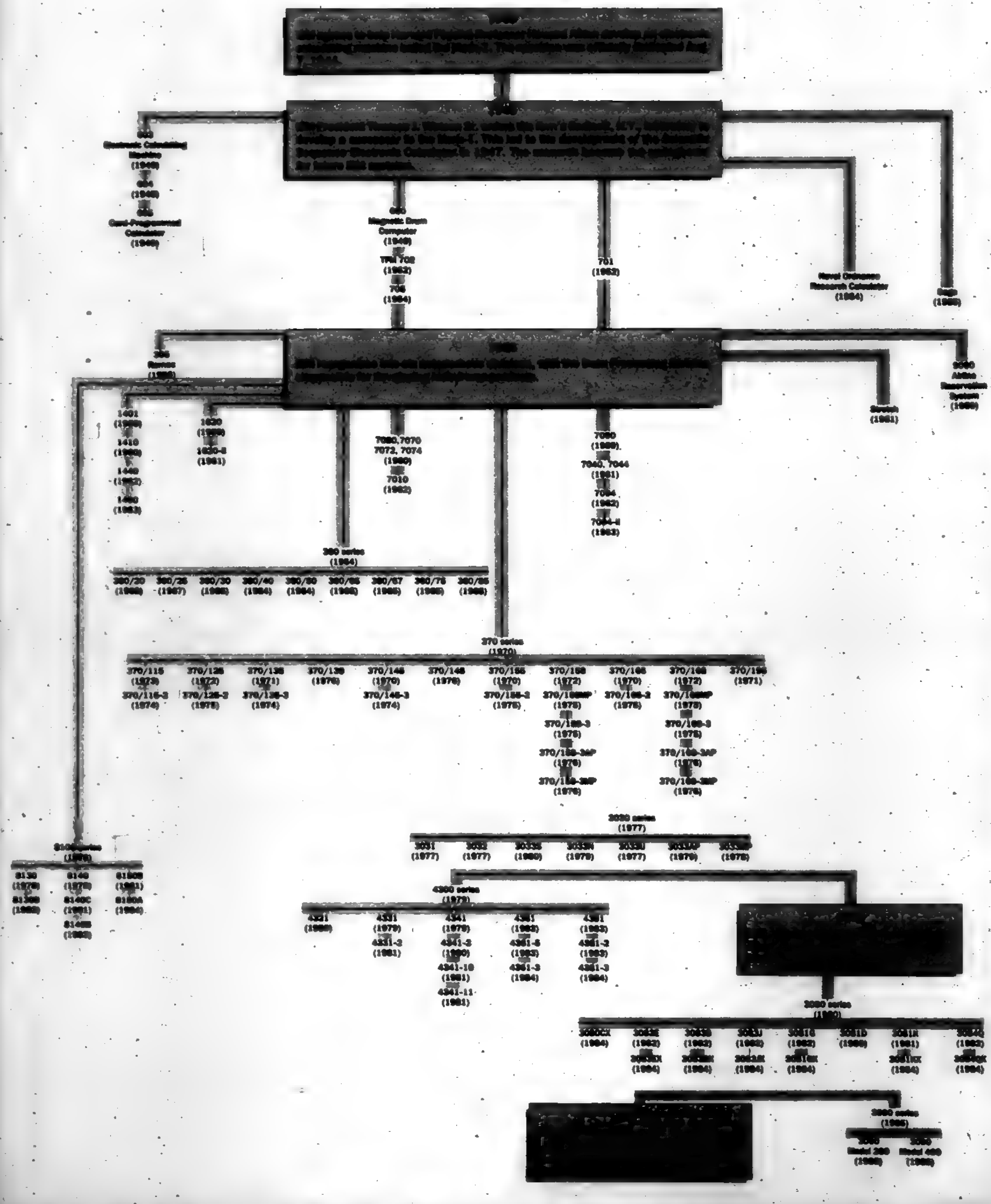

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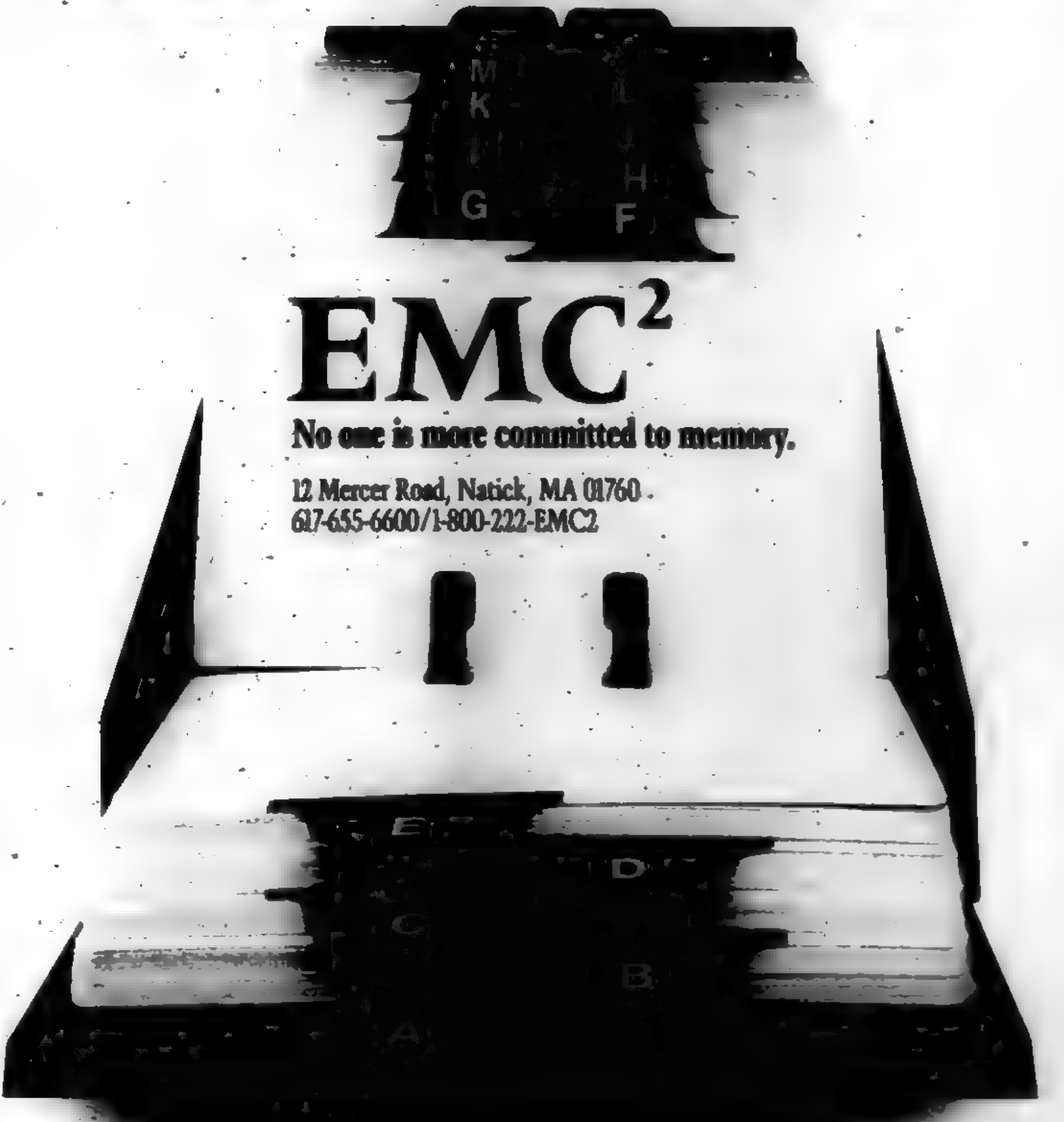

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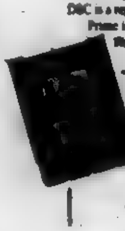

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IBM'S EARLY COMPUTERS

IBM's early response to computers was convincing, and by late 1955, Tom Watson Jr. could breathe a sigh of relief: His large-scale computers were leading Remington Rand's in installations.

By Charles Bashe, Lyle Johnson, John Palmer and Emerson Pugh

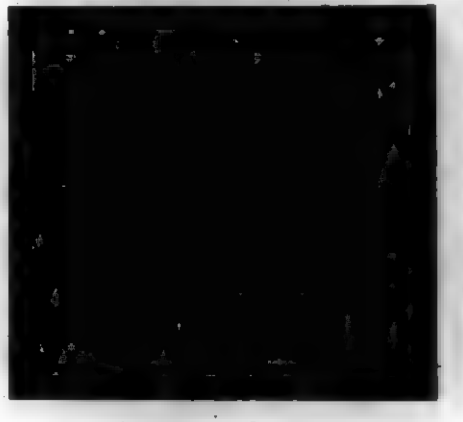
Until 1946, when IBM announced its Type 603 electronic multiplier, an electromechanical technology had sufficed for the company's products. Much of this technology was rooted in the distant past; IBM's inventors, draftsmen, modelmakers and machinists — and even the specialists who helped them in chemical and electrical design — had been dealing with slowly accumulating bodies of knowledge.

But the vacuum tube, which until World War II was considered essentially a communications device, had been pressed into service for military applications, and the data processing industry had suddenly become susceptible to a higher rate of technological change. The prospects for change were considerably heightened by the 1945 conception of the stored program.

Although by 1946 IBM was already designing the Selective Sequence Electronic Calculator (SSEC) in Endicott, N.Y., and establishing a small electronics activity in Poughkeepsie, N.Y., the company was far from ready for abrupt technological change. Thomas J. Watson Sr. and his staff had never been forced to come to grips with close relationships between science and technology. As a result, they tended to emphasize the broad social benefits of science rather than specific applications to product technologies.

Moreover, the traditional IBM views concerning patent policy and product secrecy needed overhauling in America's postwar society, where the government was becoming increasingly disposed to support computer development in university, national and private laboratories.

Watson had built a company with an exceptional record for customer service and employee loyalty. It is noteworthy that Ralph Palmer and a number of other engineers returned to IBM after having tasted the excitement of wartime electronics. Watson put together an excellent manufacturing organization, and his product development laboratories improved punched-card machinery. Most important, he created a company with a rare unity of purpose; he and his managers were completely preoccupied with data processing.



COURTESY OF IBM

By capitalizing on old strengths while gradually developing new ones, IBM adjusted to electronics and the stored program from 1946 to 1955. Well before the end of the period, most of its engineering activities had been redirected toward computer systems. Computer production increased between 1956 and 1961, even though the growing revenues from electronic accounting machine (EAM) products exceeded those from computer systems.

Adjusting to new technology

IBM took its first significant commercial steps into the era of electronics with the pluggable vacuum tube circuit and announcement of the 604 electronic calculator. The first step, taken in 1948, was a modest one, but it met a widespread customer need and provided experience in designing, manufacturing and servicing vacuum tube machines. The 604 preserved product continuity and bolstered an already successful line.

The critical matters for advanced development, those upon which its effectiveness largely rested, concerned the choice of components to be pursued seriously, the excellence of the components finally obtained and the availability of challenging commitments. Much depended on these matters. Among the most successful components were the vacuum-column tape unit, current-switch circuits, mass-produced ferrite-core memories, Ramac disk file, slider disk file, chain printer and removable disk pack.

IBM's determination to learn by making bold commitments led to the Defense Calculator, Norc, Sage, Fortran, Stretch, Harvest and Sabre projects — to

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EXTRA

mention only major ones. Each involved risks of one kind or another, a good deal of technical and managerial effort and the support of high-placed management.

The diverse technological benefits that resulted defy a summary, but all of the projects added to the number of trained IBM engineers and programmers.

The challenges presented by such undertakings aided greatly in recruiting technical people who otherwise would have been deterred by the pervasive view that IBM, as a respected but conservative supplier of punch-card machines, had little appetite for advanced technology.

The challenges presented by such undertakings aided recruiting technical people who otherwise would have been deterred by the pervasive view that IBM, as a respected but conservative supplier of punch-card machines, had little appetite for advanced technology.

In the electromechanical era, design engineers had gained professional recognition through their patents, and business-machine companies had relied heavily on patent protection.

These circumstances, coupled with the senior Watson's penchant for dealing directly with his engineers, fostered an atmosphere of secrecy within the Endicott laboratory.

This IBM tradition of secrecy and patent protection was antagonistic initially to any acceptance of government funding for advanced development. But by 1949, the tradition was being eroded by the influx of electronics engineers and other technical personnel.

In the dynamic field of electronics, scientific information was shared at professional meetings, and the pace of technological change reduced the scope of proprietary information.

The concurrent rise of solid-state physics, with its heavy demands for research and development funds, ended the tradition. By 1954, IBM avidly sought government development contracts, as did its competitors, attempting to defray the rising cost of advanced development.

Internal funding

Even after IBM's attitude toward outside funding changed, most of the company's successful advances in components and automated manufacturing were internally funded.

Skills previously used in developing electromechanical punch-card equipment were applied, with remarkable success, to speed up the tasks of handling, testing and wiring the thousands of ferrite cores used in memory arrays.

Later, IBM built the first fully automatic production line for transistors and developed many techniques for efficiently manufacturing the Standard Modular System (SMS) cards and circuits that until 1964 remained the company's primary solid-state computer components.

The changing environment

While IBM was taking its first lessons in technological change and tentatively forging policies for dealing with it, the business environment also was changing.

First, the U.S. postwar perception of a Soviet threat was followed by heavy emphasis on research and development in ballistics, nuclear physics, aerodynamics and related technical fields.

This focus in turn led to mounting interest in faster computation and in stored-program computers on the part of universities and national laboratories, to the convening of influential technical conferences and to the formation of professional groups concerned with computers.

Second, a large-scale computer known as the Univac, designed by the Eckert-Mauchly Computer Corp. (EMCC) and partially funded by a government contract for three units, was accepted by the U.S. Bureau of the Census in 1951.

The vendor was Remington Rand, Inc., which had absorbed EMCC the previous year. Census personnel, who were relying on Univac for help with the 1950 census, operated the system in the factory for nearly two years to postpone the substantial downtime of a move.

Univac, a computer with a thousand words of delay-line memory, had been heralded for years, and its availability signaled the beginning of an era of commercially available computers.

After falling behind in the punch-card machine market, Remington Rand acquired in Univac an automatic system that was capable of displacing a whole installation of punch-card machines as well as most of the operators required for carrying card decks from machine to machine.

Since census taking stands as a prominent symbol of nontechnical data processing, the bureau's acceptance of a Univac soon began

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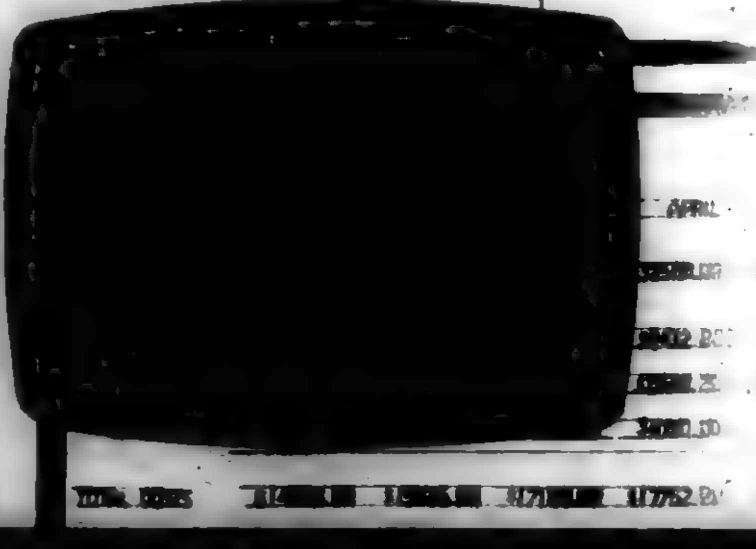

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EXTRA

In 1952, IBM announced the 701, its first production computer for scientific calculations.

changing the public view of the electronic computer as a laboratory curiosity.

The thought of performing applications in a better way began to catch the interest of methods supervisors in large corporations everywhere. They could foresee possibilities for improved data processing services, even though the cost reduction attainable in replacing punched-card machines with large-scale computer systems was often debatable.

Within IBM, the result was a tug-of-war between computer and card-machine advocates concerning the true needs of the marketplace.

As the tide slowly turned toward the use of computers, the period from 1952 to 1955 became one of great tension for IBM engineers, executives and salesmen. The company's initial computer, the 701, first delivered about two years after Census accepted the first Univac, was designed for mathematical applications. IBM's direct response to the Univac, the accounting-oriented IBM 702, was delivered four years after the Census Bureau had accepted a Univac.

The future of DP came to be perceived, within IBM and elsewhere, as heavily dependent upon large computers and magnetic-tape units.

Despite the gratifying early sales of the relatively small IBM 650 computer, first sold in 1954, the future of the data processing industry came to be perceived, within IBM and elsewhere, as heavily dependent upon large computers and magnetic-tape units.

Success causes suit

Remingtom Rand management presumably viewed its acquisition of EMCC — and in 1952 of Engineering Research Associates (ERA), a company whose computer soon vied directly with the IBM 701 — as the best way to recover from a product-line weakness caused by Remington Rand's lapse in fielding a counterpart to the IBM 604 electronic calculator.

In fact, IBM's degree of success with card machines led the U.S. Department of Justice in 1952 to sue the company for monopolizing the punched-card accounting machine industry, an action that ended with a 1956 consent decree under which IBM agreed to sell (as well as rent) its machines and to license certain data processing patents at reasonable royalties and certain card-machinery patents without charge.

At this time, IBM adopted the policy of making all patents pertaining to the manufacture, sale and use of data processing equipment available at reasonable fees.

Under this policy, the company's patent portfolio merely assured freedom of action, while product superiority was to be achieved by using all available knowledge rather than excluding competitors from patents.

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1956 duration of the antitrust action corresponded closely with a period during which the highly visible presence of Univacs prompted some industry observers to speculate about the possible eclipse of IBM by Remington Rand.

But in acquiring pioneering computer products, Remington Rand executives had also acquired formidable marketing problems. At the time, experience upon which to estimate ultimate customer receptiveness was nonexistent.

After the first Univac was accepted in 1951, Univac deliveries curved as follows: 1952, three; 1953, three; 1954, seven; 1955, seven; 1956, 15; 1957, six; and 1958, one.

Although these numbers were augmented by less-publicized deliveries of ERA-developed scientific computers, they well indicate the early hesitancy in the markeplace.

Lulled into security

Perhaps Remington Rand management was beguiled by the extraordinary public acclaim accorded to Univac (eventually called Univac I), but much of the initial acclaim was based more on awe and curiosity than on readiness to buy.

During the initial years of the Univac challenge, IBM's Card-Programmed Calculator (CPC), based on the 604, served much of the nation's need for computational equipment. The presence of the CPC was helpful in showing IBM's comprehension of the pervasive role that data processing was to play.

Then, in 1953, deliveries of a production run of 19 701s began. In late 1954, the completion of the superspeed NORC (Naval Ordnance Research Calculator) provided additional evidence of IBM's technical capabilities. IBM's commitment to the future of computers was further demonstrated in mundane, but telling ways.

For example, IBM computer products were designed as units that could pass through standard doorways, thereby ensuring that they could be installed conveniently.

Moreover, before the company delivered the first 702 system, it had programmed its Poughkeepsie, N.Y.-area payroll and a number of other applications; by early 1955, prospective customers could watch an IBM payroll being run on a 702.

Meanwhile, in 1954, IBM announced the performance-enhanced, core-memory 704 and 705 systems as successors to the 701 and 702.

IBM's coordinated response to computers was convincing, and by late 1955, Tom Watson Jr. could breathe a sigh of relief: His large-scale computers were leading those built by Remington Rand in installations, and the company he managed had apparently weathered a critical challenge.

By late 1955, Tom Watson Jr. could breathe a sigh of relief: His large-scale computers were leading Remington Rand's in installations, and the company he managed had weathered a challenge.

Coping with growth

In the first half of the 1950s, IBM experienced rapid growth as a result of defense programs and brisk EAM sales. By 1956, continuing growth seemed assured by mounting orders for computers. As a result, the corporate offices were overloaded with responsibilities, and the burdens were increasing.

After careful study, a thorough reorganization was undertaken in late 1956. Some new divisions were created, and many divisional responsibilities were realigned. Responsibilities were also clarified, thus decentralized.

Aside from a class of important decisions reserved for corporate headquarters, divisions became free to conduct their affairs under guidelines provided by the written policies of a watchful corporate staff.

The resultant organization gave the Data Processing Division (DPD) responsibility for developing, manufacturing and marketing EAM and computer product lines. Because DPD's success was measured in revenue growth, actions naturally keyed on

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the short run, with heavy emphasis placed on system improvement and embellishment and on programming aids that might increase the appeal of revenue-producing products.

These tactics proved successful in terms of sales, but they also contributed to the untidiness of a product line that already contained several computers of divergent design.

As a result of DPD's growth, another companywide realignment of responsibilities and resources occurred in May 1959. This reorganization, which among other things carved the General Products Division (GPD) and the Data Systems Division (DSD) out of DPD, was an additional step in the direction set in 1956.

> *The 701 designers stressed arithmetic speed, the 702 designers stressed character-handling convenience and the 650 designers low manufacturing cost. Once the pattern of diversity was set, other distinctive systems followed.*

As Tom Watson Jr. said, "The management concept is decentralization, wherein more of the responsibility for key decision making and for profit is set at operating levels below corporate headquarters." The boundary between GPD and DSD products was loosely understood in terms of rental pricing levels, with systems renting at $10,000 or more per month assigned to DSD and those renting for below that figure assigned to GPD.

As explained by the company's newsweekly: "The General Products Division is responsible for all product planning, development and manufacture of equipment presently represented by the punched-card, Random Access Method of Accounting and Control (RAMAC) and 650 class. The Data Systems Division does the same for equipment in the 700-series class and up."

The new alignment motivated the product divisions to plan and design computers of long useful lives rather than to opt for the quickest means of exploiting every opportunity sighted by the marketing organization (the surviving Data Processing Division). But it did not preclude interdivisional quarreling over the middle ground — often the most lucrative region of the market — and it did little to reduce proliferation of dissimilar families.

Product diversity

IBM's first three marketable computers — the 701, 650 and 702 — exhibited little kinship in their instruction sets and data formats. The engineers who championed these computers were influenced by differing backgrounds and were forced by the high costs of hardware to warp their designs toward specific customer needs and device characteristics.

The 701 designers stressed arithmetic speed, the 702 designers character-handling convenience and the 650 designers low manufacturing cost. Once the pattern of diversity was set, other distinctive systems followed.

At an early stage, Stretch planners argued for a unified product family, emphasizing potential saving in hardware development and manufacture. These were sound reasons, but potential saving in program development later proved to be far more compelling. The Stretch planners also foresaw the value of being able to expand a customer's installation without serious disruption, but this argument did little to advance their case because other planners found little difficulty in developing feasible growth paths for 704 users (to the 709 and 8090) and 705 users (to the 705II, 705III and 7080).

By September 1960, just two years after announcing its first transistor computer, IBM featured eight solid-state computers in its sales catalog. In order of announcement date, these were the 7070, 7090, 1401, 1620, 7080, 7030 (Stretch), 7074 and 1410. The last two provided a measure of compatibility, in that programs written for the 1401 could be run on the more powerful 1410 and programs written for the 7070 could be run on the faster 7074. But among the first six, none could execute a program written for another.

Moreover, the development plans of the laboratories were fostering future diversity. Of particular concern was the preoccupation of GPD and DSD with new mid-size computers. While GPD's 1410

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— planned long before the divisional split and announced a year after — could be configured below the $10,000 per month rental line, typical 1410 configurations were priced well up within the DSD range.

In fact, prior to its September 1960 announcement, the 1410 was challenged by a DSD design — the 70AB.

The 8000 plan

Meanwhile, DSD Poughkeepsie, N.Y. was developing an "8000 series," a computer family intended not only to supplant all DSD computers but, circumstances permitting, to supplant the GPD product line.

Considerably conditioned by pleas from the sales force for immediate responses to the need for a more dollar-worthy product line, the plan for the 8000 series was somewhat shortsighted. To permit announcement of the 8106 in mid-1961, DSD had ruled out significant improvements in circuit technology.

Thus, the planned series would be making its debut as another line of SMS products, although the company had by then begun developing a form of integrated circuits and packaging.

Furthermore, a full solution to compatibility was lacking. Some machines were to be word organized and others to operate on characters, and economy was to be served by varying the instruction sets.

'If all our customers were able to interchange program information, progress would be even more rapid than it is.'

In February 1960, John McPherson dusted off a year-old memorandum that he had circulated within corporate headquarters. It recommended a unified product line. Sending a new version to C. R. De Carlo, DSD assistant general-manager, he noted, "The amount of common knowledge which has to exist to use stored-program data processing machines is so great that I feel we need the advantage of a single system that makes a single community of all our customers.

"If all our customers today were able to interchange program information, the progress in programming would be even more rapid than it is, and our contributions to programming could be much more significant and more widely useful."

Incompatibility

McPherson was well aware that customer data processing managers with two or more kinds of IBM computers were encountering formidable obstacles to optimal resource allocation.

Among the biggest obstacles were a proliferation of incompatible program libraries and of differing personnel-training requirements. Programmers and computer operators suffered a temporary but substantial loss of productivity in reassignments that moved them from one computer family to another.

'The common knowledge which has to exist to use stored-program data processing machines is so great that we need the advantage of a single system which makes a single community of all our customers.'

The more an organization came to depend upon computers, the more obvious such inefficiencies became. The most critical problem for IBM nevertheless lay in the huge task of developing and upgrading system programs and general-purpose routines of the kinds desired by users.

By supporting half a dozen computer families, IBM was reducing its capacity for advanced work on programming technology. And improvements in programming technology had been clearly recognized as necessary counterparts to technological improvements in hardware components. Improvements in both technologies were important to the continued growth of the computer industry.

IBM set about analyzing the problems in creating a unified line that would benefit from recent advances in transistor circuit technology. Obviously, several disparate needs had to be reconciled in the design of the new line.

Architectural considerations

First, the prevalent distinction between computers for science and computers for accounting needed to be erased because, as the variety of applications and operating modes widened, more computer installations needed capabilities for both floating-point arithmetic and character-handling convenience.

Second, core-memory technology was continuing to enhance the prospects for larger memories — much to the satisfaction of customers, whose

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The models might differ in design and construction but all should present the same outward aspect to a user. The family of computers that resulted was the IBM 360 series.

requirements for larger memories were steadily increasing. This meant that the computer programs of the future would have to address much larger memories.

The need for longer addresses, which was already stretching instruction formats in large computers, obviously posed serious problems for anyone proposing to reconcile the addressing structure of more powerful computers with that of small computers.

Third, the six-bit character sets in use were becoming an intolerable limitation that barred the use of both uppercase and lowercase alphabets and of suitable variety in special symbols.

Fourth, the increasing variety of attachment methods for I/O units had become a hindrance to the design of optimal hardware and software.

The possiblity of standardized I/O interfaces had received considerable attention in the design of Stretch.

Radical design

These needs and others related to promising new modes of computer operations and maintenance made it clear that the hypothetical product line would have to constitute a radical departure in design.

Moreover, the effort as a whole would shake the entire corporation as never before. Attitudes toward computer design would have to be changed, as would the provincial attitudes of divisional management.

So vast an undertaking would require the concerted effort of everyone in the company.

In November 1961, as a way of indicating the seriousness of the task and of mobilizing technical know-how and support, a companywide task force called Spread was convened.

The 13 task force members worked for about 60 days and produced a final report on Dec. 28, 1961.

In essence, the report recommended that IBM create a compatible family of computer models spanning an unprecedented range of performance. The models might differ in design and construction as well as in price and performance, but all should present the same outward aspect to a user. In other words, they should share a common computer architecture. The family of computers that resulted was announced in April 1964 as the IBM 360 series.

When Tom Watson Jr., became president of IBM in 1952, EAM products and electric typewriters were the company's major sources of revenue. Revenue from computer products was nil.

In 1962, the company's U.S.-based annual revenue from computer products reached $1 billion and for the first time surpassed the corresponding revenue from EAM products.

In the course of a decade, the data processing industry had relied heavily upon vacuum tubes and then had gone about replacing the tubes with solid-state devices.

Storage had come to include various kinds of new devices, among them ferrite-core memory units and direct-access magnetic disk files.

Software technology had produced compilers, operating systems and various other programs intended to facilitate the programmer's task or contribute to more efficient computer operations.

The computer company

IBM's organization had changed dramatically and instituted a large, clearly delineated research activity, with several laboratories equipped for exploring future technologies.

During the decade, the growth prospects for electronic computers also had attracted many entrants to the data processing industry. By 1962, Remington Rand and IBM were competing with many firms, among them General Electric, RCA, Philco, Burroughs, NCR, Honeywell and Control Data Corp.

After suffering from the malady of complacency for a time following World War II, IBM management had confronted the existence of stored-program electronic computers and had undertaken the technolgical buildup essential to a rapid transformation of the IBM product line.

Then, in the course of satisfying a wide variety of specific customer requirements, the firm had become a computer company, finding itself at the forefront of an unusually dynamic industry.

Not only was technology advancing rapidly, but customer requirements were dictating greater unity in computer architecture. An early phase of the computer era was closing, and the manner in which IBM would respond to the Spread report was destined to influence profoundly the company's future.

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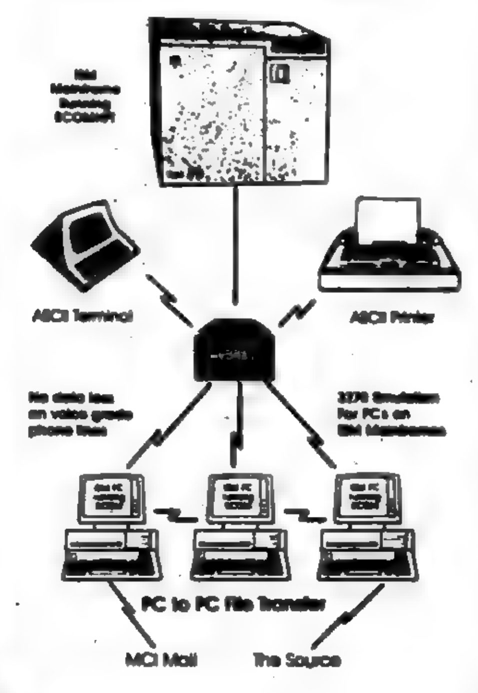
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EXTRA

ILLUSTRATION BY ALAN WITSCHONKE

Wild ducks, corporate picnics, the open door — Thomas Watson Jr. remembers his father, IBM's legendary T. J. Watson Sr., and the beliefs that built a company.

A business and its beliefs

By Thomas J. Watson Jr.

IBM's philosophy is largely contained in three simple beliefs.

I want to begin with what I think is the most important: *our respect for the individual.* This is a simple concept, but in IBM it occupies a major portion of management time. We devote more effort to it than anything else.

This belief was bone-deep in my father. Some people who start out in modest circumstances have a certain contempt for the average man when they are able to rise above him. Others, by the time they become leaders, have built up a unique respect and understanding for the average man and a sympathy for his problems. They recognize that in a modern industrial nation, the less fortunate often are victims of forces not wholly within their own control. This attitude forms the basis for many of the decisions they make having to do with people.

T. J. Watson was in the latter category. He had known hard times, hard work and unemployment himself, and he always had understanding for the problems of the working man. Moreover, he recognized that the greatest of these problems was job security.

* * *

Our early emphasis on human relations was not motivated by altruism but by the simple belief that if we respected our people and helped them to respect themselves, the company would make the most profit.

Our management also recognized that the individual has his own problems, ambitions, abilities, frustrations and goals. We wanted to be certain that no one got lost in the organization and, most of all, that no individual became a victim of any manager's unfairness or personal whim. In this regard, we developed what we call our "Open Door" policy. This is a key element in our employee relations.

The Open Door grew out of T. J. Watson's close and frequent association with individuals in the plant and field offices. It became a natural thing for them to bring their problems to him, and in time, it was established as a regular procedure. My father encouraged this in his visits. He spoke of it in his telephone broadcasts to offices and plants. If a man was not getting along or if he thought he was being treated unfairly by his manager, he was told to go to the plant or branch manager. If that did not work, he was then invited to come and lay his case before my father.

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Hundreds of employees literally did just that. Many would take the day off from our plant in Endicott, N.Y., and come to his office in New York to talk about their problems. More often than not, he favored the complaining employee — sometimes, I'm sure, more than he should have. But he built up a lasting relationship with a great many employees, and they helped him to keep in touch with what was going on in the company. At the time of his death in 1956, most of our then-57,000 employees thought of T. J. Watson as a friend they could count on.

Years ago we ran an ad that said simply, "IBM Means Service." . . . It stated exactly what we stand for: We want to give the best customer service of any company in the world.

The open door

The Open Door exists today as it did then. I'm sure that a policy of this kind makes many a traditional manager's blood run cold. He probably sees it as a challenge to his authority or, worse yet, as a sharp sword hanging over his head. But the fact remains that in IBM, it has been remarkably effective, primarily because — by its mere existence — it exercises a moderating influence on management. Whenever a manager makes a decision affecting one of his people, he knows that he may be held accountable to higher management for the fairness of that decision.

From time to time, we have had second thoughts on the practicality of this policy, especially now that IBM has grown to a company of more than 80,000 people in the U.S. alone. Obviously, if everyone with a problem insisted on seeing the president or me, we would both have run out of time long ago.

The answer, in the future, may have to come in a shift downward in this court of appeal, possibly to the level of division president or general manager. But whatever the difficulties, we certainly have no intention of denying anyone the opportunity to talk to whomever he wishes to in this business. Whether they exercise it or not, our people are reassured by the fact that they have this right. And by its existence, I believe it acts as a deterrent to the possible abuse of managerial power.

* * *

It is interesting to contemplate the possible nature of individual achievement in the absence of large organizations. It probably would be of a different order. The challenges in a large organization are great, and achievement, really, is the successful response to challenge. Men who have accomplished great deeds in large organizations might have done less if they had been challenged with less, and they would have realized less of their potential and their individuality.

In IBM, we frequently refer to our need for "wild ducks." The moral is drawn from a story by the Danish philosopher, Soren Kierkegaard. He told of a man on the coast of Zealand who liked to watch the wild ducks fly south in great flocks each fall. Out of charity, he took to putting feed for them in a nearby pond. After a while, some of the ducks no longer bothered to fly south; they wintered in Denmark on what he fed them.

In time, they flew less and less. When the wild ducks returned, the others would circle up to greet them but then head back to their feeding grounds on the pond. After three or four years, they grew so lazy and fat that they found it difficult to fly at all.

Kierkegaard drew his point — you can make wild ducks tame, but you can never make tame ducks wild again. One might also add that the duck who is tamed will never go anywhere any more.

We are convinced that any business needs its wild ducks. And in IBM we try not to tame them.

Service and superiority

Years ago we ran an ad that said, simply and in bold type, "IBM Means Service." I have often thought it our very best ad. It stated clearly just exactly what we stand for. It also is a succinct expression of our second basic corporate belief. *We want to give the best customer service of any company in the world.*

We recognize that service is the key element in what I hope is our good reputation. T. J. Watson realized early the great importance of reputation. When he was 18, he drove a horse and buggy across northern New York state selling pianos and sewing machines. His customers were farmers, and like farmers everywhere at the time, they seldom had much cash. To make a sale, he frequently took animals or farm equipment in trade, later selling them off in Painted Post, his home base.

He had two years of good training in how to get along with people, how to make a fair trade and leave people happy. As he drove his team through

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the countryside the second time, he saw at once the value of the golden rule in business, for many people would buy his goods on the basis of what satisfied customers had to say about his products.

Cultivating the sales force

IBM's sales and service forces bear the prime responsibility for our rigid insistence on service. To maintain our reputation for excellent service, we long ago established high standards for the selection of salesmen and customer engineers.

To attract top-quality salesmen, IBM used sales commissions, advances, quotas and guaranteed territories at a time when most of those practices were still looked upon as innovations. Schools were set up for salesmen — the training course now runs as long as 18 months — and we began to visit colleges to recruit our sales trainees.

Equal care was taken in the selection and training of customer engineers. With high-speed electronic equipment and large systems installations, the job requirements have since become so demanding that we interview an average of 25 applicants for each one we hire.

In its commitment to customer service, IBM learned that the best way to serve a prospect was to provide equipment adapted to his requirements rather than ask him to alter his business to fit our machines.

We found that good service to the customer requires the cooperation of all parts of the business. I think this was brought home to us years ago when we centered many of our activities on our plant in Endicott.

Sales and customer engineering schools were located there, as were our sales conventions in the 1940s. Customer executives and administrative personnel also visited and stuided at Endicott. This arrangement brought together all our people as well as our customers and made it possible for us to give the latter better serivce as we learned more about their problems.

In a business like ours, a reputation for service is one of the company's principal assets. Many operations performed by our machines are vital to the customer's business. Lengthy breakdowns could be ruinous.

* * *

The third IBM belief is really the force that makes the other two effective. *We believe that an organization should pursue all tasks with the idea that they can be accomplished in a superior fashion.* IBM expects and demands superior performance from its people in whatever they do.

I suppose a belief of this kind conjures up a mania for perfection and all the psychological horrors that go with it. Admittedly, a perfectionist is seldom a comfortable personality. An environment that calls for perfection is not likely to be easy. But aiming for it is always a goad to progress.

In addition to this persistent striving for perfection, we believe an organization will stand out only if it is willing to take on seemingly impossible tasks. The men who set out to do what others say cannot be done are the ones who make the discoveries, produce the inventions and move the world ahead. T. J. Watson used to tell our people, "It is better to aim at perfection and miss than it is to aim at imperfection and hit it."

As a result of this insistence on perfection and the way we went at almost impossible tasks, there soon developed within the company what might best be called a tone. It was a blend of optimism, enthusiasm, excitement and pace. The company was always on the move, constantly changing, always striving for something better. Evidence of it was everywhere — new products, new branch offices, sales contests, slogans. Better to do something — even the wrong thing — than to do nothing at all.

Part bluster

Believing in success can help to make it so. Back in 1924, when things like butcher scales and time clocks were still mainstays of our business, we had the temerity to change our name from the Computing-Tabulating-Recording Co. to the International Business Machines Corp. We constantly acted as though we were much larger, much more sophisticated, much more successful than any current balance sheet might bear out.

As I have already pointed out, part of this tone was optimism, of course, and in this my father excelled. One day during the Depression of the thirties, my father met one of his major competitors in an art gallery. IBM was not doing particularly well but was managing to equal its previous year's income. The other fellow was having more difficulty.

He said to my father, "Tom, I hear you're still hiring salesmen in spite of the Depression, and I just can't see how that's a prudent thing for your business."

My father said, "Well, Bill, you know, when a man gets about my age, he always does something foolish. Some men play too much poker, and others bet on horse races and one thing and another. My hobby is hiring salesmen."

This optimism, which may have been little more than an enlightened guess, paid off. When business turned up the next year and then started to boom during and after the war, IBM was very glad my father had hired those salesmen.

We had an IBM day at the World's Fair of 1939 and next year brought 10,000 of our people to the fair at

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There are times in an organization when an instinct for leadership and drama is often more important than following the book on good management procedure.

T. J. Watson Jr., remembering the early days.

company expense. People realized they were working for an unusual individual and an unusual company that was capable of doing unusual things.

By the 1930s, our sales conventions had become spectacular affairs. Salesmen, on awakening, would find newspapers under their doors carrying a complete account of the previous day's events. Our overseas salesmen attended our conventions at that time, and when they got to their seats, they found small headphones with which they could hear the speeches in their native tongues.

Quite a business

When General Eisenhower, then president of Columbia University, went to Endicott to address a Hundred Percent Club meeting in July 1948, T. J. Watson persuaded him to spend an extra hour and talk to the plant people. Within that same hour, the people were let off from their jobs, and a platform was constructed in the street outside the main plant.

As the general and my father climbed the steps, the carpenters hammered in the last nails. "My gosh," one worker was heard to say, "what a business."

In a way, no one knew quite what to expect next. It may not have been management according to the book, but it seemed to keep us on our toes. Things were always being done in a highly vigorous fashion, with little regard for how much energy was being expended but with a great regard for the quality of the result and for the impression it would make on people.

In 1934, we told the sales force that as soon as the company's profits were doubled, the annual convention would be held in Europe. All salesmen making their quotas would qualify for the trip. The year of doubled profits came in 1941, but Hitler had other plans for Europe, and the idea of the trip was swallowed up by the war.

Then in 1961, one of our old-timers, a salesman who had qualified for that trip, wrote to remind me that the pledge had never been fulfilled. I knew that I had to make good on the promise and was glad of the opportunity. So in the summer of 1962, 187 salesmen who had qualified for that trip traveled to Europe with their wives to keep the date that had been interrupted.

The trip provided an interchange between American and European salesmen with, we hope, mutual benefits. In addition, it proved to be a great morale booster on both sides of the ocean.

Looking back on it now, I can see that many of the things we did in the formative years were anything but scientific. But what we learned, I believe, is that there are times in an organization when an instinct for leadership and drama is many times more important than following the book on good management procedure.

Setting the tone

What T. J. Watson did, probably more than anything else, was to set the tone for IBM. This was created in large part by the beliefs he brought to the company, for with them he brought vigor and great excitement. But it was also colored by his own good sense of what would be the most appropriate for the time and the situation.

When things were difficult and the sledding was uphill, he could be very optimistic. But when things looked good and our future began to clear up, he was forever cautioning us against getting complacent about it. I suspect this is a necessity for any leader — to be a balance wheel, a leavener.

Certainly no one can argue with the results. From 1914 to 1946, our company's profits grew 38 times. By the end of World War II, IBM's management had developed a deep belief in the policies upon which we had built our business: respect for the individual, major attention to service, and drive for superiority in all things. ■

WHO KILLED COBOL JOE?

2:15 A.M. TUESDAY
Middle of the night,
COBOL Joe bolts upright.
The phone has rung.
The trouble's begun.

10:00 A.M.
Application abend.
Hex data—no end.
Under ISPF with records too long,
Can't find where the data went wrong.

8:45 P.M.
Counting each byte,
Joe works through the night.
If soon I don't go home,
My wife will think I roam!

3:15 A.M.
Problem in the VSAM file.
Under ISPF it will take a long while.
Back to the record layout.
Got to find out what the data's about.

1:30 A.M.
COBOL Joe is on the floor.
Apparently couldn't take any more.
Something here doesn't quite
meet the eye.
Need Inspector Xperto to stop by.

2:10 A.M.—The Inspector Speaks
Too late now
To show Joe how
XA's DATA-XPERT
Handles the hex dirt.
Under ISPF, it lets the data in
So against the clock, we all can win.

Now about poor Joe you begin
to wonder
who did what to put him under.
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lonely lass?
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EXTRA

LU6.2

Born to be a standard

LU6.2 got a boost in the universal connectivity race when IBM announced personal computer capabilities in October. It's the talk of the town now, but users are wondering what they'll be using it for in the office.

By John Dounis
and Sharon Efroymson

The shackles binding the Personal Computer during mainframe communications will soon be broken. In place of the master/slave relationship of the past, the Personal Computer and every other network resource will be free to process distributed files intelligently.

That is IBM's message in the October announcement of a Personal Computer level in the capabilities of the LU6.2 protocol.

Accessing data from the mainframe has been a thorn in the side of many a micro user tapping into network resources. The Personal Computer functions most effectively as an intelligent workstation when used as a stand-alone. But when connected to the mainframe, the Personal Computer is relegated to dumb-terminal status by IBM's Systems Network Architecture (SNA). Practically, this means users must download data to the Personal Computer and only then resume using it as an intelligent workstation.

Industry observers view LU6.2 as one of the most important architectures IBM has introduced in recent years. IBM's Advanced Program-to-Program Communications (APPC) consists of LU6.2 and its partner, PU2.1 — enhancements to SNA that promise to simplify communications, introduce program-to-program processing and provide the industry with a much-needed standard.

Program to program

The APPC architecture allows for a direct application-to-application interface between processors. Any two programs on any two computers on a network can communicate, regardless of the computers, operating systems or languages used.

When LU6.2's full potential is realized, it is expected to revolutionize data processing, to legitimize distributed transaction processing and to free intelligent terminals such as the Personal Computer on a network to claim their full potential. It is this last application that vendors and potential users see as the most significant.

"This is a radical move," says Tony Percy, director of product planning and integration at Applied Data Research, Inc. "At last IBM is saying, 'No longer does the mainframe have complete control or have to get involved.' In the past, IBM promoted a hierarchical view."

The announcement of APPC has been particularly well received by Personal Computer product vendors, such as Lotus Development Corp. "APPC allows users to put the mainframe

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John Dounis is the director of systems development and consulting for the Center for Advanced Data Processing, Inc. (CADP) in New York.

Sharon Efroymson teaches personal computer communications to corporate clients at the productivity center of CADP.

behind the Personal Computer and to have the illusion that all data resides on the Personal Computer," says David Reed, vice-president of research and development of the Information Services Division.

"From Lotus' point of view, mainframes are relatively uninteresting. The mainframe should be viewed as an extension of the Personal Computer," he notes.

Prospects for integration

While not every user is looking for a microcomputer-oriented hierarchy, vendors and users alike are very interested in the prospects for integration offered by LU6.2. Hardware and software vendors plan to incorporate the LU6.2 architecture as a real solution to integrating distributed systems.

When the APPC architecture is fully implemented by these vendors, true distributed data processing with multiple processors (mainframe, mini and micro) and network types (local-area and wide-area) finally will be established. Most important, APPC establishes a single architecture in distributed processing and peer-to-peer communications that software developers will be able to use.

However, at this stage of the game, no one can be certain how these changes will translate into the real world. Which applications actually will be developed rests on IBM, third-party developers and internal data processing departments.

APPC is now implemented in some of IBM's hardware and software products. LU6.2 and PU2.1 support is now offered for the System/38 with Release 5 of the Control Program Facility and Vertical Microcode extensions. This support is also implemented with the IBM Displaywriter and Scanmaster or in conjunction with Document Interchange Architecture (DIA) and Document Content Architecture (DCA).

IBM's recently announced token-ring network will also support APPC, as will a number of hardware vendors that interconnect with IBM.

Many users are having difficulty seeing how APPC will affect the way they use Personal Computers, since many of the supporting products do not exist yet.

"When we talk to our customers about APPC . . . a lot of them ask, 'Why should I change from the way I'm already doing things?' APPC is not a product for 1985; it's really a 1988 product," says Tim Wise, vice-president of Pathway Design, Inc., a software company providing predominantly SNA communications emulation.

Vendors are looking into the future and conceiving application solutions for user needs. Lotus already has developed Symphony/Link, which connects micros to mainframes through Digital Communications Associates, Inc.'s Irma boards.

"We plan to continue to take data from other computers in the corporate world. We'd be silly to ignore LU6.2, since it allows you to do just that," Reed says.

"Historically, architecture has not been as interesting as the products that support the architecture. What will interest Lotus will be which particular features of LU6.2 get implemented in IBM devices.

"Ideally, the peer-to-peer data sharing that LU6.2 provides will be used," Reed continues. "With LU6.2, a mainframe, a System/36 or other IBM hosts will give easy access for Personal Computers to run Symphony or 1-2-3 and to allow users to perform actual data extraction instead of just downloading.

"The main difference will be that any interaction will be less visible to the user, and you won't know what communications activities are going on behind your back," he notes.

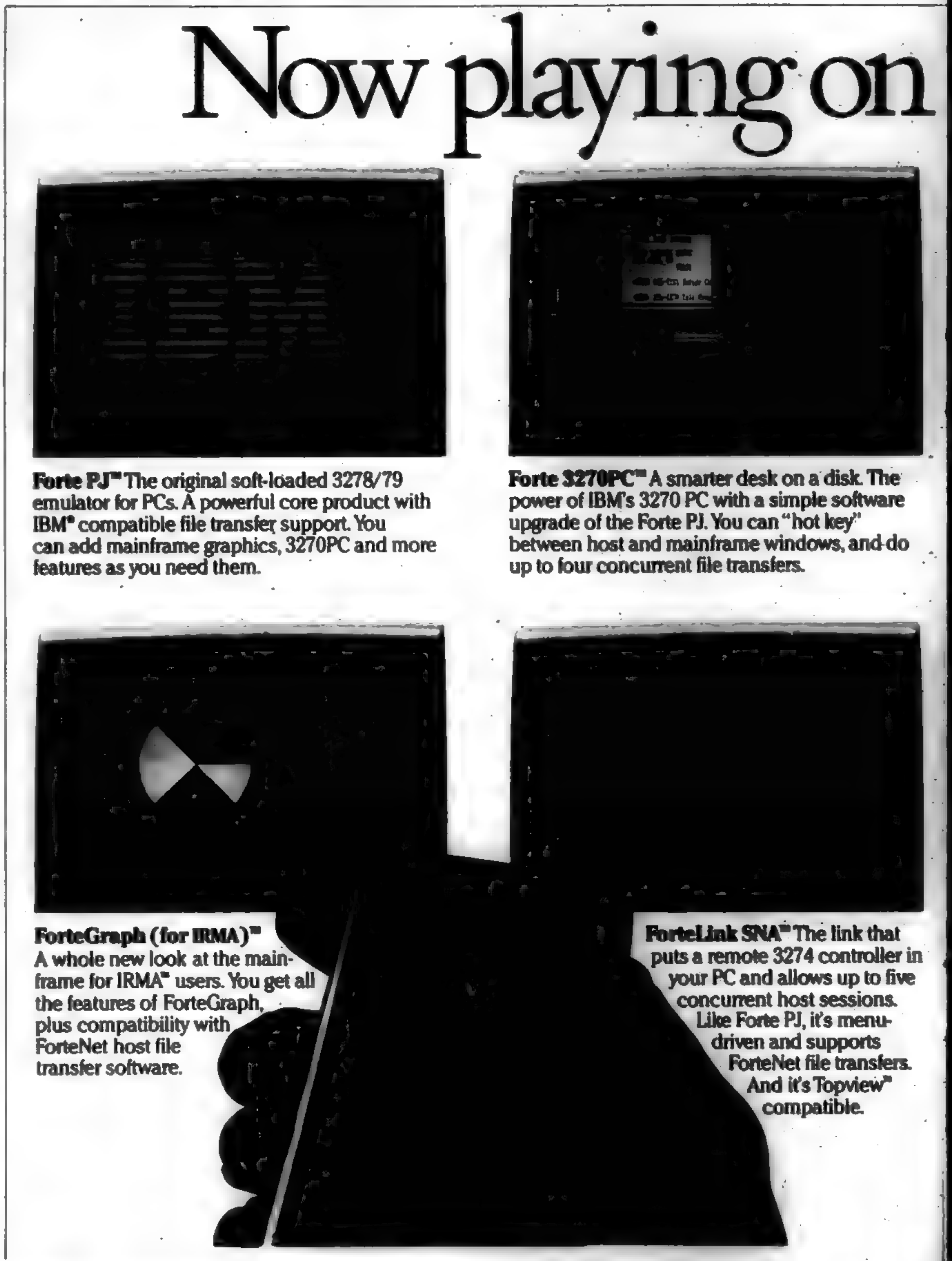
Practically speaking

"The user now has to take explicit steps to log on to the mainframe and extract data through interactions. However, the process is very slow."

In its most practical applications, LU6.2 will allow the developer to converse with a remote data base, extract (or update) the required information, checkpoint the transaction (both locally and remotely) and terminate the conversation. This setup allows actual data extraction instead of forcing downloading of files. Users will be able to query remote data bases and perform actions as though the data base were local.

Currently with LU6.2, for example, a user is able to enter a transaction at his terminal that is connected to a System/38 in Los Angeles. When a particular transaction is executed, the system determines that the requested data resides on the System/38 in Chicago. The Los Angeles System/38 routes the transaction to Chicago over a Synchronous Data Link Control

> *'When we talk to our customers about APPC . . . a lot of them ask, "Why should I change from the way I'm already doing things?" APPC is not a product for 1985; it's really a 1988 product.'*



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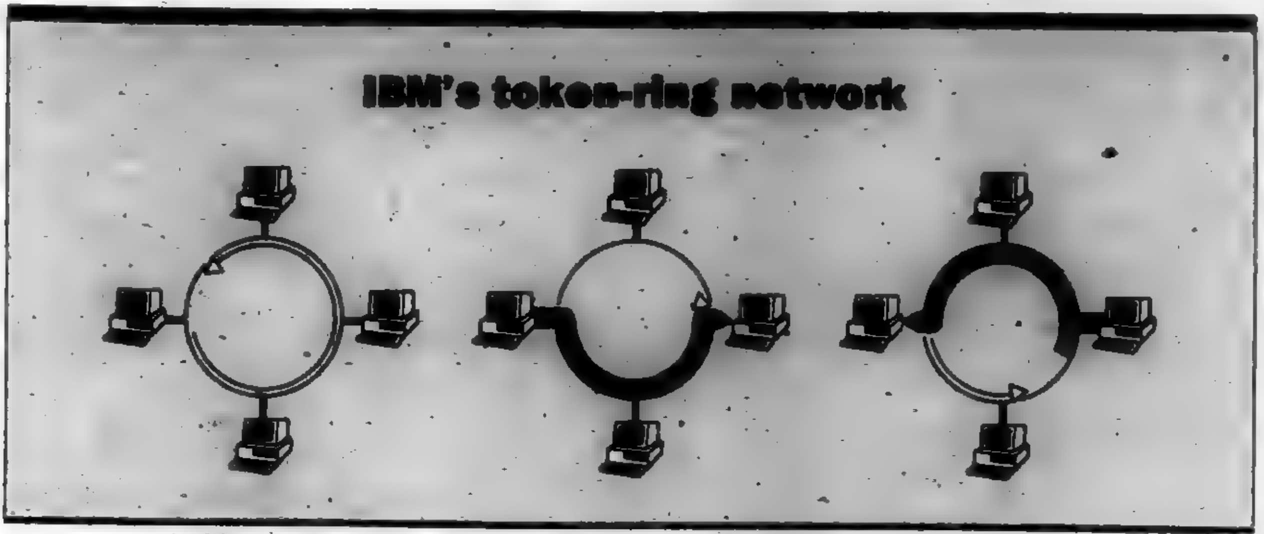

Architecturally, PU2.1 resides upon the token ring, and LU6.2 resides upon PU2.1.

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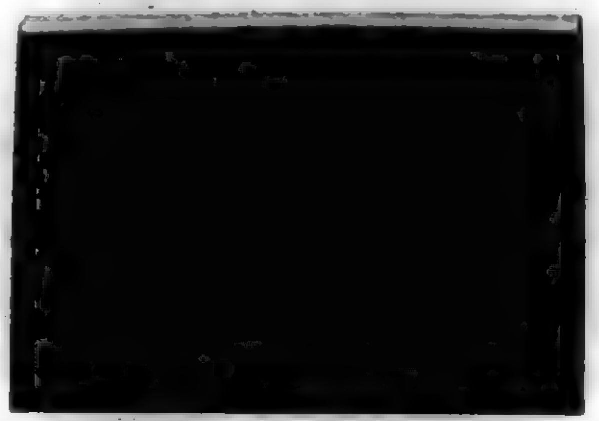

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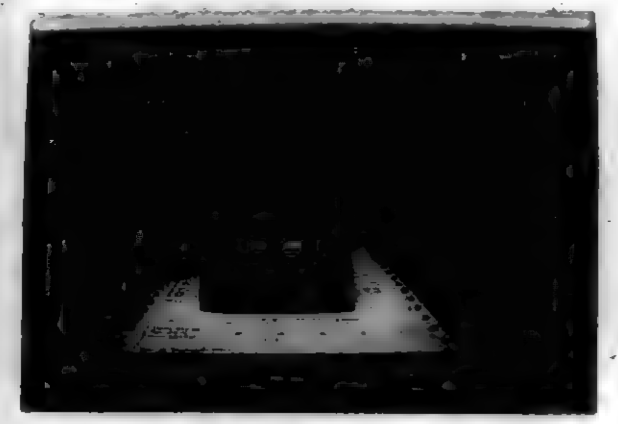

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(SDLC) network, and the transaction is processed remotely in Chicago.

With the recent announcement of APPC for the Personal Computer:

- A user with a micro attached to the mainframe will be able to use his local data base on the micro and use information from the mainframe as required.

For example, the user could execute a transaction on the Personal Computer, and if the information is not resident, it will automatically be requested from the host — transparently to the user.

- The same is true of the implementation of LU6.2 with a token-ring network. If the user's micro doesn't possess the required information, it will establish a conversation with one of the other micros on the token-ring network that does contain the information.
- Users will also be able to establish an SDLC session between two micros to coprocess information.

International access

A future implementation of the APPC architecture will be able to use the existing SDLC network to get to a particular node in the network. For example, a totally distributed data processing facility may include an international network where the data for a local office or region resides on the local computer (regardless of machine size).

'LU6.2 support for the Personal Computer has been the missing piece.'

When the user requests data that is not locally available, the system will initiate a session with another intelligent node in the network, and the information will be requested.

For example, the Detroit office of an international insurance company might connect a Personal Computer with an APPC application to the host processor at the New York headquarters. An important customer from Geneva enters the Detroit office and needs immediate information about his account.

The customer service representative in Detroit enters the inquiry, and the system determines that the required data is not in the local data bases. The data, however, is resident in the Geneva system that is on-line through the network and also supports APPC applications. The Detroit system then establishes a session with Geneva through New York's domains, the inquiry transaction is executed at the remote Personal Computer in Geneva, and the information is transmitted to Detroit.

In the future, no host may need to get involved, and the transaction will be processed using the existing VTAM/SDLC network, 3705 communications processor and communications lines (telephone lines or microwave).

Another application of the architecture's facilities is storing predefined screens in local nodes. With APPC, the user's commonly used screens can be stored on the user's local computer,

EXTRA

> ***In Crocker's view, IBM's announcement of the protocol freed developers to build applications with true distributed processing. 'IBM now says [distributed processing is] the OK thing to do, and here's how to do it. The company has removed the stumbling blocks; developers had been afraid to do something because they weren't sure where IBM was headed.'***

and the applications programs will use them as required.

Therefore, the network will carry less operator-related cosmetic information, such as the screens, and more data. That is, overhead will be reduced in favor of carrying the actual information that is requested.

Although the concept of storing the screens remotely was introduced in the mid-1970s, it did not catch on as an industry standard because of the limitations imposed by the 3790 communications processor.

The missing piece

"LU6.2 support for the Personal Computer has been the missing piece," says John Crocker, executive vice-president of information systems at On-line Software International, Inc., a software product vendor for large-scale IBM environments. "Although the LU6.2 protocol has been on mainframes and minicomputers for some time, until recently it was not available on the Personal Computer.

"Until this protocol was announced, the technology that the vendor had to use was terminal emulation," Crocker says. "The dumb terminal protocol is something every device understands.

"Terminal emulation was never designed for intelligent applications. It was designed for transferring screens of information from the mainframe to the terminal," he adds. "It was never designed for a heavy volume of data transfer. With the old system, the software had to know a lot about the protocol."

In Crocker's view, IBM's announcement of the protocol freed developers to build applications with true distributed processing. "IBM now says it's the OK thing to do, and here's how to do it. [The company has] removed the stumbling blocks; developers had been afraid to do something until now because they weren't sure where IBM was headed," he says.

According to Robert Sundstrum, manager of IBM's Communications Systems Architecture of the Communications Products Division at Research Triangle Park in Raleigh, N.C., APPC was developed to answer a need for distributed transaction processing across multiple hosts.

"LU6.2 is the architectural solution for all products to communicate with," Sundstrom explains. "IBM was motivated to introduce APPC to provide a common set of protocols that allow any set of products to communicate using the same protocols."

LU6.2 and PU2.1

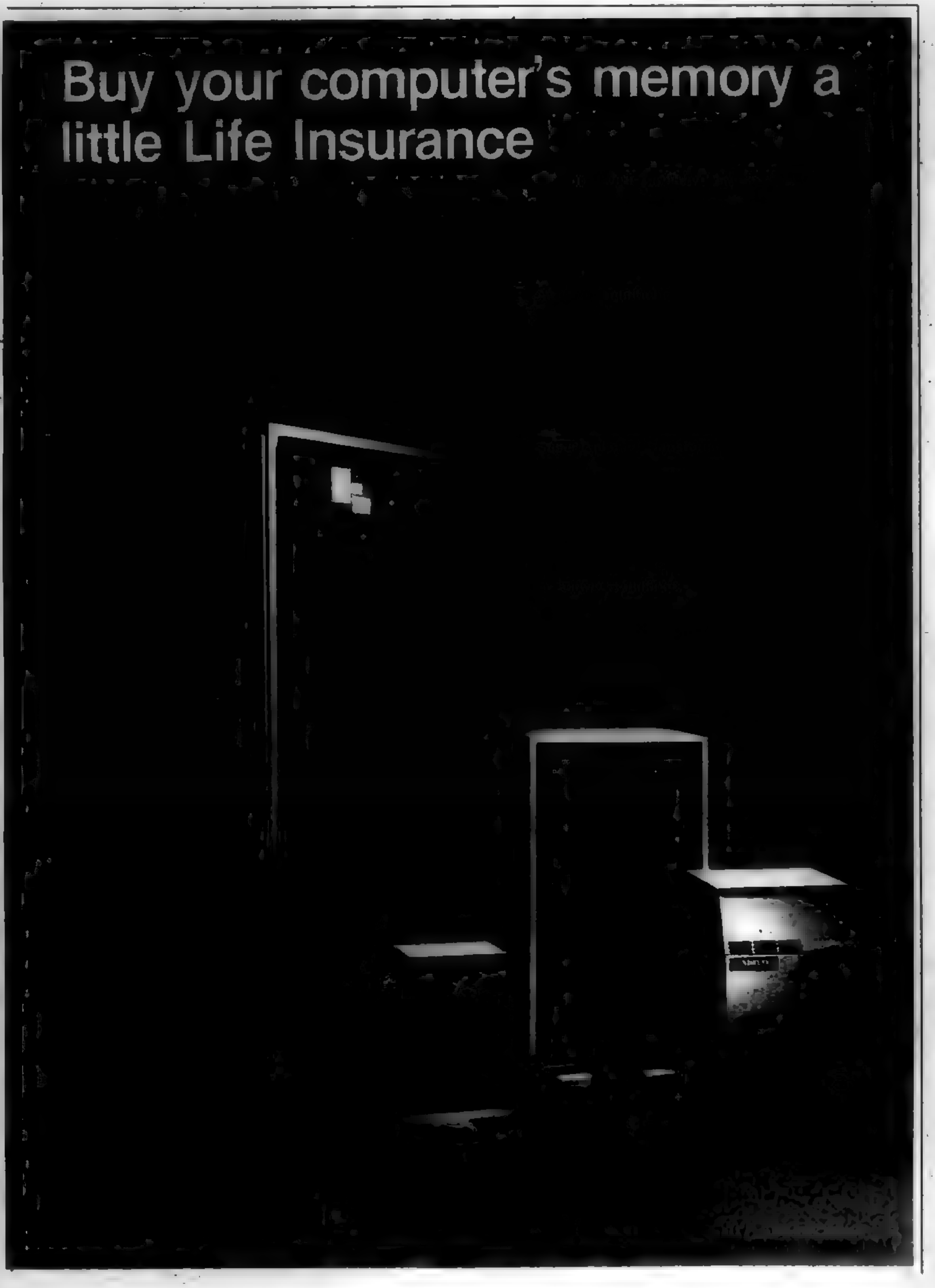
To understand how LU6.2 and PU2.1 benefit networks, it is first important to distinguish between the two.

LU6.2 and PU2.1 address different layers in the SNA architecture. LU6.2 addresses the session and presentation levels; PU2.1 addresses the physical level (transport level) that deals with link activation and routing. The logical unit resides above that transport network and works with it.

PU2.1 allows processors to communicate as peers. For example, 5520 devices are able to communicate directly with other 5520 devices, Personal Computers can communicate with other Personal Computers or with System/36s, and System/36s can communicate with other System/36s.

A processor does not have to be defined as a host to communicate with another processor. It is a new architecture that provides extensions for peer-to-peer communication and parallel session support that allow for multiple conversations with host systems.

With its current implementation of the architecture, PU2.1 facilities will not be implemented in micro-mainframe links with the IBM 370. When these links are required, PU2 will still be implemented with the Personal Computer, and the other LU6.2 facilities will still be available. However, as a PU2 device under the 370, the Personal Computer will not support multiple sessions.



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"LU6.2 was designed for many of the same reasons as the Intersystem Communications Facility," Sundstrom says. "It was designed to handle program-to-program communications with an appropriate set of protocols that would work both at the high end, with large-scale mainframes, and at the low end, such as in departmental systems.

"APPC was designed for ease of development for programs that would communicate. It was designed for our internal use and for use by third parties."

IBM provides applications today that utilize LU6.2. For example, DIA with the IBM Displaywriter and Scanmaster, the 3820 page printer with PSF and other applications are available on System/38 and 36. The System/38 and 36 provide a firm foundation and can provide the interfaces to third-party vendors.

Most installations, however, have become more compute-intensive at the Personal Computer level than on the computer room floor, Sundstrom points out. In some instances, processing data at the host will be appropriate; at other times, the host will function as a file server and will pass data to the Personal Computer for processing.

"LU6.2 gives you the ability to cooperate in processing," Sundstrom points outs. "Peer-to-peer communications will mean larger messages and less frequent messages; this will have network performance implications."

With the IBM token-ring network, a user will be able to talk across the local-area network. LU6.2 can reside on the network with the SDLC adapter and route data between the network and the host. Paths will be available that allow data to be accessed with a protocol converter or a local-area network gateway.

"A variety of interesting applications will be developed with Personal Computers. We're really staged now for customers and vendors. And third-party vendors will play major roles in the implementation of APPC," Sundstrom says.

Frank Thieroff, vice-president of architectural services at Chemical Bank, expects to use LU6.2 with the intelligent workstation.

"LU6.2 has been out for a while," Thieroff explains. "The excitement will be its integration with intelligent workstations in the future. One will have the ability to design cooperative systems that will take advantage of the local intelligence of the Personal Computer in collaboration with the back-end processors that provide more extensive data management services.

"The system can be designed to have the Personal Computer preprocess information and reduce the amount of communications required to the host," he says. "If the host is down, users will be able to store the data at the Personal Computer and forward it to host at a later time. Systems in general will tend to be more reliable and will rely on the host when it is available.

"The System/36 with LU6.2 could be a reasonably powerful product for supporting data entry and data gathering interaction, specifically when integrated with the Personal Computer. What is disappointing is that LU6.2 support for Personal Computers wasn't announced a year ago."

> *'The main reason that LU6.2 has become a hot subject is because IBM says it is. The company stated that LU6.2 will be the way of the future in its System/36, System/38 and IBM 370 statement of direction.'*

Enthusiasm, caution

SNA is the main network architecture for Chemical Bank, with gateways from other processors accessing the SNA backbone. LU6.2 will be the standard, and integrators will not need to worry where the exchange takes place. It is the unification protocol that enables users to ignore the nature of the individual processor.

"When I will use LU6.2 is pending on a lot of announcements from IBM, [Digital Equipment Corp. and Wang Laboratories, Inc.]," Thieroff notes. "We want to see what linkages will be developed and if they will use it."

"With cooperative processing, a need has always existed to transfer data from the mainframe to Personal Computers," ADR's Percy says. "Until now we've developed and used our own ADR protocols. However, we'd rather use IBM's.

"If we're talking about an application on the Personal Computer that needs information from a mainframe, they have to speak the same language. We acquired Progress, a product from Data Language Corp. that is a fourth-generation language with which we may want to initate a transparent link.

"LU6.2 and the Personal Computer will be supported with CICS Release 1.7, and [CICS] will be the only mainframe application with which [the

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Personal Computer] will interface," Percy says. "LU6.2 allows sessions to be held between applications running under CICS and those on the [Personal Computer] to converse. The big issue for ADR is, do we develop our own language or find something on the outside?"

Pathway Designs' Wise is enthusiastic about the future of APPC but approaches it cautiously. He says, "Anybody betting his company on LU6.2 next year will lose. The pioneers will make limited money with it this year, a little more the following year. It will be 1988 before you see it fully implemented." Useful applications are needed to provide users with the impetus to convert to APPC.

"The main reason that LU6.2 has become a hot subject is because IBM says it is. The company stated that LU6.2 will be the way of the future in its System/36, System/38 and 370 statement of direction," he notes.

According to Wise, in implementation, "APPC will require horsepower at the distributed level. Due to the sheer number of conversations and sessions, it will eat up memory in the host and in the Personal Computers. Multiple conversations to the same logical unit, the cost of establishing the link and [executing] BIND processing are expensive."

Although IBM 3270 technology is not sufficient for the integration of intelligent workstations into the network, Wise estimates that it will stay around until the 1990s, when networking and tightly entwined distributed data bases are implemented.

Distributed DP

Many important products will come from third-party vendors. The data will then be segmented and segregated across multiple processors. Local-area networks will continue to expand, and with that network expansion will come distributed data processing.

Wise sees more offices consolidating their media with the installation of local-area networks. This first sign of integrating Personal Computers reduces the incidence of sharing floppies. The second level of integration is the gateway to the host that allows users to "hot-key" between local applications and access information from the host. At this level, users can download files for local manipulation. Finally, APPC allows the total integration of applications and data that allows users to access any data on the network selectively.

"Unfortunately," Wise points out, "people forget that PU2.1 services are just as important as LU6.2." Although IBM announced PU2.1 services two years ago, they are not yet fully documented. Third parties cope with the lack of documentation through reverse engineering.

"This is a problem in dealing with IBM," Wise says. "Although IBM claims to support the third parties fully, it often doesn't let out all the information, and we have to try to figure out what they are doing. We put in the inputs and see what outputs are generated."

On the bandwagon

Unlike Wise's cautious approach, other vendors have jumped onto the LU6.2 bandwagon. One is Paul Rampel, president of the Orion Group, Inc.

Orion recently announced the availability of its SNA62 Peer Communications Facility. This product provides a complete implementation of the LU6.2 protocol and PU2.1 to run on the Convergent Technologies, Inc. Miniframe and on the AT&T Unix PC. SNA62 is targeted for OEMs and was developed using the C language for a range of operating systems environments.

Rampel points out, "Our marketplace is principally OEMs and systems integrators, and we are getting into the market in a time when OEMs are looking at connectivity. We felt these protocols would become a necessity for OEMs to maintain a presence in SNA-dominated architectures.

"LU6.2 will solve problems that

> ***'Reverse engineering is a problem in dealing with IBM. Although IBM claims to support the third parties fully, it often doesn't let out all the information, and [the third parties] have to try to figure out what it is doing. [The third parties] put in the inputs and see what outputs are generated.'***

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IBM was experiencing in its own product line. Historically, multiple logical units were developed around particular applications. That resulted in [logical units] becoming incompatible with one another, and no single protocol existed that would allow them to be interconnected across the variety of products. LU6.2 was designed to run across the entire product line."

This functionality is important, especially when users desire to mix and match hardware. "It has the prospect of solving a real industry need and to become a single industrywide standard for communications," Rampel says.

Some vendors express reservations. ADR's Percy says, "Although LU6.2 is a step forward, in practice it leaves a lot to be desired. In CICS, [LU6.2] required 25,000 lines of code to implement because the old CICS architecture is not layered as SNA is.

"Therefore, it is hard to define CICS architecture to match LU6.2. Because of the restrictions imposed by the architecture of CICS and IMS, IBM itself may be restricted in implementing APPC fully."

ADR has been investigating the potential of LU6.2. In its next release of E-Mail (targeted for the first quarter of 1986), ADR will include support for LU6.2 for the routing of electronic mail messages between multiple CICS systems.

Not new ground

Distributed transaction processing is neither a new concept nor a new implementation. Currently, DEC has implemented distributed transaction processing for six years and developed its own international corporate network connecting more than 6,000 devices.

Users anywhere on the DEC network may execute a transaction that will locate the required data at another (remote) node in the network. In addition, DEC microcomputers and IBM Personal Computers that are connected to a VAX through the Decnet network with Decnet-DOS already support distributed transaction processing.

David Korf, multivendor networking marketing manager at DEC, says, "DEC has been shipping these products for a long time. You can compare the IBM announcement of distributed transaction processing to the conquistadors coming over, staking out ground, planting their flag and claiming the new world. The natives say, 'What new world? This is our backyard.' "

Decnet, which is 10 years old, can carry videotex and electronic mail and perform true office automation for document sharing, network management and virtual terminal capabilities.

Link to Japan

"I can log on at 6:30 a.m.," Korf says, "and go to another node in another part of the world — for example, our research and development center in Japan — and be able to process a distributed data base transaction."

DEC is one of the vendors that already support LU6.2 and DISOSS. Users can link their Decnet to SNA networks through their Decnet/SNA gateway, Gateway Access Software or VMS-SNA system and access data. The DEC users are not aware that they are connected to an IBM host and therefore need not learn a new set of commands.

DEC has implemented other gateways between its

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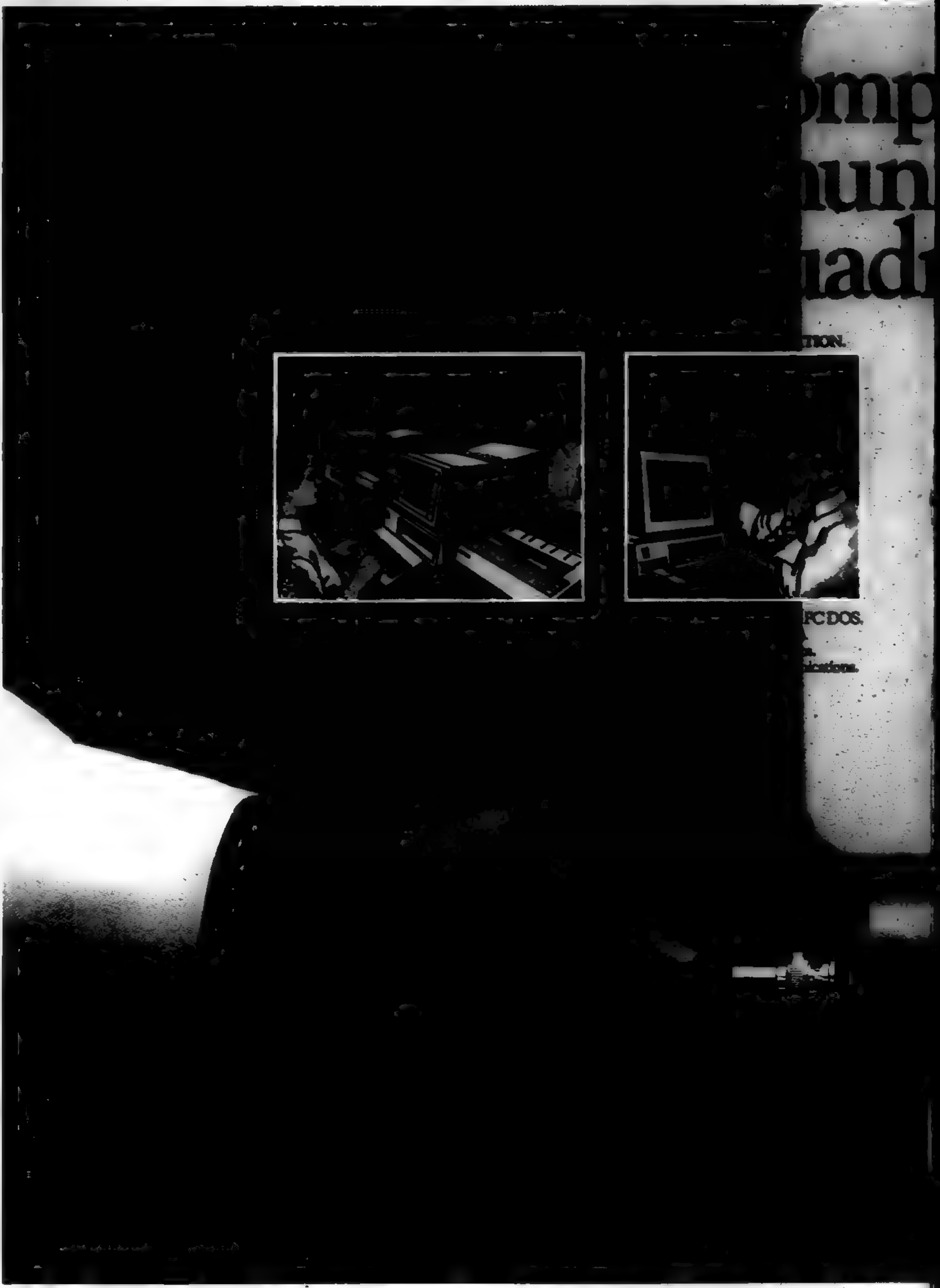

LU6.2's potential for enabling distributed processing, enhancing network performance and allowing peer-to-peer communications promises to change the nature of data communications.

products and IBM's. For example, DEC workers can exchange data using DIA and DCA in Final Form and Revisable Form.

"When documents are passed through the gateway to the DEC user, the terminal will beep and show that [the user] just got new mail from the Displaywriter," Korf says. The interface is based on LU6.2, as an architectural interface that looks like an IBM device, and it transfers the document to or from a Decnet network.

"This alternative was chosen for investment protection [because it] is less susceptible to changes in software releases. We allow different options to the product and provide the ability to interface and distribute a document," Korf says.

"DEC adopted the LU6.2 standard to interface with IBM because we were concerned with investment protection for our customers, and we're concerned with investment protection for us. We don't want to throw away our engineering time. DEC announced its intent to support LU6.2 in February 1984, and in October 1984, it was delivered."

With competitive vendors supporting LU6.2 and PU2.1 and with vendors of IBM products already planning to incorporate the architecture into future products, the protocol is clearly on its way to becoming an industry standard.

The protocol's potential for enabling true distributed processing, providing for actual data extraction from any processor, enhancing network performance and allowing for true peer-to-peer communications promises to change the nature of data communications in the near future.

Fruits of labor

The October announcement of LU6.2 protocols for the Personal Computer heralds more significant changes coming in APPC — a break from the mainframe-oriented hierarchy of SNA.

With the Personal Computer freed to resume its capabilities as an intelligent workstation in a network system, APPC promises to simplify and improve data handling in the workstation of the future.

While it may be some time before the protocol affects communications in the user setting, vendors are already designing the applications needed to provide users with the impetus to convert to APPC.

How APPC will actually affect communications depends on the fruits of this developmental stage. But based on its initial reception and on planned announcements from vendors in the coming months, APPC/PC will evidently have a very significant impact on microcomputer communications.

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How LU6.2, PU2.1 work

The introduction of LU6.2 is important, for it sets up standardized architectures and protocols on which vendors can build. It will have the greatest impact not on the protocol level but at the applications level.

To understand how LU6.2 and PU2.1 benefit networks, it is important to distinguish between the two.

LU6.2 is the specification of protocols that evolved as an enhancement to IBM's Systems Network Architecture (SNA). It directly addresses peer-to-peer protocols and gives the applications developer the set of commands needed to establish conversations with remote processors.

PU2.1 defines peer node types and allows each node to act as a peer to any other node on the network. Users with intelligent nodes will be able to establish sessions with other intelligent nodes in the network for data communications purposes. PU2.1 will allow users to establish sessions and communicate directly, without processing through the host.

LU6.2 addresses the session and presentation levels, while PU2.1 addresses the physical (transport) level. The two work hand-in-hand to take the place of terminal emulation. Together, they fall under the umbrella of Advanced Program-to-Program Communications (APPC): software that supports SNA communications over token-ring and Synchronous Data Link Control (SDLC) links.

Setting standards

The introduction of the LU6.2 protocol is important to vendors, for it sets up standardized architectures and protocols on which the vendors can build. It will have the greatest impact not on the protocol level but on the layer above, at the applications level. The application can send the request in a manner that any other processor can understand in the same format.

John Crocker, executive vice-president of On-Line Software International, Inc., says, "APPC provides the highway to get from point 'A' to 'B' without [the developer's] having to know the mechanics of how to get there. Now that we [the vendors] have the highway to travel on, we need to build the vehicles — the applications."

Two options are available for integrating the LU6.2 protocol: the open and closed Application Program Interfaces. With the open interface, an application can be written using LU6.2. With the closed interface, LU6.2 is incorporated within the existing application, allowing it to communicate with other processors for data communications. This means intelligent devices such as the Scanmaster can be included in existing networks.

Historical applications

A predecessor to APPC is the Intersystem Communications facility (ISC). It allows applications developers to process remote transactions within other CICS and IMS regions or machines. Until the ISC was introduced, interapplication processing within the IBM world did not exist.

The ISC was originally announced as LU6 in CICS/VS Release 1.4. Two CICS systems could use a single session to process a transaction between them. The ISC was upgraded to LU6.1, whereupon it allowed communication between two CICS systems, two IMS/DC systems or a CICS and an IMS system (in CICS/VS Release 1.5 and IMS/DC Release 1.1.6).

LU6.1 allowed multiple concurrent sessions to be supported across applications. LU6.2 has been integrated with the ISC in CICS Release 1.6, and it allows for synchronous program-to-program attachment and a conversational flow of transactions. PU2.1 is an enhancement of PU2, which is commonly used in IBM 3270-type devices. PU2.1 was introduced to support parallel or primary logical-unit sessions and can have multiple links, where PU2 can have only one.

In addition, PU2.1 allows primary sessions that generate the communications poll; by contrast, PU2 only allows a secondary session. The PU2.1 implementation allows two Personal Computers to establish a unique SDLC session between themselves.

The recent announcement of APPC for the Personal Computer (APPC/PC) provides LU6.2, PU2 and PU2.1 support for the IBM Personal Computer, requiring a minimum of 208K-bytes memory on the Personal Computer with the token-ring network and the SDLC adapter.

APPC/PC allows Personal Computers to interact with other Personal Computers, IBM 370 (with CICS Release 1.7), System/36 and 38 or Series/1 (with RPS Release 7.1). It supports these processors as PU2.1 nodes, with the exception of a 370 configuration, where it supports the Personal Computer as a PU2 node.

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Portable sessions are also a feature of CONSOLE-Master. No pre-planning is necessary to move a TSO session from one local console screen to any other.

Hardware requirements such as multiscreen terminals can be reduced and of course, CONSOLE-Master is simple to install and requires virtually no user retraining.

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TOPVIEW

Top-heavy, not topflight

If IBM refines Topview, it could become a viable, even significant, product for corporate micro use — something it isn't right now.

By Robert Moskowitz

IBM introduced Topview in August 1984 as a multitasking "environmental manager." The purpose of the $149 software product is to allow an ordinary, single-function IBM Personal Computer to run several applications at once, with data and peripherals shared among them.

If successful, such a system would slice through one of the major limitations of the popular Personal Computer: the inability to shift quickly from one task, one project or one set of data to another. This limitation was what spawned a great many multitasking packages in the first place, integrated software such as Lotus Development Corp.'s Symphony and Ashton-Tate's Framework; desktop software such as Borland International, Inc.'s Sidekick and Conceptual Instrument Co.'s The Desk Organizer; and system software such as Digital Research, Inc.'s Concurrent PC-DOS, Application Executive Corp.'s APX Core Executive and North American Business Systems, Inc.'s Multi-Shift.

But each of these programs has its own shortcomings, so none has achieved the dominance that would make it a standard. Users turned to IBM once again for a standard method for multitasking on the Personal Computer.

Released with fanfare, Topview encountered severe criticism from the press and from user-evaluators almost at once. Among the major complaints were: It was slow, cumbersome, inefficient and memory hungry.

Topview's few supporters in the press countered with enthusiasm about its features and emphasized that the new software was more of a full-blown operating system than a simple environmental manager. Rumors circulated concerning IBM intentions to break away from PC-DOS and establish Topview as the main user interface for its entire family of personal computers.

Under the new system, it was rumored, applications that used a standard interface to work with Topview would automatically be able to exchange data with other applications holding to the same standard. But even more significant, they would be able to run without relying on what has become the most popular operating system in the world. Abandoning the Microsoft Corp. MS-DOS standard would mean new software could be developed without catering to MS-DOS limitations, but it would also mean charting new waters — a voyage with unpredictable results for users and software vendors alike.

These rumors did nothing to quell the argument that Topview is slow and cumbersome — that its performance is sluggish because most of its code is taken up with functions and features not yet enabled in the early releases.

Favorite son status

Despite the claims and counterclaims, users continued to be disappointed with Topview's performance level. If Topview had been released by virtually any other computer company, it would have been dead in the water from the first day. But because IBM affixed its name to the package and vowed to support and develop the Topview concept, a great many corporate users dutifully tested and evaluated the software.

Robert Moskowitz is a Woodland Hills, Calif.-based writer. He edits a national newsletter, "Office Automation Update."

> *'Micro users are no longer buying iron or the latest technology in software. We want to see support for at least one piece of software that has considerable impact, such as 1-2-3, before we will move to a new product in a big way.'*

Objective results from these evaluations are difficult to obtain. Some companies simply refuse to go on record about Topview. San Francisco-based Bank of America, a typical example, admits to having tested Topview and to not supporting its use but will not go into details.

A few major companies were willing to go on record with their opinions of Topview. However, not a single one of these organizations is using it. After a year or more of evaluating Topview with various applications packages and testing it against other "managers" and multitasking systems, their conclusions tend to echo those very early assessments: Topview is top heavy.

But nearly everyone who has worked with the program also concedes that if IBM continues to refine it with the proper development and support, Topview could become a viable — even significant — product for corporate microcomputer use.

Joe Kane, an office systems specialist at General Dynamics Corp.'s corporate headquarters, says that Topview is "basically a good product, but there are competitive products just as good or better." He named Microsoft Windows, Symphony and Concurrent PC-DOS as examples of packages that do a better job of running several stand-alone software products under multitasking or integrating several different applications into one package.

Kane made clear, however, that he feels IBM was trying for something more than an environmental manager when it developed Topview.

"IBM's goal was to provide a standard shell, inside of which applications can talk to each other," he suggests. "They want all applications to work smoothly. They want different workstations to perform more similarly. They want users to have the flexibility of using an application's standard keystrokes to run the software from menus or do things however the user wants.

"It takes IBM to set this kind of standard. It will be great if [IBM] can achieve it. But so far, [the company] hasn't."

Kane says that Topview is strongest right now at putting many different applications under one shell and thus saving time for high-salaried micro users. Its major benefit is the ability to swap data back and forth between various applications. But, he asserts, there must be a great many more applications packages developed that use the Topview standard. "Otherwise," he says, "there is little a user can do with it."

Hank Kee, vice-president for personal computing and office technology architecture at New York's Chemical Bank, is another expert who evaluated Topview and decided not to adopt it companywide.

"I don't know of anyone in New York who is using Topview," he says. "We have tested it and worked closely with a few users, and we have found it unsatisfactory.

"It's a product with lots of promise," Kee admits. "But the actual delivery of the product fell far short of my expectations. In fact, it had a depressing effect on me: I expected a heck of a lot more. My understanding is that the potential is there, but it is just not realized."

All alone

One criticism Kee leveled is that IBM released Topview without enough applications software to support it. IBM included a softcover book listing about 100 third-party applications that had been tested and found compatible with Topview. But some of the most popular applications, such as Micropro International Corp.'s Wordstar, Lotus' 1-2-3, and Ashton-Tate's Dbase II, were not — and are still not — on the list.

Other software packages not on the list may operate with Topview, but users encounter errors and problems when using unlisted software in the Topview environment.

"The presentation of new hardware or software is of little use unless it's tied in with applications," Kee points out. "Topview by itself has little value to me or to anyone. Microcomputer users are no longer buying iron or the latest technology in software. We want to see support for at least one piece of software that has considerable impact, such as 1-2-3, before we will move to a new product in a big way."

Along with many other evaluators, Kee found flaws in the new software. "You never know how much memory you have left," he says, "and the CHKDSK program doesn't work properly with Topview. The computer

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The time has come for straight talk about database management systems.

“The only reason to buy a database management system is to build better applications.”

Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEO's of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

J. J. Cullinane

John J. Cullinane
Chairman of the Board

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The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of online and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/1, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS

Cullinet

400 Blue Hill Drive, Westwood, MA [illegible]

> *'IBM [did not design] Topview for today but for processors like the Intel 80286 . . . It may well become the operating environment of the future.'*

just hangs up, and you have to reboot."

IBM representatives admit the former difficulty but refuse to comment on CHKDSK problems. Since its initial release, Topview has been updated only once. With Version 1.01, IBM eliminated three bugs that were found in the original version: two that happened only when users tried to run 1-2-3 within the Topview environment and one that sometimes occurred when more than one application initiated the disk read/write operations.

Gobbles up memory

Flaws and bugs aside, the most common criticism of Topview cannot easily be silenced: The package is a "byte hogger." Topview requires about 175K bytes of random-access memory (RAM), a considerable portion of the 640K-byte maximum for PC-DOS microcomputers. The problem is compounded by two tendencies:

- Microcomputer users often allocate 50K to 100K bytes for resident utility programs such as alarms, calendars, calculators and note pads.
- Software programmers often demand more RAM for their advanced applications. Many popular applications now require 256K bytes, for example, and some — such as Borland/Analytica's powerful Reflex data base — need 384K bytes.

As a result, there generally isn't room for more than one, or at most two, applications in the same memory space with Topview. Thus, the package's whole purpose is significantly circumscribed by its own use of memory. "By the time you bring Topview into memory," Kee explains, "how many other windows can you possibly run?"

IBM claims that Topview was developed in anticipation of the Personal Computer AT and other advanced technology computers that can address up to 4M bytes of RAM, and that when computers commonly possess that much memory, Topview's hunger for bytes will be much less limiting. However, Topview cannot address that much memory.

At present, Topview does not make use of any more than 640K bytes in any microcomputer and does not work with either of the two standard methods now on the market for addressing memory above the 640K-byte limit, so the claim rings a bit hollow.

Topview shows potential

William Synnott, senior vice-president of information systems and services with the First National Bank of Boston, notes that Topview shows more potential than present value. Synnott's staff at the bank does not currently use Topview but is looking forward to the improved viability of the product as IBM continues to upgrade it.

In the meantime, Synnott's users concentrate on Dunn & Bradstreet Computing Services' Dunn's Plus, a combination of theirs and other vendors' software running on IBM Personal Computer XT computers. The package gives users access to 1-2-3, Multimate International Corp.'s Multimate and Western Union Corp.'s electronic mail as well as outside or commercial data bases.

It also has the ability to import and export data between programs on the Dunn's Plus system and includes a "user install" section that allows virtually any software to be added to the basic system.

Users work from an overall menu that lists every program and possibility. Although it runs only one application at a time, Dunn's Plus automates such functions as getting stock price quotations from Source Computing Corp.'s Source, loading them into a 1-2-3 template and recalculating an entire portfolio.

Synnott believes the system possesses great potential for people who don't fully understand software but need fairly sophisticated computer functions.

Not a lost cause

Despite Topview's poor performance and the lukewarm reception it received, many in the world of corporate microcomputing still do not consider it a lost cause. "IBM has a way of resurrecting things," Kee explains.

"It's still the early days for this product," agrees Danielle Barr, vice-president of corporate systems with Bank of New England in Boston. "I don't think IBM designed Topview for today but for processors like the [Intel Corp.] 80286 and maybe even the 80386. It may well become the operating environment of the future."

She observes, "Often IBM is not the innovator technologically, but eventually it develops products that people want and need. It'll probably do the same with Topview."

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DB2 and IMS

The options doubled, and so did the confusion

If you don't buy IBM's dual-DBMS strategy, you may end up going it alone with IMS.

By Paul Hessinger

The medium to large-size IBM mainframe user community greeted the original June 1983 announcement of DB2 with skepticism, cynicism and, at best, cautious optimism.

Those attitudes, for better or worse, affected how DB2 has been evaluated and used thus far. With increasing frequency, data base planners in large IBM installations prepare reports and direction statements that express their confusion over the role of DB2 and their reactions to the data base, as various roles are considered for it. A replacement for IMS? Panic. An "information center DBMS"? Overkill? A relational front end for IMS? Inefficiency.

The cynical IMS user views DB2 as a reincarnated IMS. Some industry analysts agree, suggesting that the "new IMS" is a creation of marketing, not technical, personnel. In their view, IBM's real intent is to gather increased market share via a second data base manager. The company would give the impression that DB2 marks the first step in a move away from IMS — the Information Management System. The subsequent uproar will then lead IBM to reintroduce it as "IMS classic," no doubt — an improved version of the original formula.

Offering two DBMS is clearly consistent with IBM's mission in the data processing world — selling hardware — or so the industry analysts' song goes. The cautious optimist observes all of this while remembering that the IMS acronym stands for two things — and the first is "increasing mainframe sales."

Focus on large systems

IBM seems to be focusing its attention on large-systems environments with the dual-DB2/IMS strategy. Many of these installations are themselves going through a transition in terms of the information systems they are attempting to provide. "End-user oriented," "data driven," "flexible" and "integrated" are no longer simply nice ideas. These characteristics have become practical necessities in fourth-generation system engineering efforts.

The optimistic IMS user had hoped that at long last IBM would provide a viable architecture that would deliver efficient performance, relational data management and flexible information processing tools. Of course, these wishes represent a set of very high expectations for any single product or integrated set of products, not just for DB2. But early users found that DB2 does deliver some of what other IBM products, most specifically IMS, lacked.

The target environment for these products is not clearly divided between operational and end-user applications. IBM's version of an integrated software architecture must support both the high performance and management support environments.

Even for those installations with a strong affinity (conscious or otherwise) for mainstream IBM technologies, the dual-DBMS approach seems inconsistent with basic tenets of the data base concept, such as minimal redundant data storage. From a business

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Paul Hessinger is vice-president of research for Computer Task Group, Inc. in Buffalo, N.Y. He is also a speaker and corporate consultant on matters concerning the information systems community.

perspective, however, users report a strong desire for what might be described as "results at the expense of philosophical purity."

In trying to incorporate information technology into the operational and decision-making transactions of an enterprise, many organizations came to use the concept of corporate information architecture as a planning and design framework.

Admitting DB2 use

The concept of an integrated corporate data resource processed by even semi-integrated tools provided a backdrop for many organizations' evaluations of DB2.

In the last two years, the attitude, "So what if I use another DBMS?" has been voiced more frequently by DP managers. Again, users are pursuing results. At a major industry conference in the spring, a show of hands revealed that two-thirds of the 450 installations represented used IMS.

Another show of hands revealed approximately 125 DB2 users — you could actually count the hands because they went up slowly, as individuals looked around to see who else was going to admit in public to being a DB2 user.

A third question — "How many of your organizations are receptive to a second DBMS?" — produced an 80% show of hands. The subsequent panel discussion revealed that the motivating factors behind considering a second DBMS varied from a desire for integrated applications to a need for fourth-generation language facilities and relational data base support — results. These factors add up to fertile ground for IBM's introduction of a new DBMS:

> *Particularly in the next two to four years, the question "when DB2" will outweigh "if DB2."*

An old Bulgarian proverb comes to mind as we attempt to put to rest once and for all the notion that IBM's DBMS strategy is as devious or as Machiavellian as some would believe. The pragmatic proverb says, "In times of great danger, it is acceptable to walk with the devil until you have crossed the bridge."

Here the "bridge" is analogous to one of many transitions — from batch to on-line transaction processing, from stand-alone to integrated applications, from process-oriented to data-driven, from custom solutions to fourth-generation tool-driven information processing. Overall, the bridge represents the transition to a corporate information architecture concept many firms are attempting.

DB2 clearly does not support every aspect of the transition. But it does promote a software infrastructure that is conceptually viable and with which users can walk until they get past the crucial transition stage. IBM is attempting to give many installations what amounts to a semi-integrated software vehicle, with IMS and DB2 as the "engine." The trip across the bridge will be a difficult one. Particularly in the next two to four years, the question "when DB2" will outweigh "if DB2," as users view the new DBMS as both an architecture and a strategic IBM product.

DB2's uncertain role

Whether IBM's positioning of DB2 as both a complement to IMS and a stand-alone DBMS becomes clearer in terms of both marketing direction and technical development remains uncertain. Users wonder about many other details as well:

- What is a reasonable time frame within which the dual-DBMS strategy will give way to a more aggressive promotion of and a more comprehensive role for DB2?
- Are the apparent functional weaknesses of DB2 (lack of a comprehensive data dictionary facility, incomplete application development tools) being magnified by industry analysts and competitors, perhaps overshadowing the long-term architectural significance of DB2?
- Are the variety of IBM fourth-generation languages — Application Development Facility (IMSADF II), Cross System Product (CSP) Set, Data Base Edit (DBEDIT) and so on — skewing IBM users' view of SQL? After all, SQL doesn't compare with some other recognized fourth-generation powerhouses such as Information Builders, Inc.'s Focus and Applied Data Research, Inc.'s Ideal.
- Whither SQL/DS? Will the VM and MVS implementations of relational facilities continue on parallel paths? Will interactive interfaces at the data-systems level be provided between DB2 and SQL/DS? What degree of "production" processing can SQL/DS, or perhaps more importantly VM, support?
- What are reasonable performance expectations from DB2, based upon early user experience?

It is very likely that within the next three to six months, probably occasioned by an announcement of the next release, IBM will more clearly position DB2 as a stand-alone DBMS. Thus far, the majority of DB2 utilization has taken place in a Query Management Facility/Interactive System Productivity Facility (QMF/ISPF) environment. Approximately 70% of applications developed are end-user-oriented. Approximately 30% are transaction processing applications,

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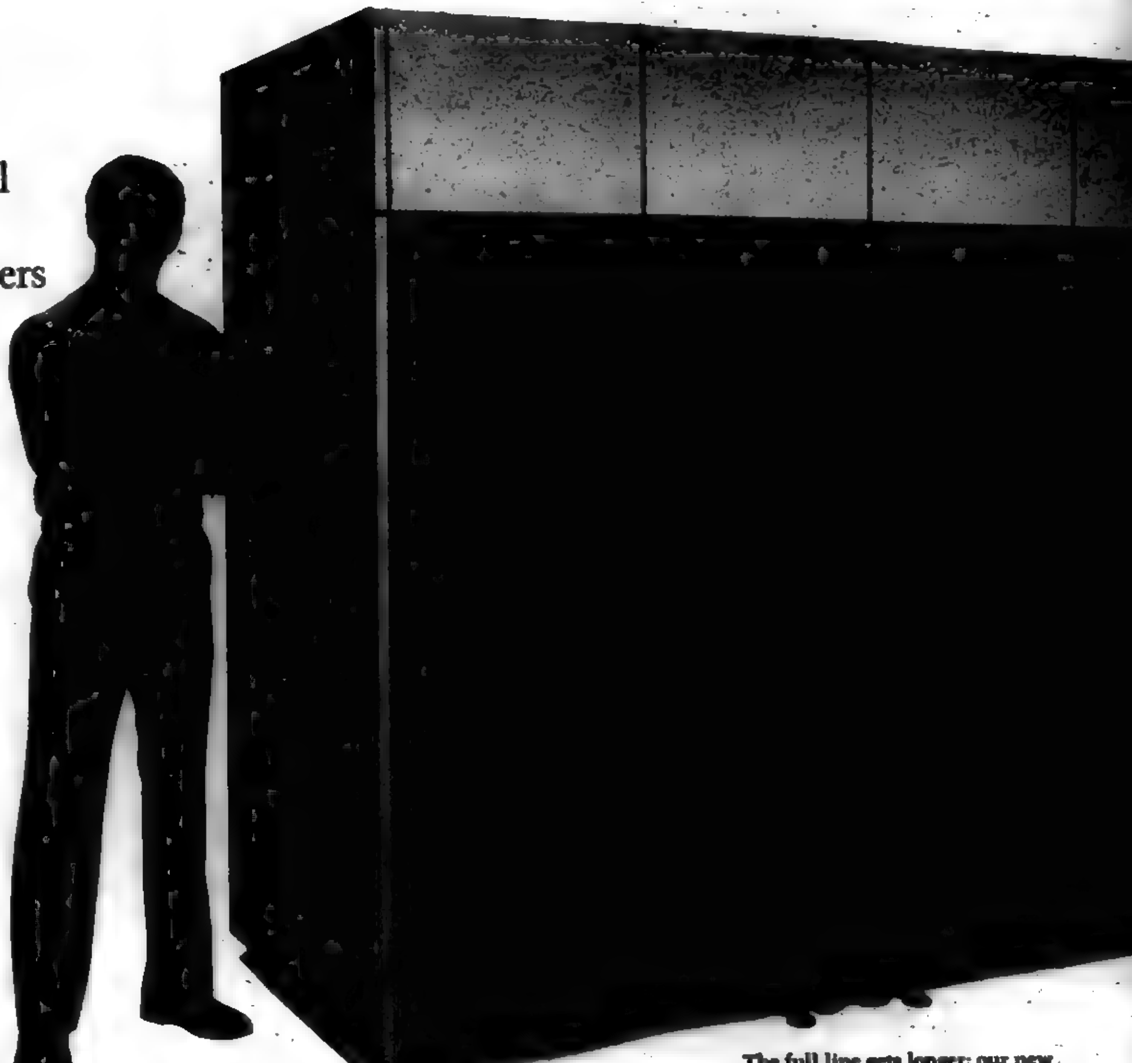

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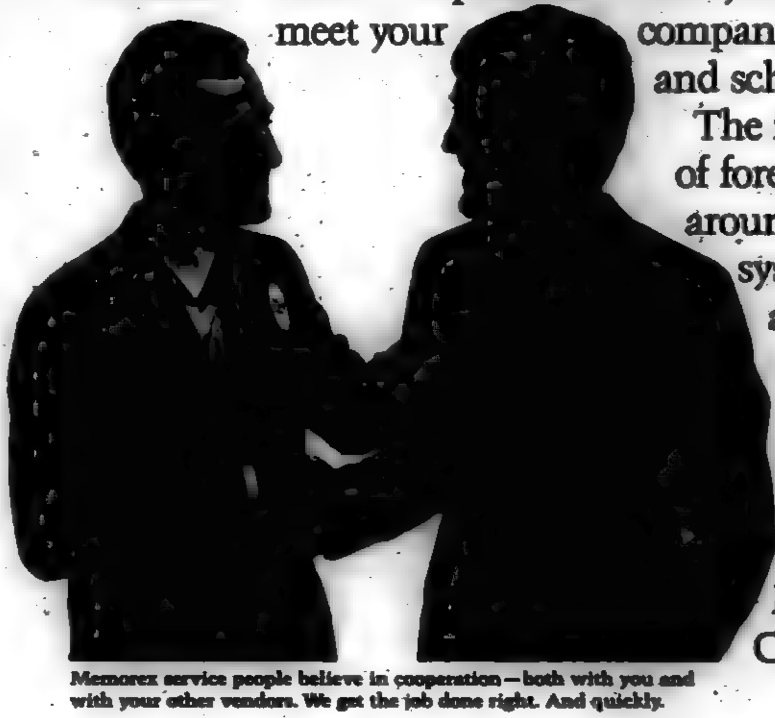

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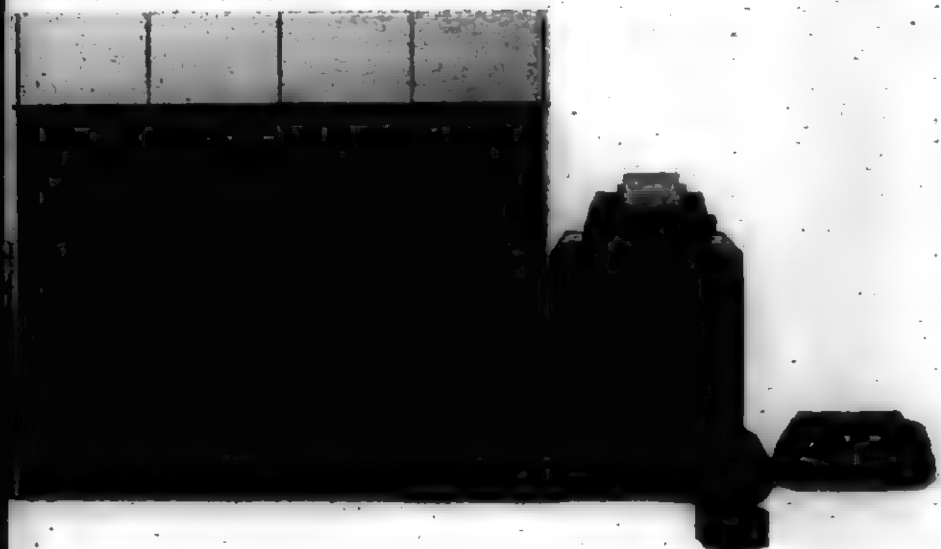

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delivered via IMS DC (Data Communications) or CICS.

The bounty of end-user applications demonstrate the viability of manipulating general-purpose "subject data bases" via a relational facility such as SQL and the feasibility of transferring varying amounts of data from the structured IMS environment to the relational DB2 environment. As IBM enhanced existing IMS Message Processing Programs, users put DB2 to work providing integrated access to select data resources.

For example, a manufacturing environment uses numerous tables for transaction processing. Very often these tables contain data that is user defined and should be user maintained, such as metallurgical codes in a steel production system.

The Cobol approach normally involves table management that requires a technician's attention for updates. DB2 lends itself more readily to end-user updates. While DB2 would be expensive if used solely as a table-management system, it does provide excellent facilities for this type of data support.

DB2 relies on SQL statements embedded in the existing program. The program defines the tables to DB2 and carries out a one-time data transfer. At execution time, the program accesses the DB2 tables via the IMS DC/DB2 Attach facility.

SQL interfaces

In a data validation situation, the SQL "SELECT . . . FROM . . . WHERE" clause navigates the table or tables. A status code is returned to the application so that it can continue processing. Via QMF, end users can now directly maintain the data.

In several installations, these "production" IMS/DB2 applications are being developed as part of a gradual introduction of DB2 that provides an enhancement capability for existing IMS systems.

Production IMS/DB2 applications are developed as part of a gradual introduction of DB2 that enhances existing IMS systems.

The emergence of standard data definition (DDL), manipulation (DML) and control (DCL) languages is critical to the success of an integrated information environment. In the one to two-year time frame, IBM's data systems strategy will emphasize SQL in that regard.

The first phase of the tactical deployment of SQL will be as a data manipulation facility, as the above example indicates.

From an end-user tool perspective, the increasing frequency of vendors' announcing "SQL interfaces" is an indication that a key interface layer (SQL) in IBM's blueprint for DB2 is becoming a de facto industry standard.

In the context of a standard data language, an extensive DDL facility is also critical. This language is closely tied to the inclusion of an integrated data directory/dictionary mechanism.

Coming clear

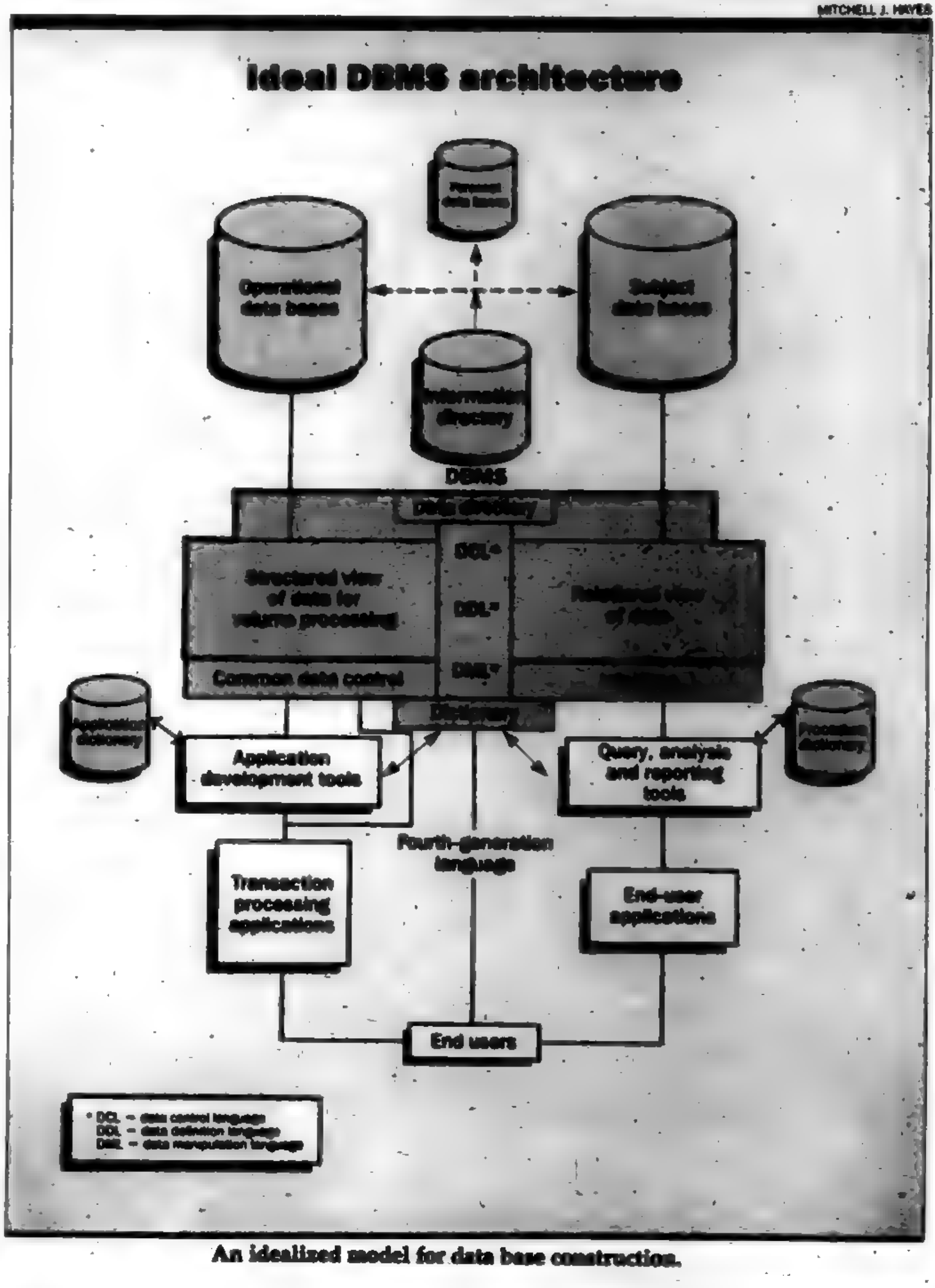
It is unlikely that SQL will begin to provide that component of the data language layer before two years. At that point, IBM's dictionary direction should become clearer and may even materialize into a workable product.

In the more difficult to predict 4+-year time frame, the final dimension of a standard data language layer will begin to emerge — a comprehensive data control facility that is essential for the distributed data access and data base management environment.

A program is now under way to implement major subject data bases in DB2 with application processing delivered via DB2/SQL, SQL/DS, Oracle and several other excellent fourth-generation languages, primarily Focus.

Continued on page 64

MITCHELL J. HAYES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Operational data bases
Subject data bases
Information directory
DBMS
Data directory
DCL*
DDL*
DML*
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Dictionary
Application dictionary
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How fast can IMS process?

Is the positioning of IMS by IBM as the "structured, volume transaction processing" data base system working?

Installations are experiencing continued increases in the volume of on-line transaction processing. The following figures are offered as arbitrary, yet meaningful, transaction-per-second metrics that help in gauging the size of a transaction processing environment:

The medium category (five to 25 transactions per second) includes a significant number of the medium to large IBM mainframe shops. The large category (25 to 100 transactions per second) is increasing. By 1990, a substantial number of installations will move into the 100+ transaction-per-second range.

There is a strong industry bias that suggests that IMS will not perform well in the high-volume environment. To the contrary, Releases 1.2 and 1.3 have made IMS' voracious appetite for resources more acceptable as its ability to support increased volumes has improved.

An IBM benchmark, which has been independently verified, shows the following performance estimates for IMS 1.3 in an XA environment where the somewhat forgotten FAST PATH feature was employed as a high-performance option:

IMS 1.3 represents the first stage in a complete restructuring of the IMS internals that is aimed at the targets of high availability and high performance.

- Full-function mode — 85+ transactions per second.
- Mixed mode — 95 to 100 transactions per second.
- FAST PATH — 135+ transactions per second.

High performance

These numbers are in all likelihood conservative. One major banking installation is supporting a peak volume of 1,000 transactions per second. It is important to emphasize that this high volume occurs infrequently and can be anticipated within one hour. Also, the high volume involves a reduction in the rest of the IMS work load.

Nevertheless, IMS handles the volume. This type of support is also indicative of the improved operational and reliability features of the IMS software.

IMS 1.3 represents the first stage in a complete restructuring of the IMS internals that is aimed at the targets of high availability and high performance. One without the other becomes relatively meaningless.

- Is FAST PATH a design framework for restructuring IMS so that it will effectively support the high-performance environment? Or is it "vaporware" — an intuitively appealing but impractical concept?
- Will IBM find a home for the "orphan" known as TPF that won't disrupt the ongoing enhancement of IMS, not to mention the continued development of DB2? Is a DBMS facility for TPF likely?
- Can IBM achieve a separation of duties between IMS/DC (as the preferred data communications system for transactions processed by IBM DBMS) and CICS (as a general-purpose on-line application monitor)?

Release 2.1, particularly in the FAST PATH area, continues to streamline virtual storage consumption via an expended use of the address space "above the line."

Release 2.1 also offers enhancements in the area of availability via XRF. While not a true "fault-tolerant" solution, XRF provides a "hot standby" approach where the work load of an active IMS system can be transferred to an alternate IMS system with a minimum amount of interruption of service to users.

Here we have an example where the integration of several IBM "Large System Architecture" products (specifically, MVS/XA, SNA and IMS) is an indication that IBM is still very much "large-system environment" oriented. It is very likely that XRF will be expanded to DB2 within one to two years.

IMS is here to stay. FAST PATH is, in fact, a significant component of IMS that is providing a redesign framework for many existing IMS systems that are high-performance oriented.

IMS will begin to play a more transparent role in new system development efforts as DB2 plays a more comprehensive role.

In the 4+-year time frame, it is likely that IMS will be completely positioned as a high-performance option. It may be premature to speculate, but a data base machine implementation of IMS appears to be a logical extension of DASD and operating system technology developments. In any event, IMS will continue to require the resources present in a 3090 class MVS/XA system.

From an IMS perspective, two items are potential obstacles for IBM if the above is an accurate description of its DBMS strategy in the next two to four years and beyond. Those items are CICS and TPF.

Release 1.7 of CICS quieted any fears that a move away from CICS was being contemplated by IBM. Ironically, for non-DBMS reasons, IBM is tied to CICS.

A mainframe product for the office systems environment — the Distributed Office Support System (DISOSS) — requires CICS. DISOSS is being widely used in large mainframe shops and has become a strategic IBM product from an overall perspective.

It is likely that IBM will attempt to emphasize one data communications system as a front end for its DBMS products. That system will be IMS/DC.

CICS support and development will continue, at least, into the four- to six-year time frame and will increasingly be positioned as the general-purpose, on-line application monitor. Extraneous items, such as the DOS/VSE user community and the large number of non-DBMS CICS applications in existence, further mandate an IBM version of the integrated software architecture that is unclear about the preferred IBM data communications solution.

A data base machine implementation of IMS appears to be a logical extension of DASD and operating system developments. IMS will continue to require the resources present in a 3090-class MVS/XA system.

The orphan

TPF is less of an obstacle. Currently, it is an orphan within IBM and most likely will not find a home. Twelve to 18 months ago, quite a few large installations began looking seriously at TPF. The user population grew rapidly from its original base of less than 50 to approximately 60 to 70 locations. Industry estimates suggested a total user community of 200 sites was possible.

As organizations moved resource-intensive, high-volume systems into RPF (and in several cases out of IMS), processing efficiency did improve greatly. But general accessibility to data became a problem, since there were no fourth-generation language facilities provided by TPF itself or interfaces to it provided by existing fourth-generation languages.

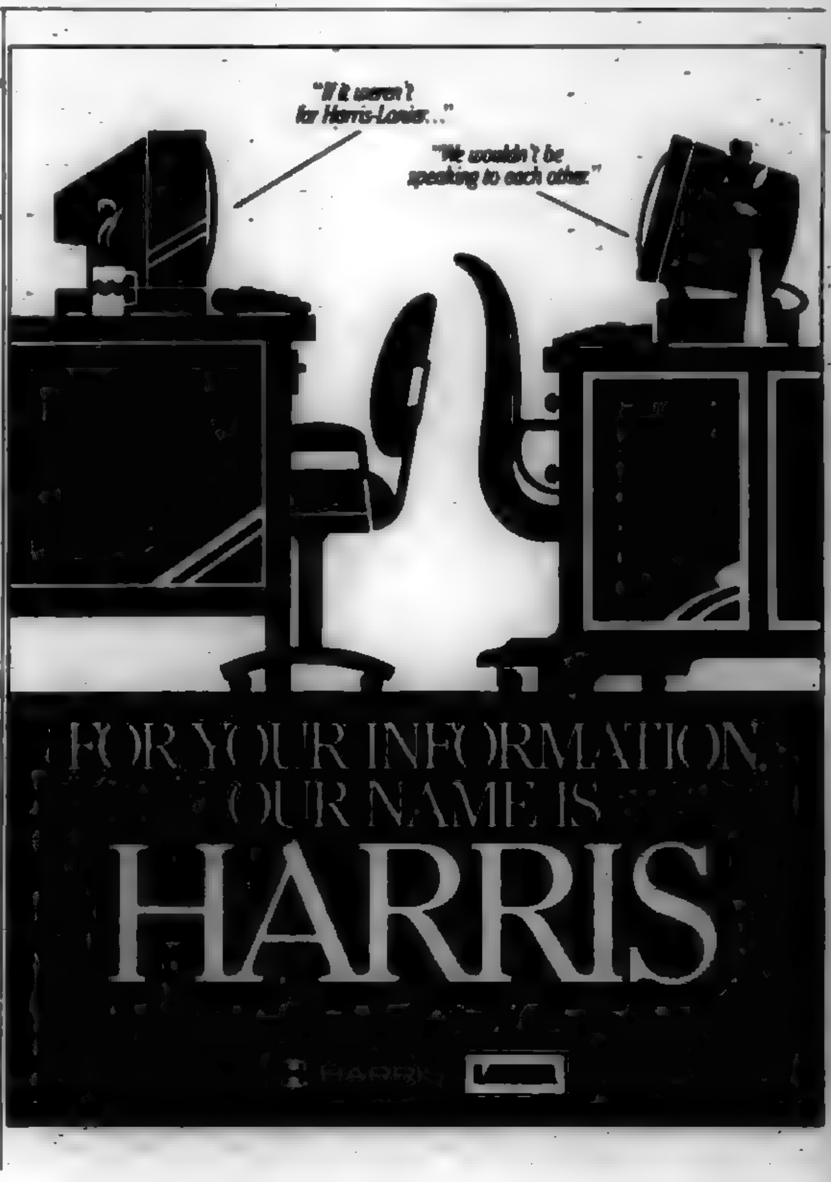
For some, the TPF environment became a no-man's-land. The lack of a DBMS facility under TPF has driven several recent converts back to a conventional environment.

TPF will remain an extremely high-volume environment approach. A TPF front end for transaction routing and network interfaces is a viable concept. It is unlikely that IBM or any other vendor will provide a complete DBMS implementation within TPF. It is likely that facilities such as Swissair's ACP/DB, an IMS/TPF interface, will be developed.

Currently, IBM is investing more in IMS development than it is in DB2 development by 3:2. This ratio will change. In restructuring IMS and positioning it as the structured, volume transaction processing system, IBM is providing itself with a means in which the evolution of DB2 can continue.

In all likelihood, IBM will be able to address more effectively the distributed environment with the demands of referential integrity, locality of reference and site autonomy, to name just a few key characteristics, once the foundation is established firmly.

In IBM's strategy, DB2 will become the focal point, with a specific role for IMS in the dual-DBMS approach.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Continued from page 62

Much of the data being managed by DB2 is drawn from operational IMS transaction handling systems. These systems will be very carefully migrated to the DB2 environment over four to six years, with some remaining permanently in IMS.

From an industry perspective, the long-term significance of DB2 is being overshadowed by industry analysts and consultants with a "David and Goliath" mentality. The David camp focuses on the dictionary and fourth-generation language weak spots of DB2, suggesting that IBM's — the Goliath's — urging to consider the dual-DBMS approach is misdirected and ill fated.

But there is a need to examine more carefully the methodologies needed to make the transition to an information-based system. Beneath the surface of early DB2 experiences there is an important caveat that should be expressed as forcefully as those concerning functional and performance constraints in DB2 or any version of the integrated software architecture.

From an implementation perspective, the importance of using data analysis and modeling as critical application planning and design procedures has finally come to the surface. This emphasis resulted from experts' recognition that a relational DBMS such as DB2 can be more forgiving of quick-and-dirty design solutions.

The notion that relational systems, because of their flexibility, minimize the need for data design is misleading and can be downright dangerous. Whether Goliath's intention was to reinforce the importance of data-oriented design remains open to question. The fact is that major installations are recognizing that maintaining a corporate architecture as a planning, design and implementation framework shores up the relational approach in general and a DB2 effort in particular.

In fact, several major installations initiated data architecture projects before DB2 was an issue. One major banking institution employed a relational data modeling method, which was applied to a functional area of the bank that was information intensive but had thus far been ignored by information technology.

During the first stage of the effort involved, MIS gathered a user-driven definition of data requirements. The second stage involved pilot implementations of relational applications using Oracle Corp.'s Oracle on a Digital Equipment Corp. VAX and SQL/DS on IBM VM processors. As pilot applications were delivered, MIS brought in DB2 as a subject data base coordinator to provide a corporatewide data repository.

> ***The notion that relational systems, because of their flexibility, minimize the need for data design is misleading and can be downright dangerous.***

Four major issues

Two central issues and two peripheral issues underlie the overall context of IBM's DBMS strategy.

The central issues are the performance and resource implications of DB2 and the future of IMS. IMS' future will be discussed in the context of IBM's data systems strategy for the 2-to-4 and 4+-year time frames.

The peripheral issues include the relationship of the VM SQL/DS product to DB2 and IBM's fourth-generation offerings.

First, the peripheral issues. In terms of VM SQL/DS' relationship to DB2, SQL/DS preceeded DB2 as an IBM relational facility. IBM clearly intended that the two environments (MVS and VM) have a high degree of compatibility in terms of data system products. It is unlikely that in the one- to two-year timeframe that better, dynamic interfaces between DB2 and SQL/DS will be provided.

The use of SQL/DS as a data management facility for VM-based end-user processing is a viable consideration. But the delivery of production applications via SQL/DS should be approached very cautiously, stemming more from the characteristics of VM architecture than from SQL/DS capabilities as an integrated application support mechanism.

The two products very likely will continue on a parallel development course in the next two to four years. Beyond that, the future direction of

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VM will dictate the direction of SQL/DS.

The fourth-generation language layer is important to productive application development and effective user processing. Admittedly, finding a precise definition of a fourth-generation language — beyond a frustrated cry of "Not Cobol!" — is difficult at best.

IBM's information generator offerings are weak — there are few products.

The distinction between tools for the technician (application generators) and for the business user (information generators) provides a solid background for discussing capabilities and representative products.

Without being unnecessarily harsh, IBM's information generator offerings are weak. For one thing, there are few products to date. Those that are available — The Information Facility (TIF), Information Center One (IC1) and the Application System (AS) — are *not* competitive with products such as Focus, Analytica/Mathematica's Ramis II, D&B Computing Services' Nomad2 and so on.

IBM's weakness

As the vendors of these and other strong products develop SQL interfaces, IBM's weakness in this area could get worse before it gets better.

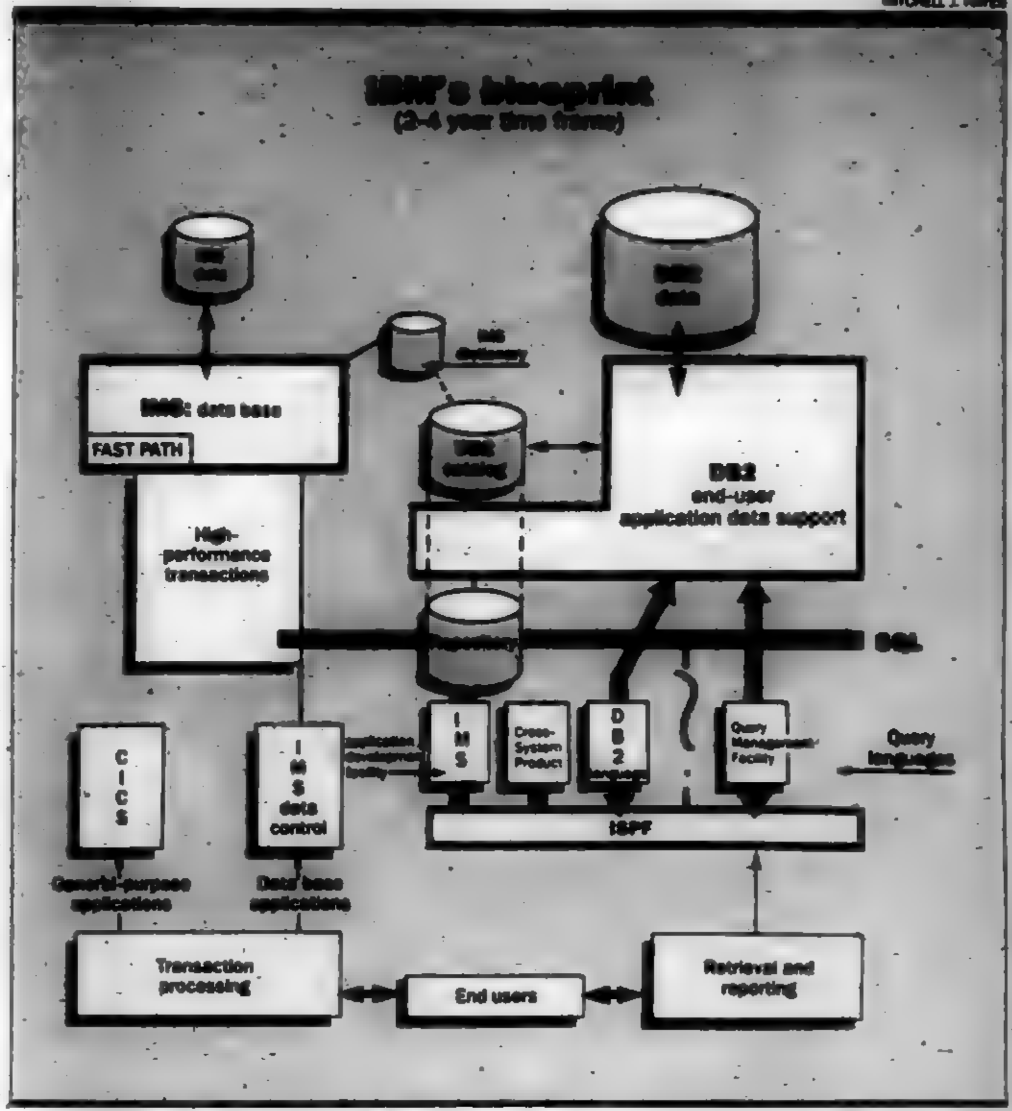
There is one notable exception in the context of mainframe-Personal Computer interfaces. IBM's Host Data Base View (HDBV) product provides an effective interface that employs common facilities for data definition and transfer (QMF and SQL). HDBV will likely be enhanced further by IBM.

For application generators, IBM offers IMSADF II, CSP and DBEDIT. SQL is not on this list; users have spent more time figuring out if SQL was IBM's fourth-generation language than they have looking at these products, perhaps with good reason.

Of the three, only IMSADF II represents a complete application development system. Past problems with it linger in the form of a strong bias against the product. While not as powerful as Ideal, for example, it does represent a viable alternative within the IBM product family.

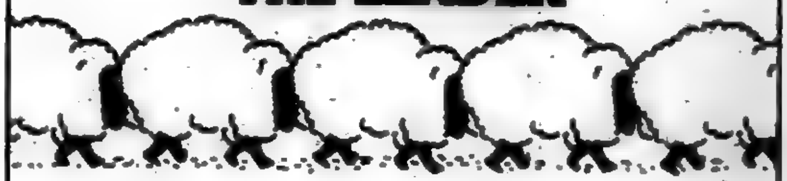
Suffice it to say that the fourth-generation language marketplace is still evolving

MITCHELL J. HAYES



In the next two to four years, IBM's DBMS plans may include a central repository.

WHY FOLLOWERS OFTEN LOSE SIGHT OF THE LEADER



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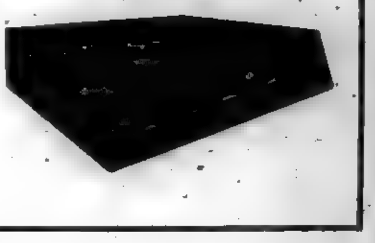

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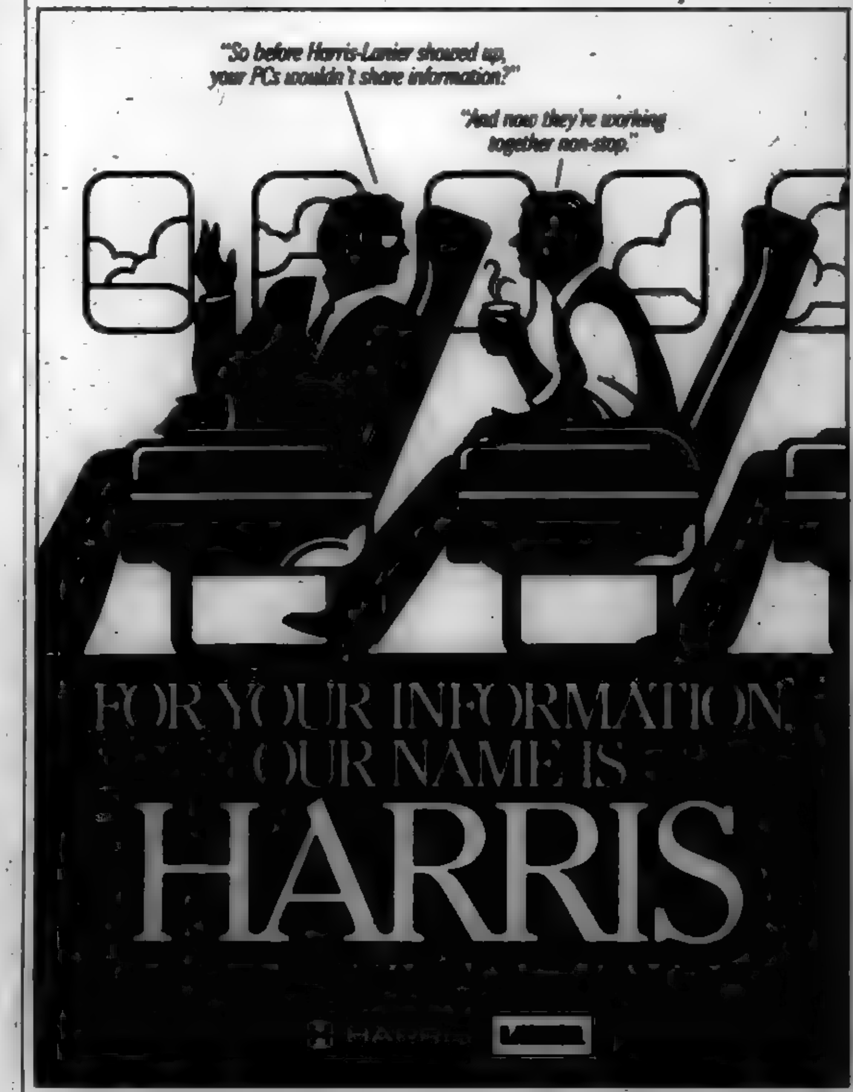
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> ***Real storage configuration becomes the central issue when considering DB2 resource allocation and the attendant throughput potential. The placement of certain elements, such as data base buffers, is the key to DB2 performance.***

and that IBM is trying in this area, but it has not yet provided truly effective development tools to complement DB2. This could become a serious inhibitor for potential buyers that are attracted to DB2 but that need to develop a great many applications in the short term.

Already, one major manufacturer with a significant investment in IMS — ADR — has chosen a non-IBM-integrated architecture for its development capabilities.

Another IMS installation has looked to the "complete software solution" marketed by Cullinet Software, Inc. as an intermediate approach to data base management in lieu of DB2. Interestingly enough, both installations intend to keep a watchful eye on DB2, particularly in terms of its performance potential.

What is acceptable performance to one installation may be horrendous to another. With that disclaimer, the following observations about the central issue of DB2 performance and resource consumption are offered.

In the most general terms, DB2 appears capable of supporting a maximum of 20 transactions per second delivered via IMS/DC or CICS. A range of five to seven transactions per second appears to be readily achievable, based on installation benchmarks of DB2.

Performance under ISPF is more difficult to estimate. Of course, the workload composition of a DB2 transaction or ISPF interactive session will vary widely. Perhaps a more meaningful analysis is the resources that DB2 requires to operate.

Storage tradeoff

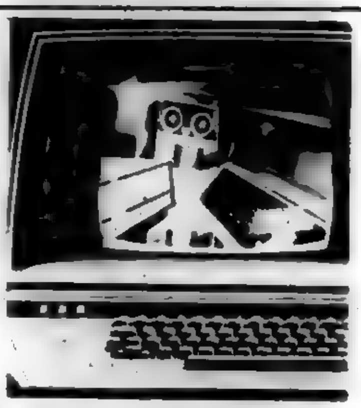
DB2 developers recognized the virtual storage constraint that has become the curse of many IMS installations and made every attempt to avoid that problem. In fact, they replaced it with the consumption of real memory.

Real storage configuration becomes the central issue when considering DB2 resource allocation and the attendant throughput potential it implies. The placement of certain elements, such as data base buffers, becomes the key to maximizing DB2 performance.

In the transaction processing area, where installations are handling increased volume, IBM is positioning IMS as the structured, volume transaction-processing data base system. This role for IMS should be completely realized in the 4+-year time frame (see story, page 63). Concerns over DB2 performance and resource consumption are not unfounded but appear to be manageable. DB2 is clearly, however, an MVS/XA-oriented product.

In the next one to two years in particular and most likely in two new releases of DB2, IBM will bolster performance and streamline resource consumption.

DEVELOP



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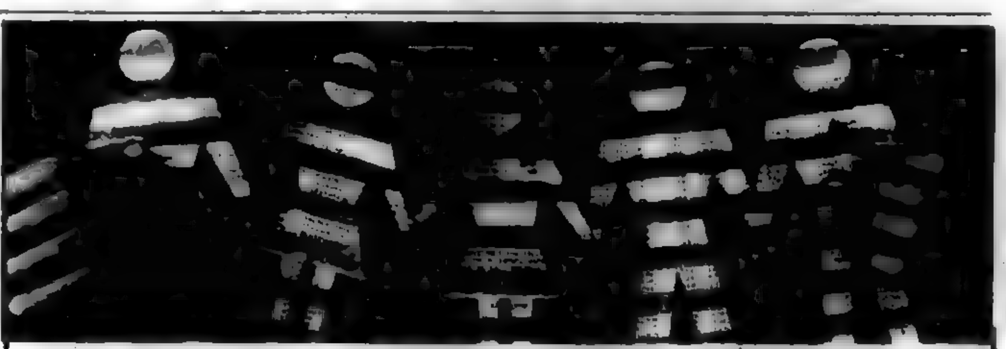

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Make no mistake about it. DB2 is a large systems environment product. In that environment, IMS DB/DC remains a vital complement to DB2 when high-volume transaction processing is required.

Both products will continue to benefit from advances in memory management, such as extended memory of the 3090 and storage management within MVS/XA. Multiple-address space architectures will receive continued emphasis and will leverage the expanded CSA (Common Services Area) and cross-memory service capabilities of MVS/XA.

Improved data integrity features are also necessary. Data integrity is tightly linked to the issue of maintaining a data dictionary. Most likely, subsequent releases of DB2 will expand the role of the DB2 catalog as one step in the direction of an integrated, active repository of data and application descriptions.

By design, DB2 will mature very quickly but will not replace IMS.

As a DBMS product, DB2 will mature very quickly and will not, by design, replace IMS. The degree to which DB2 complements IMS will vary from one installation to the next.

Not going with DB2 now does not appear to be in any way a bad decision. Particularly in the one- to two-year time frame, alternative approaches will be more effective in some installations. But DB2 does encourage an analysis of a corporation's overall information architecture.

Using DB2 successfully requires serious attention to the planning and design of an integrated, data-driven systems environment. At the implementation level as well, the relational capabilities of DB2 do not eliminate the need for a thorough understanding of the data base approach.

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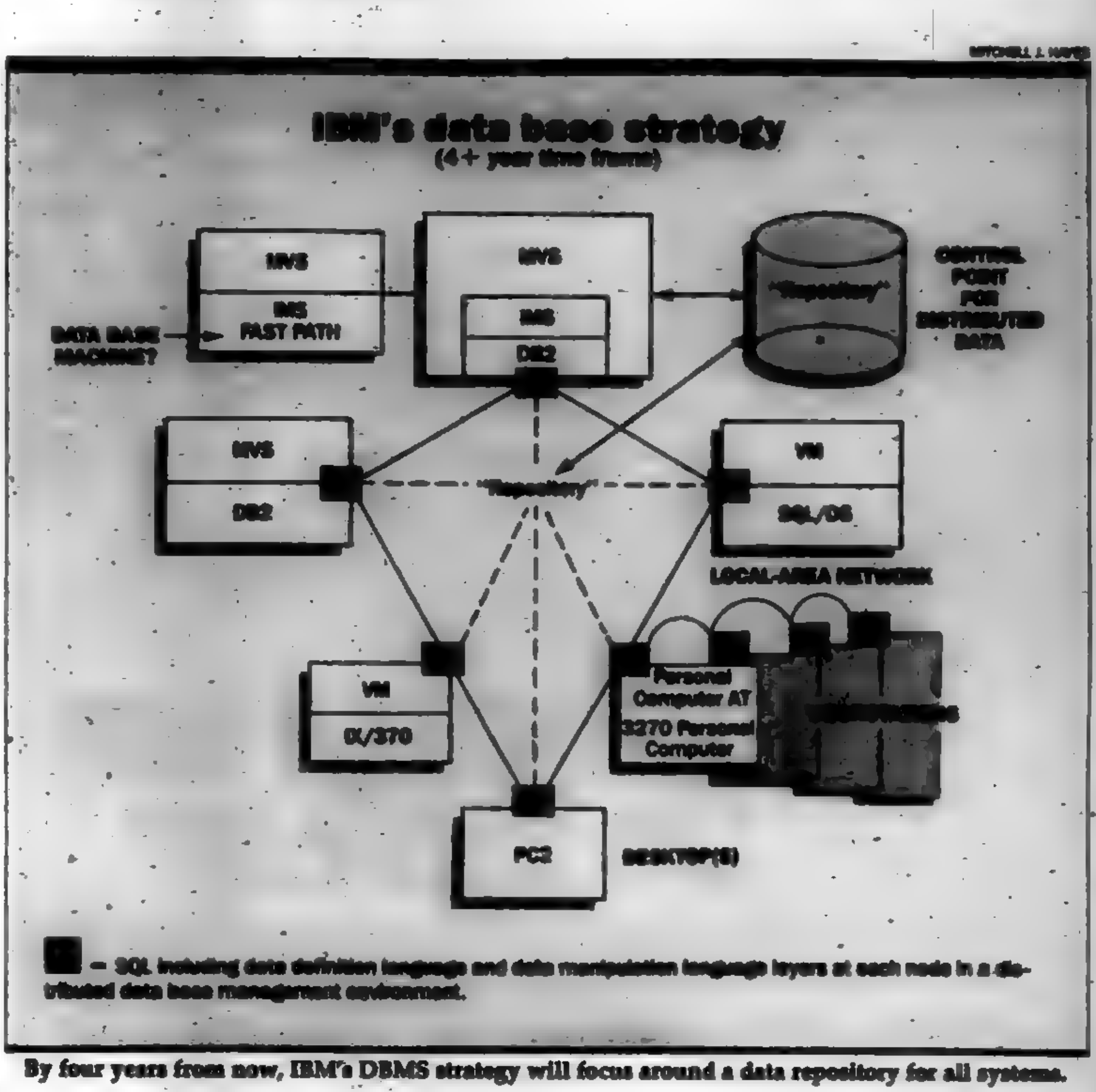

■ – SQL including data definition language and data manipulation language layers at each node in a distributed data base management environment.

By four years from now, IBM's DBMS strategy will focus around a data repository for all systems.

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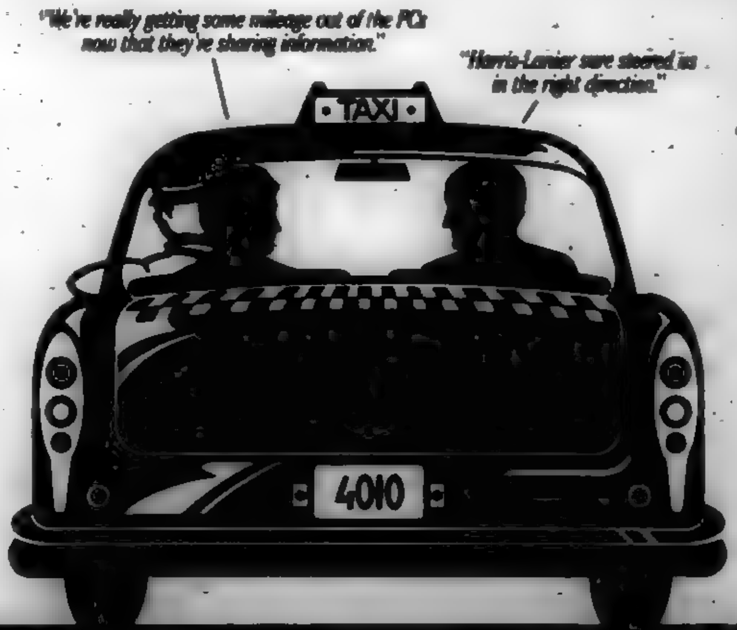
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Often asked questions

Is DB2 the only alternative for an IMS installation?

Obviously not. Applied Data Research, Inc. (ADR); Cincom Systems, Inc.; Cullinet Software, Inc.; and Software AG of North America certainly don't think so.

However, it is imperative in the next one to two years for installations selecting a non-IBM complement to IMS or a replacement for it to monitor closely the continued integration of mainframe, operating system and direct-access storage device technology to ensure that a particular integrated software architecture is configured to take advantage of enhancements.

> *DB2 is one of the most strategic IBM products ever released. Perhaps IBM could have been clearer in DB2's product announcement. The initial positioning of it as an "information center DBMS" will haunt IBM for a short time.*

Will an automated facility emerge to "translate" existing IMS systems (not just data as with DXT (Data Extract Facility) or data bases as with ADR's DL/I transparency concept) to another DBMS environment? Isn't it to IBM's advantage to provide such an IMS-to-DB2 migration facility, or is IBM waiting for an entrepreneurial group to provide it?

It appears that IBM does not see the existence of such a facility as a matter of necessity.

ADR's transparency is probably the most promising — if yet fully unproven — migration aid out of IMS and into an integrated software environment. DXT will be enhanced but not to any significant degree.

Is it unreasonable, if not pretentious, to consider DB2 an integral component of IBM's long-range, large-system architecture with the overall data systems importance that is equivalent to Extended Architecture (XA) for operating systems and Systems Network Architecture (SNA) for communication systems?

No. DB2 is one of the most strategic IBM products ever produced. Perhaps IBM could have been clearer in its product announcement. The initial positioning of it as an "information center DBMS" will haunt IBM for a short time.

In what direction will IBM's data base strategy evolve next?

There are clearly major weaknesses in DB2. In terms of performance, access-path optimization must be improved and should involve a fair degree of "automatic" optimization at execution time to minimize the need for rebinding applications to data bases.

Most of the data necessary for access path selection and optimization is already present in the catalog. Furthermore, the automatic creation of indices when needed would be a useful capability.

The DB2 catalog must become more active in data validation and in data-structure integrity. Better cross-referencing of views to base tables and more control over logical relationships between the same data that appears in two tables is needed.

How will R* fit into IBM's DBMS plans?

IBM is preparing to push into the distributed environment with data system products. Within the past year, IBM has begun discussing R* (pronounced R star) openly. R* is the successor to the somewhat mystical System R research project that followed Edgar Codd's pioneering work that created the relational model.

Once anticipated as a replacement for IMS, System R actually spawned a series of requirements for large-system data base management. In fact, many of these resulted in improvements and/or new facilities in MVS and its various subsystems as opposed to being DBMS enhancements only.

It is likely that R* will have a similar impact. It will provide a design framework within which practical solutions to the problems of locality of reference and referential integrity can be implemented. Unlike System R, however, R* will more likely than not emerge as a program product itself.

When will R* be released?

As a first-stage product, probably within four years. The prototype currently running provides both present and future insights into IBM's strategy. This prototype, which is MVS- and CICS-based, utilizes QMF (Query Management Facility) for user interface and SQL for data manipulation.

Eventually, a copy of R* will run on most IBM hardware devices. It must be emphasized that significant research remains to be completed before an R* implementation is feasible.

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EXTRA

3090

There's more to come after Models 200 and 400

By Edward Wagner

By mid-1986, IBM is expected to announce two single-processor models below the 3090 Model 200 and a third line midway between the 200 and 400.

IBM introduced the first models of its long-awaited 3090 mainframe series, Sierra, during the first quarter of 1985. But while the mystery is over, the waiting is not. The major performance boost users anticipated will not appear until the more powerful Model 400, now promised for the last quarter of 1986, is shipped.

By the early 1990s, IBM expects its typical large user to have installed 1,000 million instructions per second (MIPS) processing, 10G-bytes of system memory and 6,000G bytes of disk storage. Currently, a typical installation includes 100 MIPS processing, 200M-bytes memory and 300G-bytes disk storage. While recognizing this great demand for increased capacity, IBM announced the delay in delivering the quadratic 3090 Model 400 processor, saying that it doesn't have the resources to test the Model 400 and dyadic Model 200 at the same time. Apparently, IBM announced the 3090 Model 400 to gauge customer reaction, even as it continues to try selling the now dead-ended 3084 processors.

Laying the groundwork

The 3090 dual and quad processors offer performance into the 50 MIPS range. The new mainframes utilize the same chip technology as the 3080 processors — with the addition of emitter-coupled logic (ECL). But the 3090 announcement is viewed as IBM's groundwork for certain to-be-announced expansion capabilities beyond the designs IBM has previously included in its 360 and 370 mainframe technology.

Viewed as a major enhancement is the use of system memory (up to 128M bytes) as a holding area for virtual pages. By reducing disk I/O activity, this added system memory will boost throughput for high-volume interactive applications.

It appears that, true to form, IBM already has built into the 3090 processors significant

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Edward Wagner is president of Applied Management Services, a computer technology research firm in Patchogue, N.Y. AMS recently published the 76-page "Inside Sierra Report," examining IBM's Sierra product line, its future and implications for users.

unannounced capabilities, including 6M-byte I/O channels. The increased use of microcoded functions in the 3090s will make life difficult for the plug-compatible manufacturers rushing to develop 3090-type processors.

The latent capabilities of the 3090s fuel speculation, yet users must deal with the machines available today. IBM emphasized the commercial and scientific/engineering powers of the 3090s, but many users were not impressed with the initial capabilities of the new processors.

Vector processing

However, in early October IBM unveiled the vector processing extension. This new feature will perform at approximately 15 million floating point operations per second (MFLOPS), which positions it at the low end of the scientific supercomputer market.

> *The 3090 series appears to complement the low end of the 3080 product line. It is IBM's hope that current 3080 users will move up through the line, thereby prolonging its life. When they reach the top of the line, they will move to the 3090 processors.*

The 3090 vector processing extension offers no new capabilities beyond raw power, but IBM claims that it will run Fortran and Cobol applications 1½ to three times faster than a 3090 without vector processing.

Based on benchmarks that rate the standard 3090 Model 200 processor at 7 MFLOPS, one can predict the vector processing should provide a range of 10 to 21 MFLOPS, depending on the application. IBM has provided new software compiler capabilities to facilitate the vector extension. Users also are able to take advantage of vector-enhanced upgrades of the MVS/XA and VM/SP HPO operating systems.

While the 3090 vector announcement still leaves IBM without a full-blown supercomputer in its product line, the move clearly indicates the company's formal entrance into the growing scientific/engineering supercomputer marketplace. IBM has scheduled first shipments of the 3090 facility for February 1986. The purchase price is $370,000 for the first facility and $230,000 for an additional one.

Two facilities can be housed in a frame that adds only 20% to the footprint of the 3090 unit. A frame with one or two vector facilities can be added to the two-engine 3090 Model 200. Two frames holding as many as four vector facilities can be added to the four-engine 3090 Model 400.

IBM claims that the long wait for the 3090 Model 400, which doubles the power of the Model 200, gives users time to plan. IBM is hoping that users structure their primary mainframe plans around the 3090 series and its potential capabilities. At the same time, it wants users to continue to include the 3080 processors in their plans.

Buying dilemma

On the surface, users face two choices within the IBM product line. Either they can buy a 3090 Model 200 and plan to upgrade later to a 3090 Model 400, or they can buy another 3080 processor now at IBM's newly reduced price (roughly $6.2 million) and purchase a 3090 processor later, when additional capability is required.

A basic 3090 Model 200 costs $5.3 million for the central electronic complex. Upgrading from the Model 200 to the Model 400 will cost an additional $4.3 million, while outright purchase of a Model 400 is $9.4 million.

Looking at prices another way, prior to the 3080 price reductions, a 16M-byte 3081KX provided processor price/performance of $208,000 per MIPS. The 3090 Model 200 costs only $182,000 per MIPS, while providing four times the capacity and a greater number of channels.

Users pushing against the performance limits at the top of the 3080 line most likely will take the first choice and acquire a 3090 Model 200 as soon as possible. Those who can handle their work loads with another 3080 probably will take the second choice.

The 3090 series appears to complement the low end of the 3080 product line. It is IBM's hope that current 3080 users will move up through the line, thereby prolonging its life. When they reach the top of the line, they will move to the 3090 processors. High-end 3080 users have a much narrower choice to exercise in a much shorter time. They must migrate to the 3090 as soon as possible.

The dilemma that users with a 3080-vs.-3090 decision face is the danger of choosing a 3080 only to get stuck with suddenly old and hard-to-sell machines. This situation could occur when 3080 sales slow down to the point that IBM virtually kills the product line by rapid-fire announcements of additional 3090 models.

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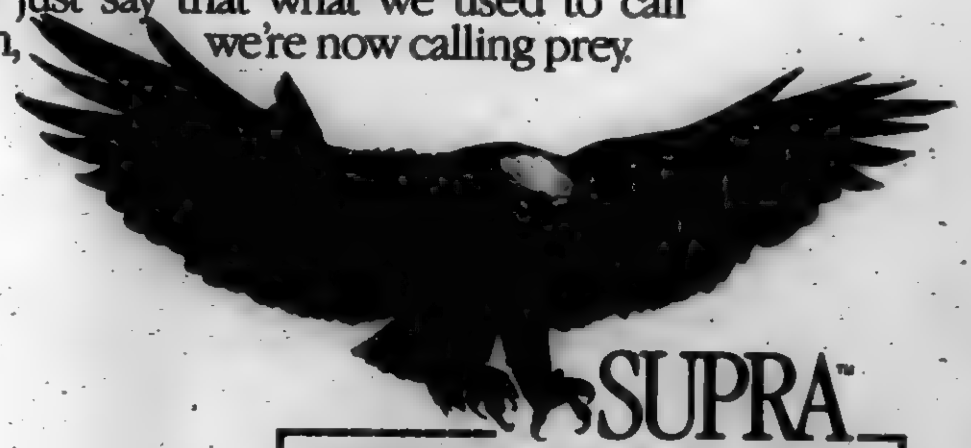

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IBM had announced the 3090 with aggressive pricing, it would have hurt seriously its 1985 earnings. Most potential 3080 customers would have waited for the 3090 models (or not proceeding with the purchase of their installed 3080 machines). To protect its credibility with its large users, IBM had to structure the 3090 announcement to provide something for everyone.

The potentially strong impact of the 3090s was deliberately blunted by the announcement at the same time of VM/XA, E/S, Unix, Fortran and the 3044 Fiber-Optic Channel Extender Link. To downplay further the announcement and to extend the life of the 3080, IBM cut prices of the line by 5%, memory increments by 23% and maintenance by 10% to 15%. Inherent in the 3090 announcement was IBM's hope that users continue to purchase 3080 processors.

IBM designed its pricing of the 3090 to encourage purchase by users while discouraging short-term leases and rental agreements. This strategy is evidenced by the unprecedented purchase-to-net rental ratio of 12.2:1 for a basic 64M-byte model 3090 Model 200.

It is difficult to ascertain the specific price per megabyte of memory for the 3090, since the central memory is integrated with the processor complex. However, an expanded storage module costs $7,400 per megabyte for 64M bytes and $5,600 per megabyte for the next 64M bytes.

These prices reflect a significant improvement when compared with 3080 prices of $12,500 per megabyte. IBM's expanded storage capability transfers data to and from the CPU in 4K-byte blocks.

Prices for 3090 maintenance also have a significant advantage. The 3090 Model 200 maintenance is $5,900 per month, while the 3084QX with nearly equivalent performance carries a maintenance charge of $7,090 per month.

Improved price/performance

Analysis shows that the 3090 provides far greater price/performance than the 3080 series. IBM made major changes in design, architectures and software. To reach meaningful price/performance conclusions, users must measure transaction rates, system performance and overall throughput. The system performance factors related to the new 3090 series include the following:

- A new Fortran compiler.
- New engineering and scientific instructions.
- Expanded storage capability.
- Faster processor cycle times.
- VM/XA and MVS/XA's greater use of 3090 architectural design enhancements.

Effective throughput of the 3090 Model 200 is rated as 1.7 to 1.9 times the internal rate of the 3081KX for commercial work loads using MVS/XA. It is rated 1.9 to 2.9 times the internal rate of the 3081KX for engineering/scientific work loads using MVS/XA. IBM claims that the 3090 Model 400 will provide 1.7 to 1.9 times the instruction execution rate of the 3090 Model 200 in single-image mode.

Changing the rules

The announcement of the 3090 series of processors made it quite clear that MIPS can no longer be considered the primary measurement criterion of processors. Many instructions in the 3090s are now high level and are implemented in microcode or hardware, thereby overlapping other functions.

> *While most industry observers continue to focus upon raw MIPS comparisons, the major advantage of the new 3090 models is IBM's new chip technology.*

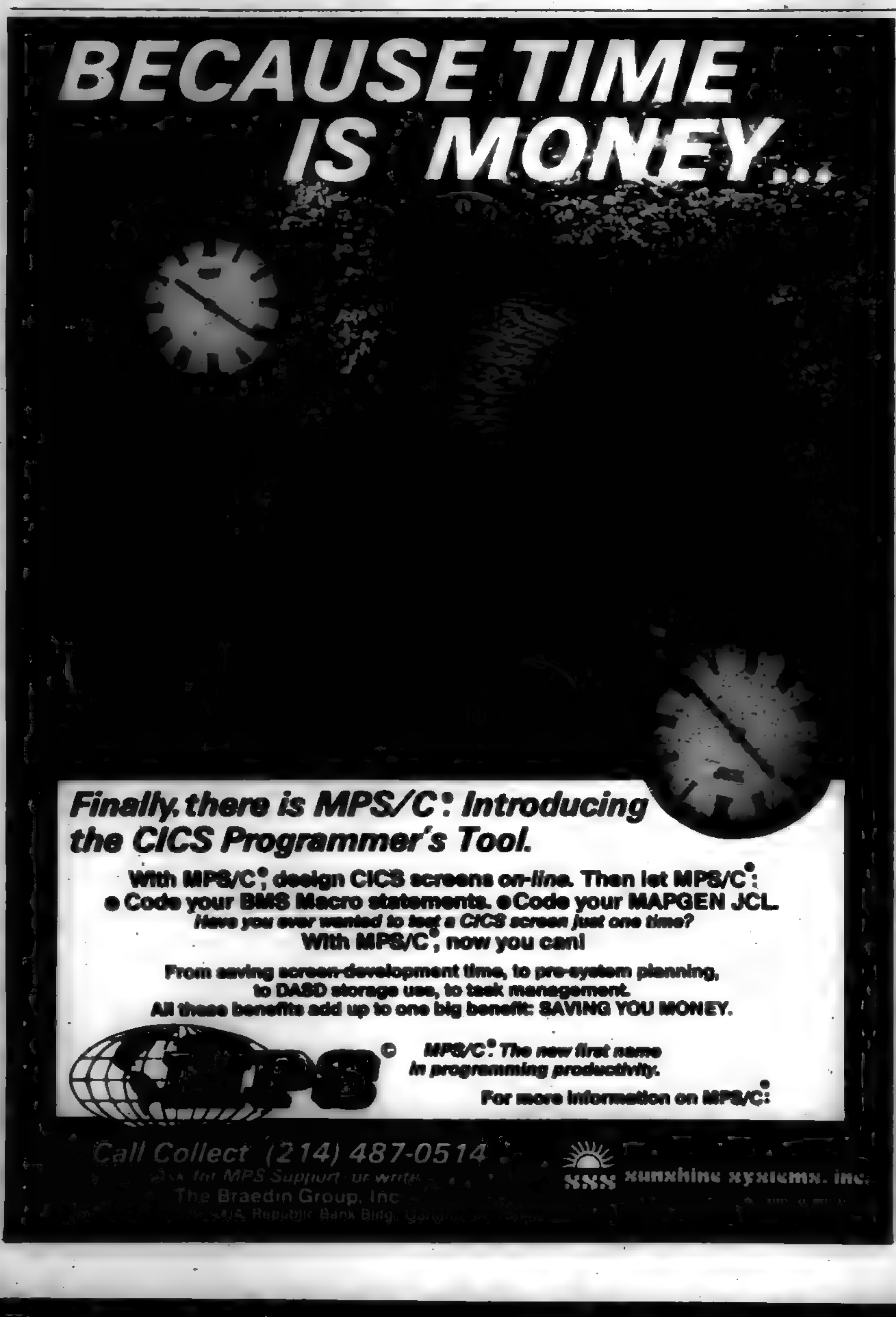
The new 3090 models use the same basic thermoconduction module, adding faster emitter-coupled logic processor chips within the devices. Processor cycle times have improved only from 24 nsec on the 3081KX to 18.5 nsec on the 3090 Model 200, but this probably means that IBM will announce faster circuits in the near future. It also means the plug-compatible manufacturers (PCM) will have difficulty keeping pace because the 3090's extended storage unit uses the new IBM 288K-bit chip.

While most industry observers continue to focus upon raw MIPS comparisons, the major advantage of the new 3090 models as compared with the 3080 series is the availability of IBM's new chip technology. The new 288K-bit chip for extended storage is available at a very low price. Up to 128M bytes can be purchased for Model 200 and 256M bytes for Model 400.

The benchmarks announced by IBM clearly demonstrate the significant effect of such huge storage sizes on real throughput, on transaction rates and on both elapsed times and response times within large networks of terminals.

Migration planning

To formulate a 3090 migration plan, users must first accept the premise that the 3090 is here to stay. This



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series represents a major new computer product line on which IBM will depend during the next four years to achieve its mainframe sales objectives.

IBM learned its lesson well during the 4300 and 3080 era of new announcements. In addition to destroying 370 and 3030 residual values almost overnight, IBM embarrassed many MIS executives who had convinced their company managers to acquire 370 and 3030 machines during the months just prior to the announcements; these executives are not likely to repeat this mistake.

A second crucial factor is to understand the potential of the 3090 series and to gauge its impact upon an organization's future plans. While no specific timetable is available today, certain unannounced performance factors and functions of the 3090 series, in all likelihood, will be announced during the next 18 months.

Overall internal performance for the 3090 Models 200 and 400 is expected to increase by 20%, while the 3081KX and 3084QX will not change. Main memory capacity for the 3090 series will also increase accordingly, even as the cost per megabyte drops, significantly affecting real system performance.

The 3080 storage capacities and prices will probably not change during this period. At the same time, IBM maintenance prices will increase on the 3080 series while being reduced for the 3090 series. The 3090 channel speeds will double, while the 3080 speeds will not change. By 1987, IBM will probably announce 3380 disk drives with quad capacity to take advantage of higher channel speeds.

Prices for the 3090 Model 200 will not change, while 3081KX and 3084QX prices will be reduced in the open market by approximately 25%. Prices on the 3090 Model 400 will drop 15%, as delivery dates further improves and more machines are available.

IBM is also expected to announce three new 3090 models by mid-1986. The smallest, with a single processor, will provide approximately 1.2 times the power of the 3083JX and will be field upgradable to the 3090 Model 200. A larger single-processor, low-end 3090 will provide approximately 1.2 times the power of the 3081KX. The third new 3090 model will be positioned midway between the 3090 models 200 and 400 in performance.

Multiple processing

IBM is moving rapidly toward the concept of multiple processors dedicated to specific functions. Each separate processor will contain a large cache of storage that will function as a loosely coupled main storage facility. Microcode will control the function and performance of each processor.

In the event of failure, the processors will provide a degree of backup. Users will be able to choose different levels of fault-tolerance capabilities both at the system level and at the device and component level.

By the early 1990s, IBM's mainframe product line will emphasize modular systems consisting of high-speed processors for both general- and special-purpose environments.

By the early 1990s, IBM's mainframe product line will emphasize modular systems consisting of high-speed processors for both general- and special-purpose environments. These mainframe systems will contain a tightly coupled confederation of processors that will provide 100+ MIPS at the high end and one MIPS for a workstation at the low end.

Migration issues

There are a number of critical issues that users should consider in terms of migrating to IBM's 3090:

- Additional investment in 3080 technology should be carefully reviewed and avoided where possible. The 3080 cannot be field upgraded to the 3090 and therefore will decline in value rapidly.
- Users must consider the functional changes that the 3090 contains. Of great importance is real system price/performance not only raw MIPS.
- Sites with especially technical applications should benefit from the enhanced scientific/engineering power of the 3090 offered by the now-available vector processing extension.
- The total combined life-cycle cost, including maintenance, floor space, upgrades and future enhancements, must be analyzed.
- The purchase: rental ratios for the 3090 series are unprecedentedly low for an IBM product.
- Delivery schedules for the 3090 Model 400 will improve dramatically.
- Non-MVS/XA shops should seriously plan for MVS/XA if they hope to move toward 3090 technology.

The true 3090 series will become more visible by early 1986. Models 200 and 400 represent the tip of the iceberg. Users should formulate their 3080 vs. 3090 plans as quickly as possible.

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EXTRA

What's hidden, what's not

Buried among the new hardware enhancements of the 3090 are the beginnings of a more modular operating system architecture. Once again, what IBM has hidden under the covers is more important that what has been officially announced.

Embedded but not announced in the 370 product line was virtual memory. Even more dramatic was 31-bit extended architecture (XA), which was included in but not initally announced with the 3080 series. Can there be any doubt that the 3090 contains unannounced but built-in potential for being far superior to the 3080 product line?

IBM is known to be working internally on a conceptual level with a product known as XAA. This new concept centers on implementing new microcode support — or "assists," as IBM has called them — to its XA capability.

By the use of such assists and a corresponding off-loading of MVS/XA components into specialized support processors, IBM is expected to cut its operating systems overhead in half. At the same time, the relative internal performance, in million instructions per second (MIPS), of the 3090 base processor would almost double.

IBM already demonstrated the success of this approach by doubling the performance of 3080 sorts by microcode assists to a new sort algorithm called DFSORT Release 7. IBM also worked through the new XAA level to microcode its I/O dynamic path reconnect software, thereby producing a further reduction in operating systems overhead.

The above moves are considered minor compared with the main objective: off-loading large portions of MVS/XA into numerous support processors and other subsystems. XA was designed with the internal capability of handling over 200 processors or subsystems. In fact, IBM has developed two kinds of support processors: CPU support processors and channel-group processors.

IBM's new 3090 processor controller, Model 3092, is also significant. This highly intelligent and autonomous I/O process controller contains its own built-in reduced instruction set processors. If these processors can emulate the full 370 instruction set, IBM will be able to pull large portions of MVS/XA and run them on the 3092, thereby freeing up CPU cycles.

To begin this process, IBM will off-load all 4,000 I/O path-length instructions to the 3092. IBM most likely has completed microcoding XA's first-level interrupt handler, which will reduce total instructions from 50 to one and processor cycles from over 300 to 70. The new microcode will be run on the 3092 processor controller.

That you cannot construct a modular architecture without using a modular operating system is readily apparent. MVS/XA must be recast into simpler portions from its present complex monolithic structure. IBM has already stated that new releases of MVS/XA will begin to arrive in 1986. These releases will move in the direction of supporting both an increased CPU channel-to-disk data rate of at least 4.5M byte/sec. and an autonomous 3092 processor controller.

3090 performance factors

Capability	Announced	Potential
Processor speed (Mips[1])	29-52	15-100
Integrated number of processors	2-4	2-8
Shared central storage (M-bytes)	64-128	64-256
Expanded storage (M-bytes)	64-256	64-512
Machine cycle time (Nsec)	18.5	14.5
Integrated channels	32-96	32-160
Channel speed (M-bytes)	3	3-6
Scientific/engineering array/vector processor (Mflops[2])	15	More powerful vector facility (25-100 Mflops)
VM CMS	Little change	VM/XA with CMS production capability
MVS/XA	Little change	More modular concept (MVS/XAA) off-loading major portions of MVS/XA to support processors
3080/3090 linkage	Loosely coupled configuration	Tightly coupled configuration (single image)

[1] Million instructions per second.
[2] Million floating-point operations per second.

Source: Applied Management Services

Figure 1

Justified concerns

The plug-compatible manufacturers (PCM) anticipate that XAA will become a reality and are justifiably concerned. The transition to MVS/XA

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was a major problem for large mainframe vendors. Users are willing to believe current claims by PCMs that they can match or surpass IBM's 3090 processor power.

But by far the most critical concern of most users is the manufacturer's ability to provide reliable XA and potential XAA capability and support. The important issue now lies in the integration of hardware and software.

A number of large installations that traditionally have been PCM-only shops are now moving back into the IBM fold for this reason. The PCM market has been reduced significantly in recent years. As IBM's XAA microcode moves closer to a reality, the PCM vendors will be in for even tougher times.

Other user concerns surround users of the current family of IBM 3080 processor family. The 3090 announcement alarms users who are concerned that the relatively new 3084QX has been rendered obsolete. They are also concerned that any further downward expansion of the 3090 family will push the other 3080X models over the hill.

The major new technical features of the 3090 series as compared with 3080X systems should be reviewed before users try to project the 3090's future capabilities. Primary features announced by IBM are as follows:

- A new hierarchy level called expanded storage, which significantly improves paging and hence the overall throughput of the system.
- Emitter-coupled logic, a new semiconductor technology for IBM mainframes.
- Major improvements in the ability of the system to continue uninterrupted operation in the event of many types of hardware failures.
- A performance increase equal to almost a factor of two in a commercial environment.
- An internal throughput rate of 1.9 to 2.9 times faster than the corresponding 3081 model in an engineering/scientific environment.

There is another critical new hardware product announced by IBM that affects the 3080/3090 relationship: the 3044 Fiber-Optic Channel Extender Link. This product, which is actually a pair of devices linked by a fiber-optic cable, allows low- and medium-speed I/O peripherals to be connected directly to processor channels up to 2 kilometers away.

Even more important, the channel extender also allows any two processors (4300, 3030, 3080 and 3090) up to 4 kilometers apart to be channel-linked using the IBM 3088 Multi-System Channel Communications Unit. These linked mainframe systems can communicate at speeds up to 1.125M bit/sec. Thus, IBM has provided the ability to mix and match 3080X and 3090 systems in a loosely coupled configuration.

Well-educated guess

In light of IBM's track record of product announcements, some fairly reliable predictions can be made regarding the unfolding of the 3090 product line.

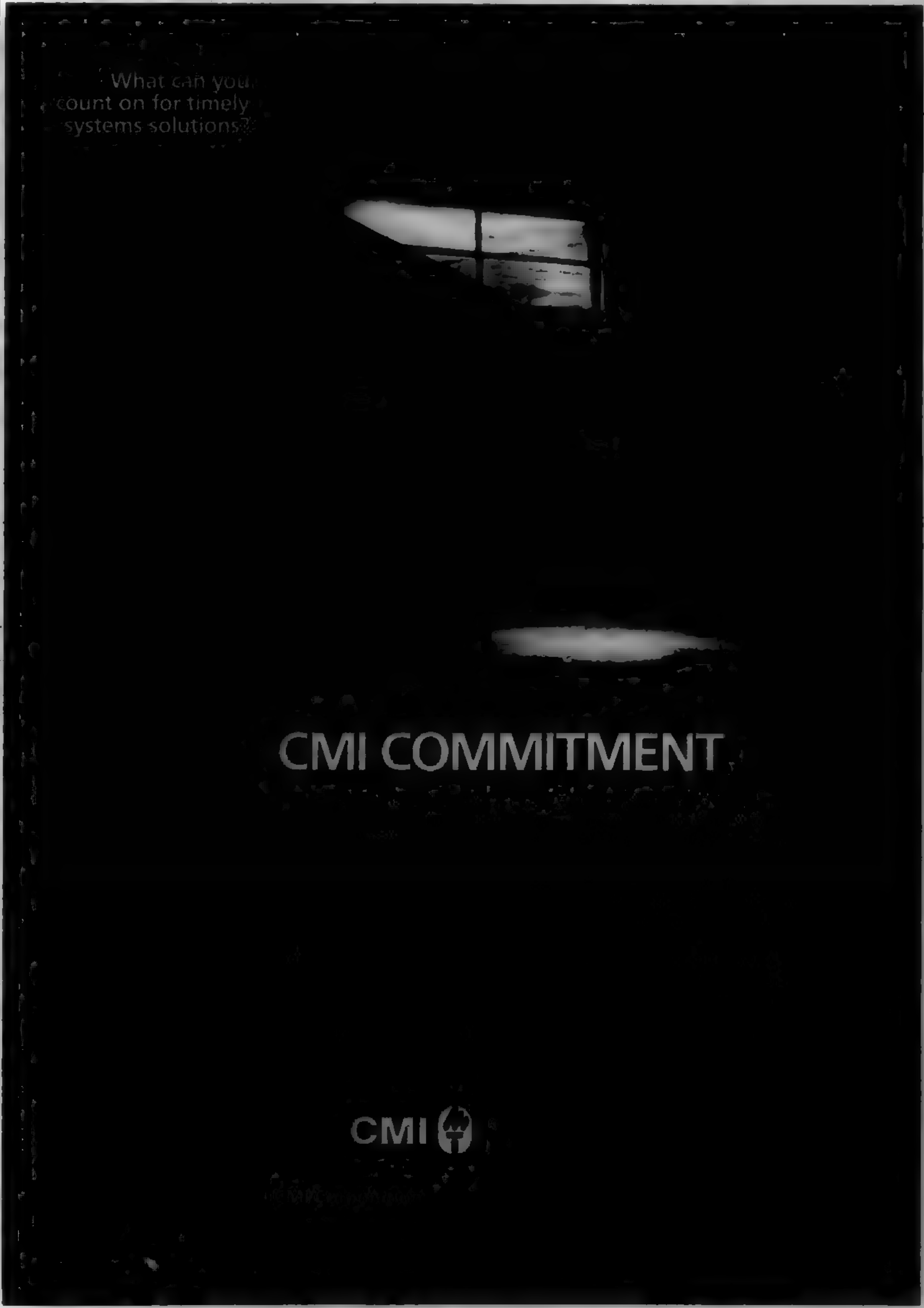
Downward compatibility. The 3090 line will be extended downward in the short run.

Adding processors. To achieve a 100 million-instruction-per-second system by 1990, IBM would have to double the power of the 3090 Model 400. It could achieve this feat by increasing to eight the number of processors that can be tightly coupled onto a single system image.

Tight coupling. IBM must announce, prior to 1987, a multisystem coupling device that will allow 3080X and 3090 mainframes to be linked into single-machine image, tightly coupled systems.

VM/XA advances. VM/XA will become even more important during the early 3090 era. In fact, tightly coupled 3080/3090 systems as described above will probably run only under VM/XA.

The mix-and-match environment will serve most users advantageously during the next two to four years. This approach would also give IBM an edge over its competitors since users would enjoy a reduced cost of upgrading from 3080X systems to the 3090 family. The 3080X systems would be usable in state-of-the-art configurations for a while to come.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Filip: "IBM's resources are shifting to Model 400."

Interview: William Filip

William Filip is vice-president of data systems marketing in IBM's National Accounts Division. He was interviewed by Extra Editor George Harrar.

You have already accelerated the scheduled delivery of the 3090 Model 400 to the last quarter of 1986. What is holding back delivery?

We're just not ready yet to announce any delivery earlier than the fourth quarter of 1986.

Is it a technological or production problem causing the delay?

There's no problem, per se, at all. It's a matter of dedicating our resources and efforts to the 400 now. We had been focusing on the 200.

So has the shift of resources taken place now?

I can't speak to a specific shift of resources. You'd have to ask our manufacturing people.

I do know that with the 200 in general availability, we are now expanding our focus to the 400. We'll continue working on the 400. What happens and whether or not there is any additional improved general availability will depend on a lot of factors.

Are you taking orders yet for the Model 400?

We've taken orders for the 400 in the form of an upgrade to the 200. We have not announced the 400 as a box that we're taking orders for by itself.

When will you take orders for the 400 by itself?

I can't speculate on when or if we'll do that.

What is the cost of the basic Model 200?

The processor itself costs $4.6 million, and $5 million is the price for the central electronic complex.

What is the cost to upgrade from the 200 to the 400?

The cost is $4.3 million.

There have been reports that IBM was offering substantial discounts on the 3090, contingent upon the order being placed before the end of the year. If the quoted list price for a Model 200 with a 64M bytes of memory is $4.6 million, what would a typical discount be?

> *'I don't know of any instance domestically where we are taking any orders with discounts in return for orders being placed before the end of the year.'*

I don't know of any instance domestically where we are taking any orders with discounts in return for orders being placed before the end of the year. That's not happening.

Would you know about it if it were taking place?

Domestically, yes I would.

There is speculation about a Model 100, a uniprocessor machine in the 15 MIPS [million instructions per second] range. If it were to come out, it would be placed squarely in the middle to upper range of the 3080 series. Wouldn't such a machine effectively kill the 3080 line?

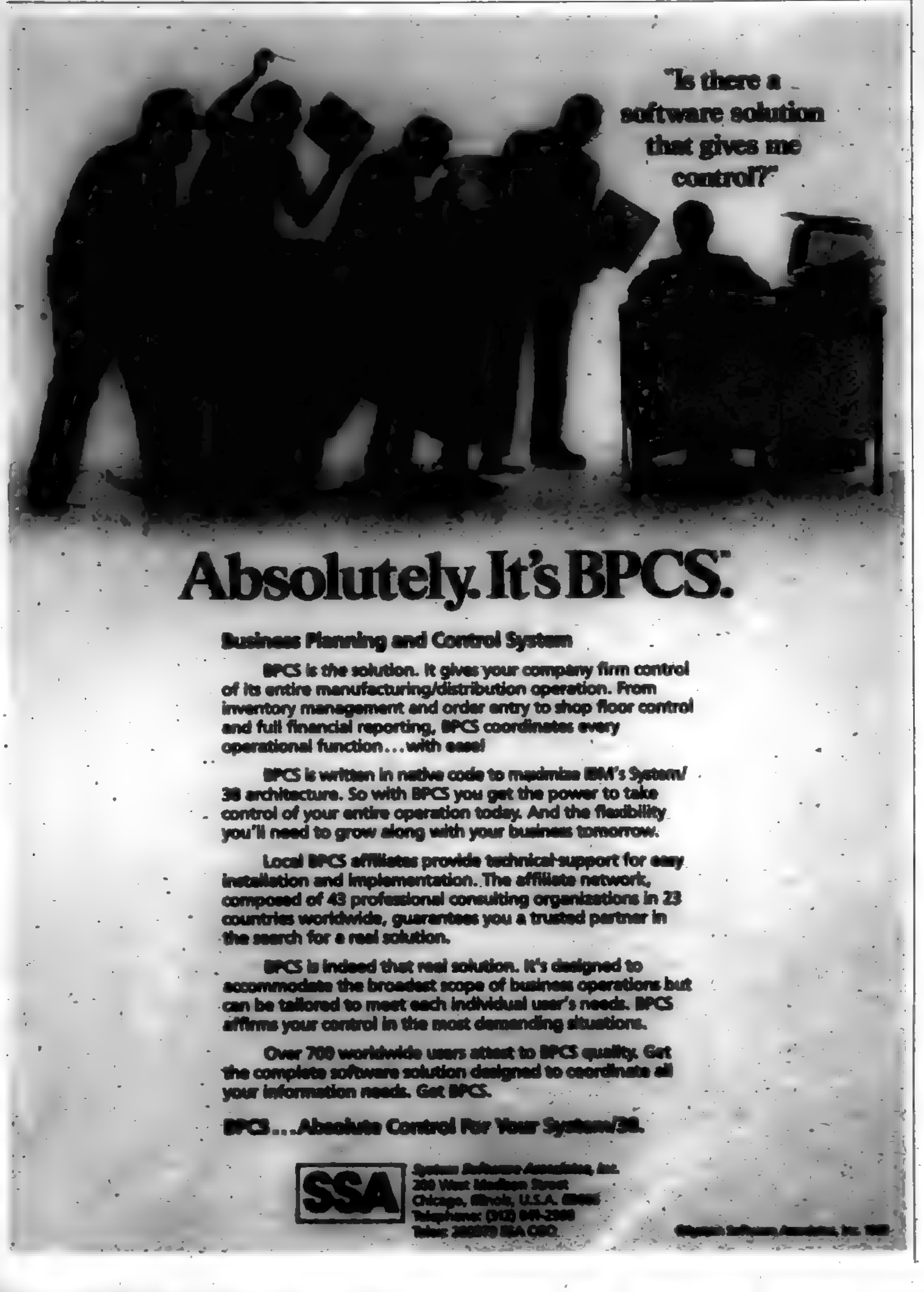
I just can't comment or speculate on future announcements or the implication or potential impact of future announcements.

What does IBM believe its large users will require by 1990 in terms of MIPS, megabytes of system memory and disc?

That's hard to project. We continue to see growth rates in our large customers on average at or near the 40% compound rate of central processing capability. For the direct-access storage devices, we see rates of growth near the 50% compound range.

So far, our projections indicate that that rate will continue for the forseeable future. If you plot that out until 1990, it would give some multiple of current capacity.

I'd like to ask you also about future growth patterns for installations.



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If you take a typical 3090 installation as of Jan. 1, 1986, can you compare it to a typical user installation on Jan. 1, 1990?

I don't know what that would be. I could multiply out the typical growth rates. If the customer's installation were a 3090 Model 200 today — that was his full capacity within a particular data center — we could work out how many 200 equivalents or 400 equivalents in which that would result.

Can the 3090 series, given its architecture, take users to 1990? Will the power demands that IBM predicts be beyond the capabilities of the 3090 architecture?

It certainly depends on how much horizontal vs. vertical growth you're talking about. Clearly with those growth rates, you can multiply out a capacity requirement in 1990 and calculate that that's two or three or four Model 400s.

Beyond that, if you're looking for what other configurations of 3090 might exist in that time frame, we're back to the question of speculation. Right now, all I can say that there would be some number of 200s and 400s in that installation to meet the capacity requirements.

IBM is committed then to the 3090 as a series of machines that will carry the typical user into 1990?

We are committed to the 3090 as a series of machines at least numbering two — the 200 and 400. We look for the 3090 to have a long, useful life for our customers.

How long does it take to process and fill an order and install a 3090 Model 200? If someone were to order now, when would the machine be installed?
The current delivery schedule is 12 months, with 10 months possible.

What new user demands will influence the design of the next generation? What are users telling you they need or want in future mainframes?

It's predominantly more power, although with the 3090, even with the base machine and its scalar processing capabilities, we announced a relatively higher performance capability for engineering/scientific applications than for commercial applications; compared with the 3080 family.

When we announced the 200, for example, we said it was 1.7 to 1.9 times the performance capability of a 3081KX for commercial, or scalar, processing.

We've announced it as 1.9 to 2.9 times the capability for engineering/scientific applications that use the 3090's very high-speed add and multiply capabilities. That number is now 1.9 to 3.1 times; we've actually found in more recent benchmarking a higher performance comparison on the 3090.

So, more performance — yes. Continuing to grow at or near that 40% MIPS growth rate requires expanded capabilities. We get that through the 200 and 400.

The other area on which we focused with the 3090 is the engineering/scientific arena, with the scalar capability and fast floating-point capability.

Now we offer [even more capability] with the announcement of a vector facility for numerically intense applications — the ability to provide extra performance with a fully integrated vector capability within the 3090 machine.

The engineering and scientific arena is a fast growing application area with our customers; we're focusing more heavily on that arena with the 3090 than we had previously with the 3080 series.

Do you feel competitive now in the mainframe markets for academic and research applications?

We feel very competitive with the vector facility and the integration of it that gives you the scalar, vector and parallel capabilities as a two- and four-way Model 200 and 400.

For those applications where we have designed the vector facilities — those that are the predominant set of applications that we see being run in the 50% to 80+% vectorization level — we think it is a very competitive product.

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ISPF

This Dialog Manager is hard to talk with

If "cross-system compatible" is ever to become more than a buzzword, ISPF must be made compatible with both MVS and VM through a single interpretive language. IBM may be leaning toward Rexx.

By David Chen

The new release of IBM's ISPF marks the company's commitment to develop easy-to-use, cross-system compatible software. ISPF is a tool for improving development productivity by allowing users to manipulate display and interactive application features.

Features of ISPF Version 2 Release 2, such as a Library Management Facility and dialogue panels supporting extended data streams up to seven colors, are some examples of where the ISPF team is leading the product.

IBM has also announced a new release of ISPF/PDF. Both new releases provide national language support for French, English and double-byte character sets for the Japanese Kanji alphabet, as well as features such as recursive BROWSE and EDIT commands that simplify frequently performed programming tasks.

Another known direction is the desire to use IBM's Dialog Manager as the basis for all interactive products. As IBM places more emphasis on its software market, it will position more successful products such as ISPF/PDF as standards for other companies.

Goodies and enhancements

However, ease of use may be a more reachable goal in the near term than cross-system compatibility. IBM's marketing strategy states strongly that ISPF/PDF will become compatible between MVS and VM, but there is a long road ahead before this kind of compatibility is realized.

Meanwhile, unless IBM reveals some hints of its future direction, vendors and users alike can only speculate and hope that ISPF/PDF will evolve in the same direction as user requirements do.

For ISPF/PDF to become cross-system compatible, IBM must first define which

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David Chen is PIE/TSO project manager at Technologic Software Concepts, Inc., a Tustin, Calif.-based manufacturers of software enhancement products.

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of the interpretive languages will be the standard. At the moment, CLIST on TSO is not compatible with Rexx and Exec2 on CMS. There are quite a few applications written in all these languages, so users often need to make a major conversion during a transition to another operating system.

Another source of incompatibility is the Edit macros, which have the same language restrictions — any one macro cannot be used under both operating systems.

Restrictions

Although the new release of ISPF is packaged with numerous goodies and enhancements, the panel language is still restrictive. For example, THEN logic is still assumed after the IF statement.

The new panel preprocessor option, used for compiling the panels and storing them in object format for better performance, indicates a move toward better panel language in the future; but again, there is a long way to go.

Also, anyone using the Table processing facility will complain about the problem of serialization, which occurs when more than one end user needs to access the same Table during processing or editing. If the first user queues the Table for an output function, it is locked for the duration of that operation — no other user can read it or use it in processing.

It is also a poor decision to keep Tables in partitioned data sets, since it makes each Table subject to restrictive space conditions. Hopefully, future versions will address these issues.

Library management

One of the most noticeable new functions in Version 2 is LMF. LMF is intended to be used as a development and production control facility. But the concept of controlling and auditing changes between test and production is somewhat confined when one has to follow the restrictive LMF library-naming convention. Users also have to define controls for each library manually, not generically.

One of the major questions being asked is, What ever happened to option 3.4?

Perhaps the most restrictive fact is that LMF still uses the total member replacement scheme. Therefore, it is still a manual procedure to identify and possibly delete new changes if they are troublesome.

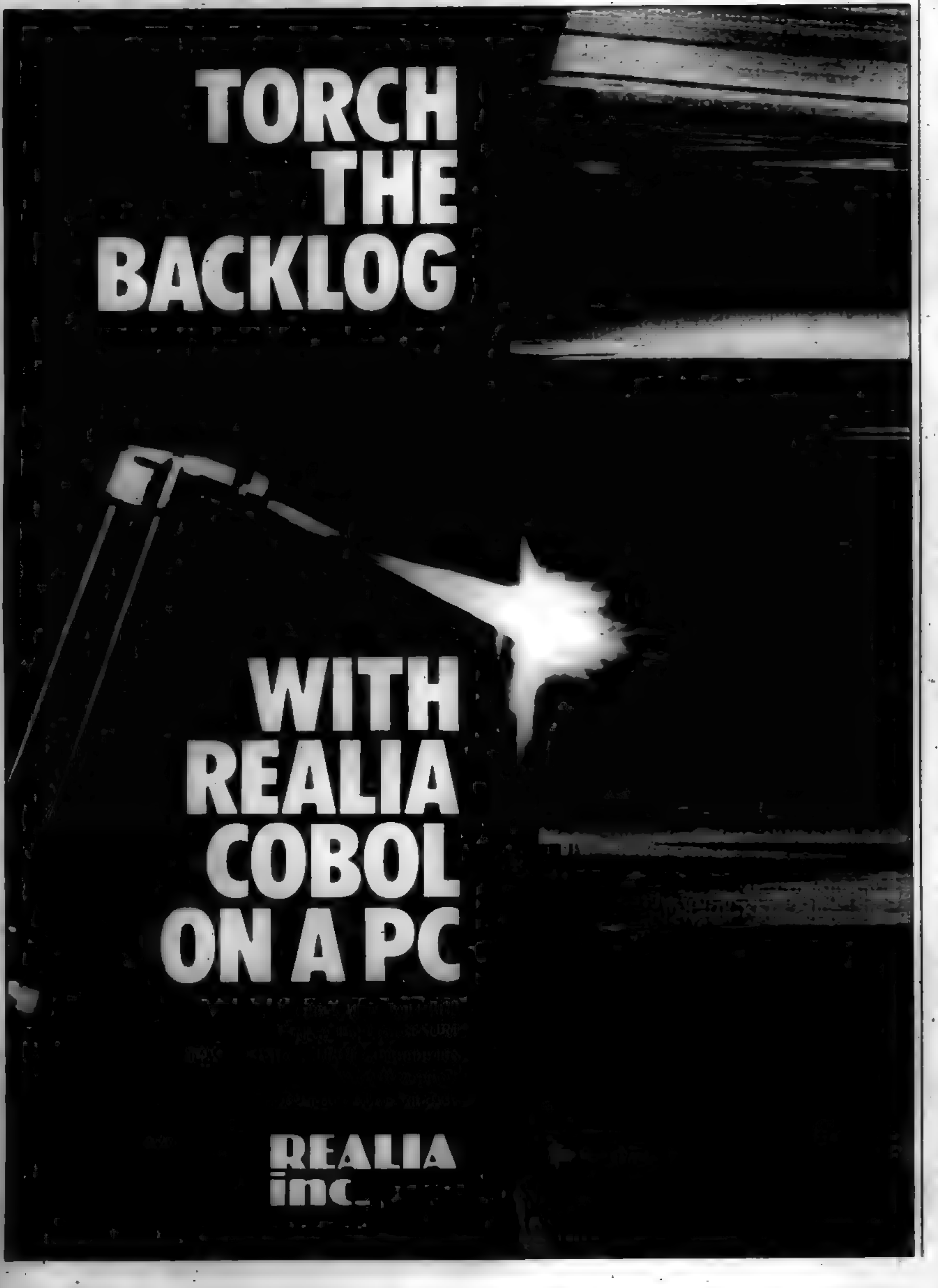
It would be highly desirable from an ease-of-use perspective if LMF could make use of the IBM Xedit or AT&T Unix Source Code Control System (SCCS) concept to separate updates from the master file.

One of the major questions being asked is, What happened to option 3.4? It used to be that users could select catalog management as the catalog option (option 4) among the utilities (option 3).

Now, the whole option has been replaced by a new file management utility, but it no longer displays a catalog management menu — only a data set management option. The idea is grand, but having to perform a separate function to list the catalog every time this option is used defeats the purpose of having a data set manager.

The concept of a master source copy of programs will also be implemented in ISPF/LMF. Each new set of changes created by an edit session will be stored in a unique update member by the editor or VSAM file. LMF will apply the changes automatically during the editing, assembling or compiling of the master program.

This is simple and transparent to the programmer; retracing or altering any new set of changes involves a



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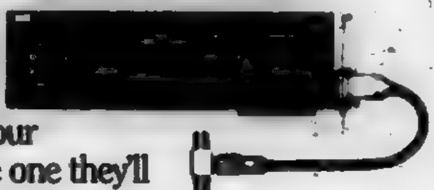

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EXTRA

Other enhancements will be added in the area of window management. A Help panel will no longer overlay the entire screen; instead, a pop-up window allows the user not to lose sight of the original function chosen.

simple rename or commenting out the unique member name from an update control file.

Added enhancements

Other enhancements will be added in the area of window management. A Help panel will no longer overlay the entire screen; instead, a pop-up window allows the user not to lose sight of the original function chosen.

The new 3.4 option in ISPF/PDF already has a simple window to indicate that a Listcat is in process when the operation lasts longer than a certain period of time. We will see full screen VSAM support, in which VSAM files can be edited or browsed.

What about the future of ISPF/PDF? What can we expect, and how much can we demand? Is "cross-system compatibility" just a new-wave buzzword?

Some of the newer interfaces in VM to Unix seem to suggest that the cross-system concept is here to stay and that there may even be ISPF Dialog Manager interface support in C language.

Unix strategy?

But the ISPF team has expressed a definite "no" to supporting the Dialog Manager in C. It may be that the only reason IBM allows such interfaces to exist is to allow for an eventual migration of all current Unix users to IBM hardware and software.

There must be a standard interpretive language if ISPF is to become cross-system compatible. Rexx is available on VM and on the Personal Computer XT/370, and it should also be available on MVS.

Developers speculate IBM is using Rexx internally on MVS. Rexx is a very powerful language, and its PL/I- or CLIST-like format also makes it highly desirable as a dialogue panel language.

Portable applications

It would be nice to be able to develop applications in ISPF/PDF and carry them over to another operating system without any regard to language or access method.

Currently, the common access method is VSAM. If ISPF/PDF is used as a simple data base for Table processing, it bypasses the headaches of serialization and the atrocious out-of-space condition that results from saving in data sets.

In the near future, we can expect to see quasi-partitioned VSAM data sets, the use of which should be transparent as if a user is accessing a real partitioned data set.

Another good direction for Dialog Manager is to replace CICS's Basic Mapping Support and IMS's Message Format Service. Such a move will certainly make application developers more productive.

ISPF's potential

Other LMF enhancements will most likely include the removal of the data set naming restriction. There will be an option of two project-level qualifiers, four group-level qualifiers and two type-level qualifiers for each data set name.

This convention allows developers to edit with their own data set names in the first data set groups and the test or production data set names in the remaining data set groups.

The possibilities for ISPF are enormous. If IBM considers the current and projected realities of the marketplace, it will ensure a continued major role for the product. ▬

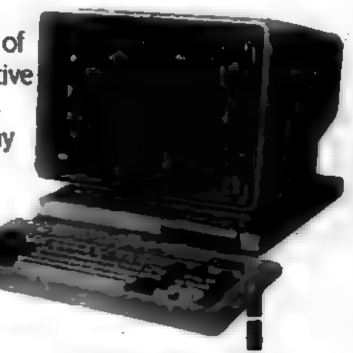

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ILLUSTRATION BY KEVIN CONLON

Meet the office products IBM calls family

There's sibling rivalry, parents who don't talk to each other, orphaned children and kissing cousins. Now, the reunion. . .

By Wendy White

If IBM had it to do over again, there is doubt that its Office Systems family would ever have come to market as such a tangle of products. The term "family" is a misnomer by every stretch of the imagination. And if IBM had recognized in the late 1970s and early 1980s the magnitude of the market for office systems, perhaps it would have introduced systems that were uniquely designed to support the office — something this systems clan is not.

Perhaps IBM chose not to. Or possibly, its planners miscalculated the market. In any event, IBM has devised a strategy to overcome any shortsightedness of which it may have been guilty in the past and, in so doing, it emerged as a formidable competitor in the office systems market.

The Office Systems family strategy identifies target users within an organization and the products required to support a variety of office applications for them. Figure 1 (see page 90) shows the organizational levels that IBM designated for its strategic product offerings:

- Corporate MIS
- Department/work groups
- Professionals
- Small companies' hosts

For each organizational level, IBM identified a core group of products to support the office environment — that is the Office Systems family.

Host systems to support corporate MIS include the IBM 370 and the System/36. These hosts provide services such as library, electronic mail, data processing access tools, communication controllers and storage.

Departmental systems target departments and work groups. In small firms, they may be considered the host system. Products include the System/36 and 38, 5520, 8100 and Series/1. Vertical applications software from IBM and value-added resellers supports departmental applications.

Departmental systems provide local business processing of generic and office automation applications that act as buffer systems between workstations and the host, thereby minimizing the host processing work load.

IBM Personal Computers represent flexible end-user products that can support user-defined business processing applications. General-purpose displays enable users to access office automation applications resident at intermediate or large host processors.

IBM treads lightly

As the IBM Personal Computer becomes the corporate mainstay for the decade, IBM must walk a fine line to appease both its loyal MIS following and the sprouting population of micro users outside the MIS domain. While there is no mistaking that IBM's primary mission is to maintain its powerful control of host-level systems, it

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Wendy White is director of industry analysis for the Sierra Group in Tempe, Ariz. This article is based on her recent report, "The IBM Office Systems Strategy: Connection or Confusion?"

must do so while sustaining the momentum at the workstation level. At the same time, IBM must regain the large departmental mid-section of organizations, where it has played a very weak role.

Although the gathering of the Office Systems family into a clan brings together a variety of systems that can support office requirements, it does not necessarily represent a dedicated office automation strategy. Rather, it is a strategic piece of IBM's information systems plan that enables the company to support enterprisewide business processing.

IBM qualifies as the definitive "enterprise vendor" by virtue of its all-encompassing capabilities in the information systems market. IBM's ability to provide a vast array of information systems and products as well as extensive support through mulitple distribution channels is unsurpassed. In fact, it can be stated unequivocally that IBM has created a role model by which other vendors must be measured.

Unlike many vendors that have only a diluted presence in the organization, IBM plans to become a universal force at all levels of an enterprise. As "enterprise vendor," the company will provide multiple systems that support both generic office automation and other business applications.

MIS revisited

The key to IBM's enterprise strategy lies with MIS. As long as MIS keeps the buying power to leverage systems and products within an organization, IBM will support MIS to the hilt. Despite the influx of Personal Computers and office systems that tipped the scales in the direction of individual users and departments, MIS is beginning to recoup its power base. And having gone full circle from the centralized to the decentralized and back to the centralized environment, IBM's strategy is perfectly timed to capitalize on supporting MIS as the enterprise kingpin.

IBM will ensure strategic success by creating a dependence on the host-level system. If a wealth of information and services are maintained at that level, end users are obviously at the mercy of accessing the mainframe. Score one for MIS.

Another benefit also emerges — the value of the Personal Computer or workstation increases. Score one for IBM.

Although IBM sinks its deepest hooks into the upper echelon of the organization at the host level, it has not ignored the general (and much larger) population of users that it describes as the departmental and workstation level. This level is where IBM has been the most creative in the introduction of office products to support targeted users — even if it has to freshen up current products to do so.

For years vendors such as Digital Equipment Corp., Wang Laboratories, Inc., Data General Corp. and NBI, Inc. filled the horizontal void left by IBM at the departmental level with a variety of departmental, cluster and standalone office systems.

Now IBM is bracing to capture the large midsection of an enterprise organization that usually consists of numerous departmental layers. It has corralled a variety of its existing systems and products to ensure a top-down and bottom-up strategy that will daunt all but the heartiest competitors.

The term 'family' is a misnomer by every stretch of the imagination.

Aging hosts

Even IBM would agree that it has an aging base of mainframe systems. The 370 series, for example, is in such wide use that many organizations are not ready to make the transition to newer host systems such as the 3090 series. Therefore, the 370 is expected to remain at the strategic helm of IBM's Office Systems family to support departmental and workstation systems.

The 370 series represents large-scale, host-based office systems that extend office support to virtually all users of IBM systems and workstations. Its major role is to allow general-purpose displays to participate fully in office networks.

The members of the Office Systems family using the 370 series can be supported by IBM's major host operating systems: MVS and DOS/VSE. In these operating environments, the primary office systems products are Distributed Office Support System (DISOSS)/370 and the recently announced Personal Services/370.

The new DISOSS/370 version allows the interchange of documents with IBM Personal Computers running the IBM Personal Services/PC program. DISOSS/370 also offers continued support for IBM 3270 terminals via Personal Services/370.

Support for the IBM Displaywriter, DISOSS/8100/Distributed Office Support Facility (DOSF), Scanmaster I and the 5520 Administrative System will continue under the functions provided by previous DISOSS/370 versions. DISOSS/370 Version 3 Release 3 is designed to operate under the MVS/370, VSE and CICS/VS operating systems.

Announcement highlights include

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the following features:

- Distribution of documents between Professional Office System (PROFS)/VM systems and other SNA Distribution Services (SNADS) nodes via a DISOSS gateway node.
- The DISOSS-PROFS interchange, which expands distribution services to include PROFS/VM users, providing a means for distribution of final-form text Document Content Architecture (DCA) documents from PROFS to DISOSS, from DISOSS to PROFS and via DISOSS SNADS implementation from PROFS to PROFS.
- Revisable-form text DCA documents, which can also be distributed from PROFS to PROFS via the DISOSS SNADS implementation.

Personal Services

Personal Services/370, a host-based application, will extend DISOSS/370 support to general-purpose displays and provide mail services (mail log, memo prompter, suspense file and distribution services for documents, messages and notes) and access to DISOSS/370 library services. According to IBM, Personal Services/370 is not intended for supporting the extensive text-editing environment, since it is more suitable for messages and office memos.

The services are intended for use by both technical and nontechnical business professionals using an IBM 3270 Information System or an IBM 3270 Personal Computer.

Personal Services/370 works in conjunction with DISOSS/370 Version 3 Release 2 and subsequent releases. In addition, Personal Services/370 extends the functions of the DISOSS/Professional Support Program offering under MVS and VSE, which will be withdrawn from marketing when Personal Services/370 becomes available.

Along with the announcement of Personal Services/370 in the MVS/CICS and VSE/CICS operating environments, IBM also plans to provide similar functionality in the TSO environment.

In addition, IBM plans to provide Displaywrite/370, a DCA text editor that will operate in conjunction with Personal Services/370 on MVS/CICS and VSE/CICS with PROFS on VM.

Horizontal and vertical

By developing an infrastructure based on supporting the requirements of a whole enterprise, IBM effectively created a cohesive framework that implies connectivity and compatibility — an "integrated" systems environment. Thus, IBM created both a horizontal and vertical strategy. While this may resemble its traditional top-down strategy, the subtle difference is that IBM has strengthened its overall position. It fortified those areas in which it has been notoriously weak — specifically, the office departmental/work group layer.

The System/36 will be IBM's salvo. Although positioned at the host level, it is also IBM's newest distributed system, which firmly establishes it as a primary departmental system. Based on this, the older departmental systems, such as the 8100, 5520, Series/1 and System/34, are expected to fade away in the near future. In fact, IBM recently announced that the System/34 will be discontinued in the European market — an indication that the transition has already begun.

> ***And having gone full circle from the centralized to the decentralized and back to the centralized environment, IBM's strategy is perfectly timed to capitalize on MIS as the enterprise kingpin.***

Within IBM's Office Systems family, the System/36 and 38 represent more economical host support for smaller organizations where a mainframe such as the IBM 370 is not required. It is IBM's intent to provide these smaller host systems with the same level of functionality that is available on the 370.

To meet this objective, IBM augmented the System/36's data processing functions with integrated office systems capabilities via the announcements of the following four office support products: Displaywrite/36, Personal Service/36, Query/36 and PC Support/36.

Displaywrite/36 offers basic text capabilities to general-purpose displays that are attached to the System/36. It allows editable interchange between Personal Computers using the Displaywrite Software Series or with the Displaywriter. Personal Services/36 is required to send a document.

Announcement highlights include the following:

- A DCA text editor similar to the Displaywriter, with local document library services for general-purpose displays.
- Revisable-form and final-form DCA.
- Access to the Displaywrite/36 function for remote users via the text entry assist feature on the IBM 5294 remote control unit.
- Integration with Query/36 for data and text merge applications and

IBM SYSTEM 38

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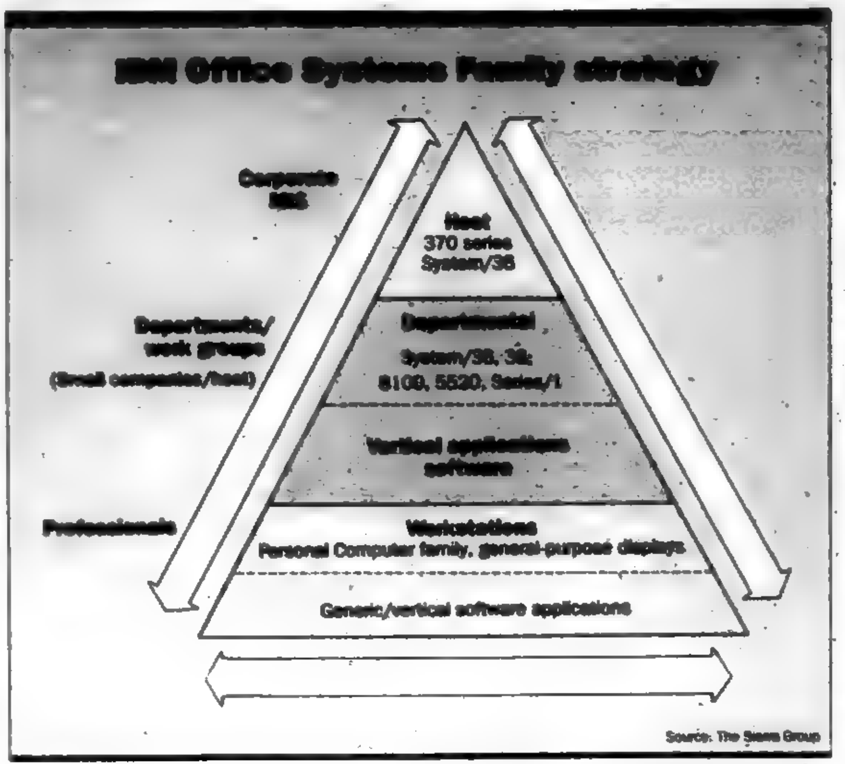
Personal mail handling

Personal Services/36 supports mail handling, distribution and calendar functions on both types of workstations (Personal Computers and general-purpose displays). Electronic document distribution is supported by Document Interchange Architecture and SNADS. Personal Services/36 requires Displaywrite/36 program and Query/36.

- Distribution services include directory services, group functions, logging hard-copy mail, local system messages, enrollment and administration for users of general-purpose displays.
- SNADS provides peer-to-peer document distribution to another System/36, IBM 5520 or DISOSS. DIA support with the Displaywriter provides document distribution.
- Documents can be interchanged through DISOSS/370 with the following products: System/36 (Personal Services/36), Displaywriter, Personal Computer (Personal Services/PC), 5520 Administrative System and 8100/DOSF.

Query/36 is a query program designed for accessing information in System/36 files. It provides text and data merging in conjunction with Displaywrite/36 and can create data processing reports.


IBM Office Systems Family strategy
Corporate MIS
Host
370 series
System/36
Departments/work groups
(Small companies/host)
Departmental
System/38, 36;
8100, 5520, Series/1
Vertical applications software
Professionals
Workstations
Personal Computer family, general-purpose displays
Generic/vertical software applications

Source: The Sierra Group

IBM's enterprise vendor strategy covers the whole user organization.

PC Support/36 consists of two sets of programs. One set runs on the System/36; the other is transferred to a Personal Computer diskette or fixed disk. It provides the ability to transfer files between the System/36 and the Personal Computer. In addition, resource sharing such as virtual disk (5M to 32M byte) and printer support is available, allowing the Personal Computer user to access the storage capabilities of the System/36.

In addition to priming the System/36 for its dual role, the Personal Computer AT is also expected to become a pivotal system to support the requirements of the smaller department or work group. Since these products represent IBM's newest systems members, they obviously form the real departmental systems equation.

The glue that sticks

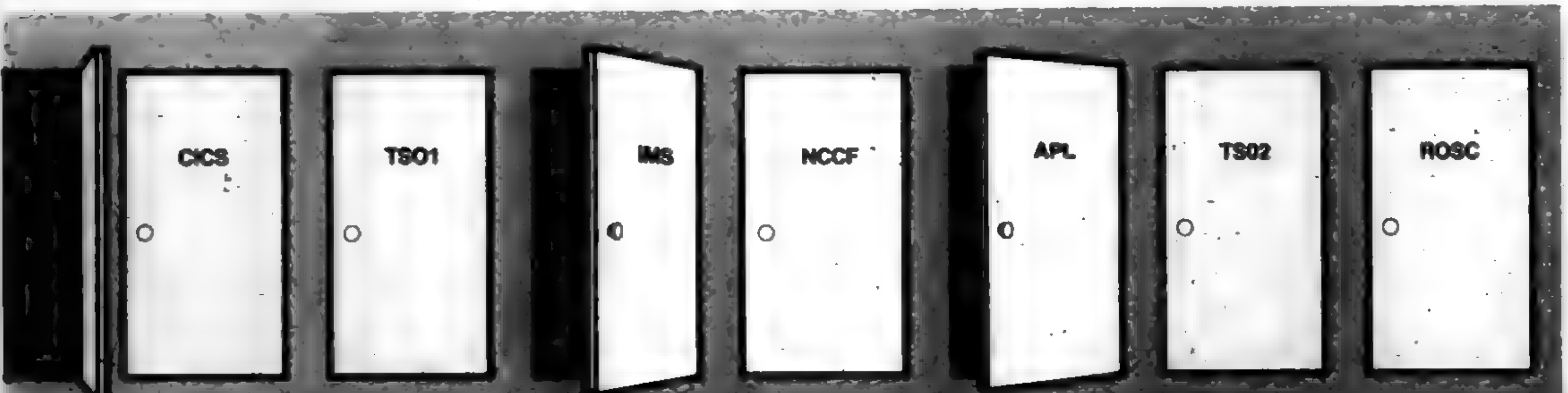
The Personal Computer, of course, has already met with unparalleled success as the workstation of choice, for a vast majority of individual corporate users. As such, it will continue to be IBM's primary solution for workstations.

As the applications glue begins to set more firmly between Personal Computers, departmental and host-level systems, control of the Personal Computer population is also expected to drift upward to the MIS organization.

This dual-pronged strategy will accomplish two objectives. First, it will satisfy MIS' requirement to maintain control over systems and workstations throughout the organization because individual end users must depend on the host system to support the information and services available via the mainframe.

In addition, IBM is assured of complete enterprise penetration with systems and products that are integrated — however loosely — to share information that is generated at all user levels.

In the final analysis, the more deeply entrenched users become, the more inviolable IBM will become



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To find out more about TPX, call us. Our door is always open.

DUQUESNE SYSTEMS
[illegible]

within its accounts. After all, the whole idea behind applying glue is to make sure it sticks.

As the cost of hardware decreases, the real thrust into the office systems market will be via software — specifically, software that supports industry-specific applications. By carving out yet another market niche, IBM is not only assured of capturing a sizable revenue generator, but, more important, it can orchestrate its total enterprise strategy as the consummate supplier.

System/38's role includes support of DIA and DCA as well as SNADS for information distribution peer-to-peer with other System/38 hosts and to DISOSS/370 environments. IBM also states that office workstation support on the System/38 will be directed toward intelligent workstations.

There is, however, a dearth of business applications to support these older systems. Among its newer systems, such as the System/36 and Personal Computer family, IBM has deferred to third-party software suppliers. Although IBM has addressed this void by putting in place an enormous software development effort expected to span the next decade, it does not have the competitive advantage that it may be perceived to have for the short term.

Still, the implications for IBM's competitors are clear. They must come to market quickly with products that fit into the DISOSS environment and provide DIA/DCA compatibility. While opportunities to provide workstations and cluster systems that support individual and work-group requirements will continue to exist, competitors must not only accommodate IBM's systems network but also provide value-added features and functions that offer superior price/performance.

The risks

As IBM smooths out the rough edges of its strategy, the risks should be minimal. If risks exist, they will probably come from unexpected quarters, not from loyal accounts or feisty competitors along the way. The source will be the rising confusion over architectural standards such as the U.S. Navy-supported Document Interchange Format (DIF) standard, the Consultative Committee on International Telephony and Telegraphy's (CCITT) X.400 and standards presented by the National Bureau of Standards.

A number of vendors, including Sperry Corp., have announced their support of DIF or are currently evaluating this standard as an alternative to IBM's DCA. Although DIF is not as comprehensive as X.400, the proposed CCITT standard for interconnecting messaging systems that provide a similar level of function as IBM's DIA is gaining momentum because of the market potential afforded by the U.S. government.

European vendors are also fueling the standards issue by attempting to suffuse IBM's de facto standard. This is occurring not so much because the vendors are motivated by introducing a better or improved solution but for purely economic and nationalistic reasons.

While there is certainly a risk that IBM may be challenged to defend its SNA/DCA/DIA standards, the efforts required to institute any changes will involve a long and tedious series of steps. In the meantime, there is no imminent threat to IBM's more-than-secure position in the market.

The System/36 will be IBM's salvo. Although positioned at the host level, it is also IBM's newest distributed system, which firmly establishes it as a primary departmental system.

Connection or confusion?

There is no doubt that IBM has parlayed its assortment of systems and products into more substantial office solutions than originally intended. By rechartering these systems, it has amassed an impressive contingent in its Office Systems family. And because IBM has dubbed these product groupings as members of a family, the implication is that these systems are, of course, connected and linked together by common family ties, when in fact they are less than second cousins with very dissimilar ancestry.

Although IBM's attempt to create a semblance of connectivity is not without merit, it is also highly confusing to users. After wading through sheaves of documentation to arrive at a general understanding of where and how the systems fit, even a well-versed IBM watcher can be intimidated.

Perhaps the only clear indication of what IBM has accomplished can be expressed thus: The company has recreated genetic connections via a series of applications that have been superimposed on existing systems to support office applications requirements. Whether these mutations can function together against the demanding backdrop of today's offices has yet to be determined. ■

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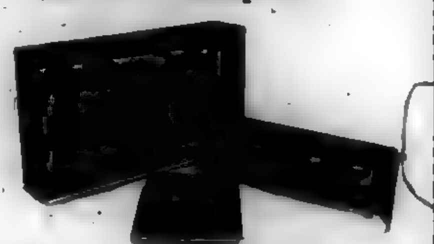

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EXTRA

CW PHOTO: O'CONNELL/LACOUSIER

Sharper PC2 coming soon

By George Colony

IBM is in a bind. The Personal Computer is now more than four years old, and it is beginning to look downright shabby. Not only has it been surpassed in features by machines like the Compaq Computer Corp. Deskpro, but its limited memory and speed have begun to stifle communications and software innovation.

Pricing on the Personal Computer and Personal Computer XT has been slashed, reducing IBM's margins and squeezing profits of retail stores and other indirect channels of distribution.

IBM must announce a replacement for the Personal Computer and the Personal Computer XT within the next four months or risk losing its momentum as the premier microcomputer vendor.

The raw truth is that to maintain its lead, IBM must "eat its own children" — make the Personal Computer obsolete by moving to a new generation. To do so, IBM will base its new set of Personal Computers on the much-heralded PC2, an Intel Corp. 80286-based machine that resembles a scaled-down Personal Computer AT.

IBM will move its Personal Computers through three generations. They consist of Generation One (Gen1) — the industry-standard IBM Personal Computer based on the Intel 8088 processor; Generation Two (Gen2) — the IBM PC2 — represented by the Personal Computer AT as the first member of this family; and Generation Three (Gen3) — Intel 80386-based Personal Computers.

In addition to these generations (which are all closely related to the original Personal Computer design), Forrester Research, Inc. has identified the "black sheep": a set of IBM machines incompatible with the Personal Computer but related in design and target market. These include the Series/1-PC, the PC-36, a very small 370 machine (the 4311) and a reduced instruction set computer (RISC) for scientific and engineering environments that is sometimes referred to as the Personal Computer RT (for RISC technology).

George Colony is president of Forrester Research, Inc., a Cambridge, Mass.-based research and data base firm.

A major problem with IBM's generation strategy is compatibility. Gen2 will retain compatibility with Gen1 machines by using optional 360K-byte floppy drives and by operating in the 80286 "nonprotected mode" — 8088 emulation mode. Gen2 machines will distinguish themselves based on their ability to run in the 80286 "protected mode," which carries direct addressing of up to 16M bytes of physical memory and virtual memory of up to 1G byte.

With the introduction of PC-DOS 5.0 (which will support protected-mode operation), the full utility of the 286 will be available to software designers. The 8088 at the heart of the Personal Computer and Personal Computer XT will continue to run a limited amount of the software created for the protected mode.

In addition, a new class of Personal Computer software will be written to run in native 286 mode — it will possess data compatibility but limited applications compatibility with the Gen1 software. Hence, new applications will run on Gen2 machines and will transfer files to but not be loadable on Gen1 machines.

Intel is expected to lend a hand by creating much closer compatibility between the 80286 processor and the 80386 processor — the heart of IBM's Gen3 machines. This translates into better compatibility between generations two and three than one and two.

Personal Computer generations linked with market generations

[illegible]	[illegible]	[illegible]	[illegible]
Life Span	1981-1985	1985-1989	1988-
Personal Computer Generation	Personal Computer family	PC2/AT family	PC3/VAT* family
Software	1-2-3 (Lotus Development Corp.); Multimate, Dbase II (Ashton-Tate)	Third-generation spreadsheet; networkable software; site licensed; portable licensed	Expert systems/ artificial intelligence; video-integrated software
Networks	3270 protocol; modem (Hayes Microcomputer Products, Inc.); communications board (IBM); Ethernet (3Com Corp.)	PC Network; Cabling System; Manufacturing Automation Protocol (GM Corp.); Technical Office Protocol (Boeing Computer Services Co.)	Cabling System
Integration	None	System/36, 38; 36/Attach; Displaywrite/36; DISOSS; LU6.2	370; VM; Bridge Business
Environment Software	None	Topview, MS Windows (Microsoft Corp.)	"VM Windows"

All products are IBM unless otherwise noted.
*Very Advanced Technology

Source: Forrester Research, Inc.

Each generation will have associated software, networking and integration.

Pricing trends

The pricing of average Gen1 machines fell by more than half during a five-year period beginning in 1981, dropping at approximately 12% per year.

The final fire sales on the Personal Computer and Personal Computer XT will price the former between $1,300 and $1,500 (with display, two diskette drives and 256K-byte memory) and the latter from approximately $2,300 to $2,500. Expect this pricing by first-quarter 1986.

Generation Two pricing will fall at an even faster year-to-year rate in anticipation of Generation Three, scheduled for 1988. The price cutting should run between 15% and 17% per year for the PC2 family.

Deepest price declines will be found on the PC2 and PC2/XT. IBM will maintain Personal Computer AT pricing at high levels, since that machine continues to rest at the high end of Generation Two. Finally, prices for "black sheep" machines, such as the Series/1 Personal Computer and the 36-Personal Computer, will decline at between 5% to 10% per year.

IBM will retain its open policy toward the development of Personal Computer products through its Gen2 and Gen3 machines. As an IBM source stated, ". . . while corporate IBM is going to take greater control of the Personal Computer, we are committed to open architecture for the forseeable future — it is the fuel that has fired our success." IBM's policy toward developers contrasts with the limited prospects of Apple Computer, Inc.'s closed Macintosh.

IBM's primary proprietary direction lies in combining the open Personal Computer with other architectures — the 36-PC and Series/1-PC.

Market impact of Gen2

Each micro generation will include associated software, networking and specific integration hooks tying into other IBM machines. A new class of software should emerge for each generation of machine, and a new group of software vendors could be first to take advantage of these opportunities.

Standbys such as Lotus Development Corp., Ashton-Tate and Micropro International Corp. will be preoccupied with preserving the status quo and may fail to pursue these new avenues.

The primary market impact of Generation Two will be the following:

The legitimization of local-area networking. IBM will aggressively tie the Gen2 machines with the PC Network, its token-ring network, the Distributed Office Support System (DISOSS) and the LU6.2 Systems Network Architecture designation.

Gen1 machines will become practically obsolete. There will be a lag of between nine and 12 months before Gen2-compatible resources such as applications software and PC-DOS 4.0 become available, and the lag will preserve Gen1 viability in the short run. But the long run will see Gen1 machines excluded from new networks and applications.

Competitors such as Digital Equipment Corp., Data General Corp. and Hewlett-Packard Co. will be forced to offer Gen2 clones quickly. Their best strategy would be dual-mode machines, capable of selecting between the Generation Two operations and the "DEC proprietary" or "HP proprietary" mode. Yet no strategy will completely save these vendors if the market moves en masse to Generation Two; IBM will hold a formidable advantage over its competition.

Crucial timing

Meanwhile, IBM still is sitting on an inventory of approximately 150,000 Personal Computers and 275,000 Personal Computer XTs. The fire-sale pricing on the Gen1 machines may begin in January, with price cuts of between 15% and 25% and special incentives given to retailers who move the machines.

The announcement of the PC2 should follow the start of these price cuts by 30 to 60 days. IBM will write off a large number of its Personal Computers to make room for Gen2 — its margins and price/performance advantage depends on this transition.

Delays in releasing PC-DOS 4.0 and problems with the 80286 processor's protected-mode operation could throw IBM's generation timing off drastically. If the company announces PC2 in the first quarter of 1986, but PC-DOS and the 80286 fixes are not available until the first or second

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quarter of 1986, then software will likely not become available for Generation Two until fourth-quarter 1986 or first-quarter 1987 at the earliest. Since software is the real driving force behind Generation Two, late development means that Generation Two will spend little more than a year in the limelight (the 12 months of 1987) before Generation Three is announced.

Timing will govern the impact of PC2 and its Generation Two relatives. PC-DOS 4.0 is critical to Generation Two's success — it is the linchpin to real protected mode/multitasking applications for PC2. The advent of these applications will give IBM leverage for reselling a whole new fleet of small computers to the Fortune 1,000. In this sense, IBM's entire micro strategy is being held hostage by a third party — Microsoft Corp.

The upshot of this scenario suggests that Generation Two could become little more than a stopgap to Generation Three. Smart users and software developers may forgo PC2 and stick with the Personal Computer and Personal Computer XT for another three years before migrating directly to the Generation Three machines.

Still another new class of microcomputers looms large on the horizon — the "3M" machines. These workstations wield 1M byte of main memory, 1 million pixels of screen resolution and 1 million instructions per second processing speed. The proposed Carnegie-Mellon University "University Workstation," the Xerox Corp. 6085 and Steve Jobs' nonApple "Big Mac" all fall into this group.

These systems could simply outclass the PC-DOS, Intel-based machines IBM relies on. "3M" workstations will be able to run as full LISP processors, operate in multitasking mode and perform tasks at unprecedented speeds. Real commercial artificial intelligence packages under development may serve as catalysts.

The micro market during the 1980s has been lulled into a false sense of stability by IBM — as if one standard could be established forever. Yet the potential threat to the Personal Computer and its satellites (such as Lotus, Digital Communications Associates, Inc. and Microsoft) is already in view on the horizon.

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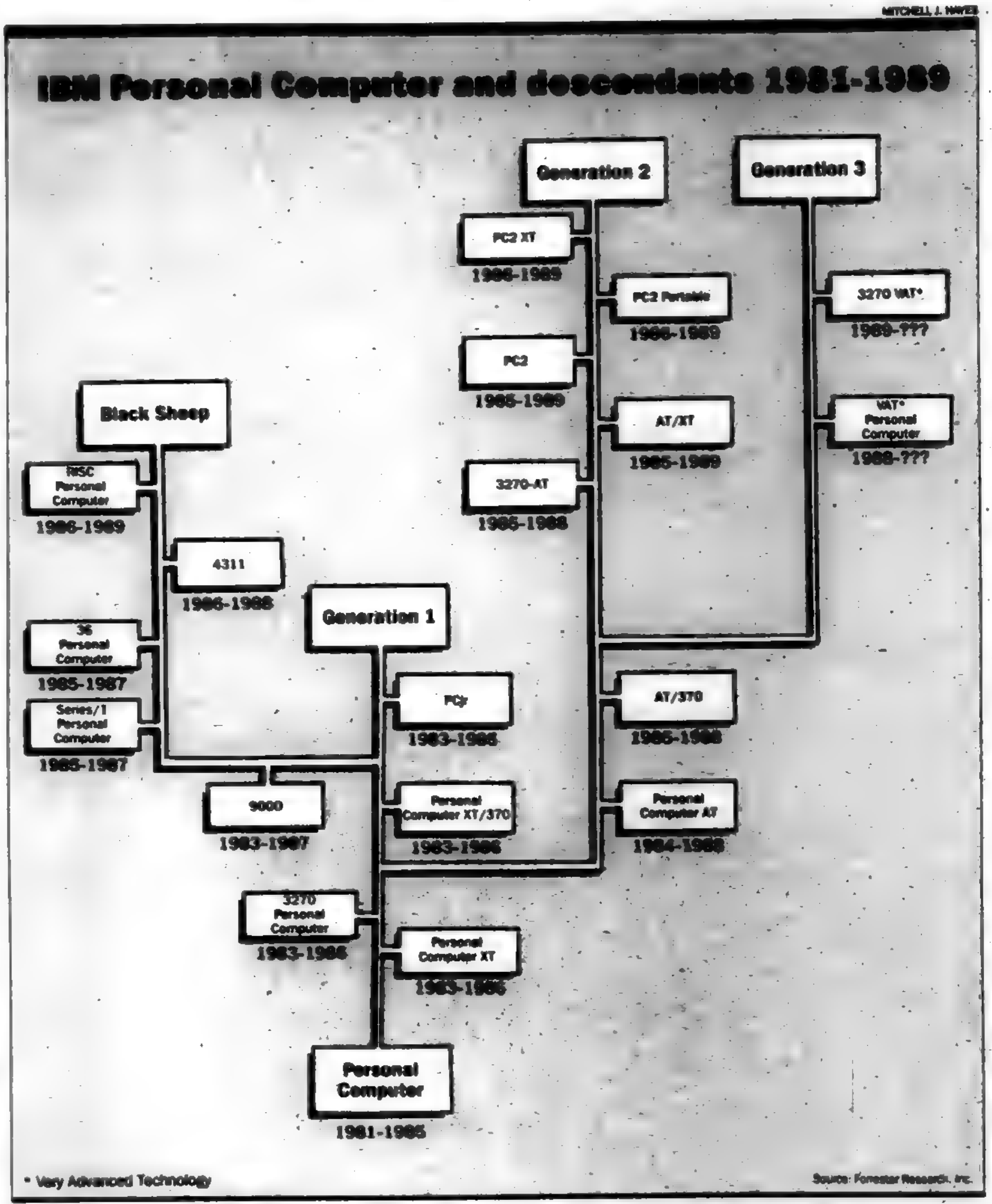

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Source: Forrester Research, Inc.

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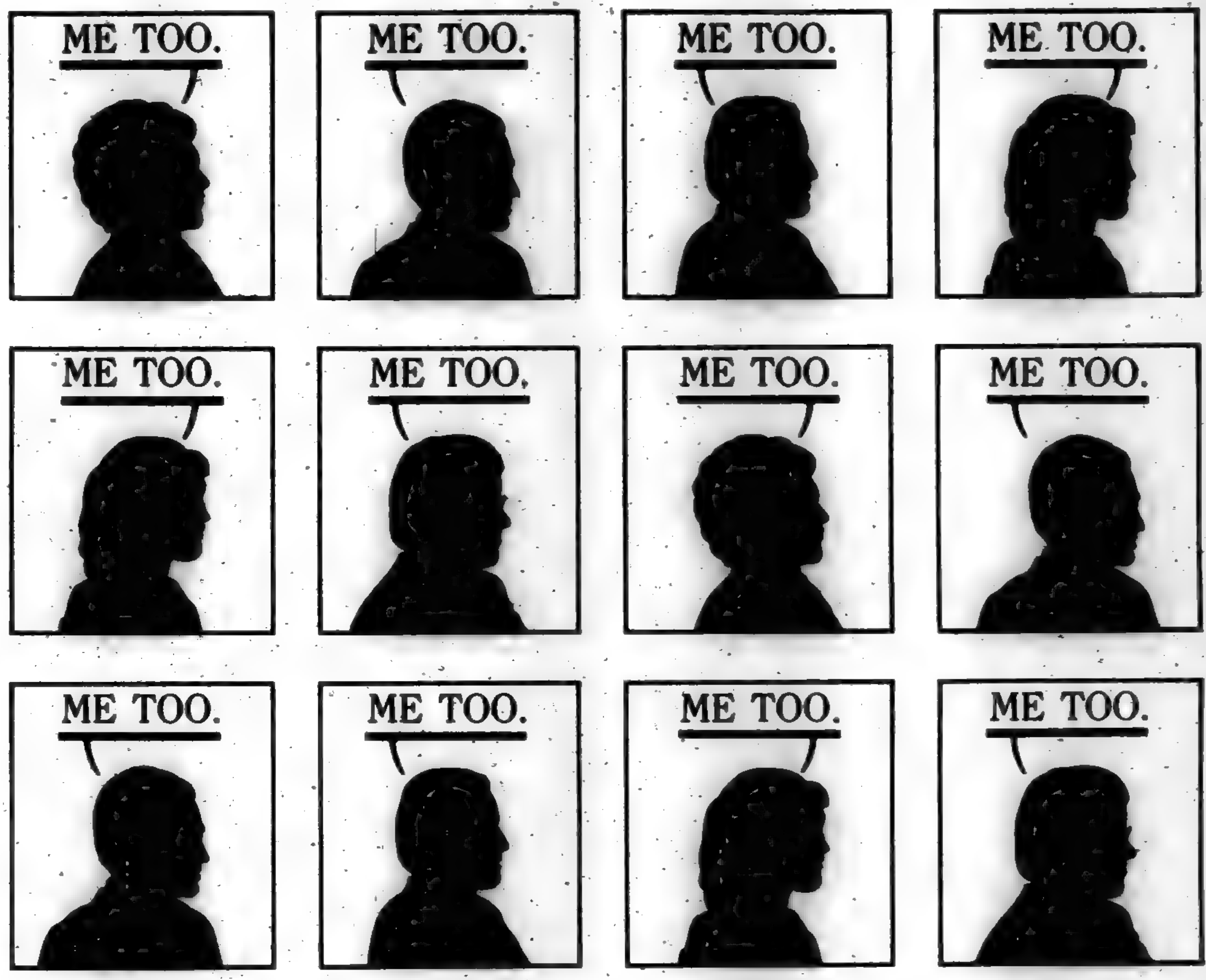
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Interview: Robert Murphy

The token ring is out – barely

"We needed to get the token ring announcement out, and insofar as we had enough content for an initial announcement, we proceeded with it."

The token-ring network announcement of Oct. 15 set no timetable for connecting Personal Computers to departmental hosts, yet isn't that the crucial link in the office at large organizations?

Yes, the token ring is an important link to other systems, and we did say that the announcements of the token ring were our initial ones.

If you go back to the original statement on May 8, 1984, we . . . stated our intent to implement a token-ring local-area network to link different types of computers, workstations and devices within a building and to share resources and exchange information between them. The intended use for that was the attachment of IBM and OEM information workstations, distributed systems and computers.

Then it could conceivably be another year before that connection is made?

I wouldn't speculate on the timeframe. We would like to do it when it makes business sense for IBM.

What is causing the delay, then — is it a business reason or a technological one?

Those are reasons I would not speculate on in the press. It certainly is our intent to get that link done quickly. We recognize it's an important requirement.

It's very obvious from all the questions we've had about it that something is missing. But we needed to

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Robert Murphy is IBM's division director for general and office systems product line planning, National Accounts Division, based in White Plains, N.Y. He was interviewed by Extra *Editor George Harrar.*

get the token-ring announcement out, and insofar as we had enough content for an initial announcement, we proceeded with it.

Do you feel pressure from your large users to speed up delivery of the token ring for connecting Personal Computers to departmental hosts or mainframes?

No, there has not been a great uproar. There's more press concern than customer concern about the connectivity. Customers tend to be proceeding with the implementation of their current strategies. What I mean is that the token ring doesn't necessarily cause a major change to the office systems strategy.

It really is a watershed kind of announcement for wiring strategies. It allows customers to see more clarity in a wiring strategy, but I think they've already selected the office strategy for implementing it.

What would be the clear choice of wiring strategy for a large customer?

Customers who have already installed the IBM Cabling System in many cases went through a decision that involved either new construction or major renovation — they're interested in wiring up the entire facility.

The primary use of the PC Network, on the other hand, has been in small clusters, which is where we market it, although it has the technical capability in some environments to go beyond small clusters.

The obvious exception is where customers have video requirements — for example, on a plant floor. The other popular environment has been the university. Where the application doesn't have a video requirement, generally the Cabling System is the recommended medium.

Users complain that IBM products don't talk to each other very well. Aren't Digital Equipment Corp. and other vendors ahead of IBM in forging links to IBM's own products?

Interconnect is certainly a key. I believe IBM holds and will hold the leadership position for interconnecting products of many types — links between the Personal Computer and departmental systems and interconnection of both of those to host-based products.

We believe the way the System/36, for example, provides connection between Personal Computers and then interconnection with [the Distributed Office Support System (DISOSS)] represents the top of the field in personal services offerings, in the vertical integration of functions and in providing easy-to-use professional aids and tools to end users.

You don't believe you've been playing catch-up with other vendors?

I think we've been setting the pace. I believe we were one of the first ones to recognize the need for connections.

We're all racing to provide better interconnectivity for customers. I don't think anyone is sitting back on his laurels saying, "I'm there. I've got everything I need." Each vendor is trying to provide functionality, ease of use and consistent implementations across a spectrum of hosts, distributed systems and intelligent workstations. That has not been simple technically for any of us.

When we at IBM talk of these interconnect strategies and the office systems strategy, we talk in terms of four models. The first is the DISOSS model — implementing the host function with both intelligent workstations and fixed-function workstations attached. IBM's products in this category, DISOSS Personal Services and Personal Services/PC, do a fine job of connecting both fixed-function displays and intelligent displays directly into a host. They also provide professional tools and aids.

The second model is [the Professional Office System (PROFS)]. In the VM environment, PROFS provides very tight integration of intelligent workstations and fixed-function displays. With the introduction of Displaywrite/370, both types of workstations have a consistent text editor.

The third model is the System/36, which really is the creme de la creme of the interconnect because of its simplistic implementation of vertically integrated office functions.

The fourth model is either the PC Network or, after the recent announcements, the token-ring network, both of which provide connectivity through gateways into other systems.

Would you say that Displaywrite is easy to use right now?

Well, I would say that Displaywrite 3 on the Personal Computer in the secretarial environment is viewed as the best text product in the market. Some would debate that, but it's true functionally and from an ease-of-use point of view.

I would prefer — and our customers have told us they would also like to see — a Displaywrite that has a little less function and is easier to use for the professional.

Is IBM encouraging a two- or three-tiered approach to office systems?

With respect to the four models I mentioned, yes, there is a three-tiered strategy, but we don't think all customers will implement it. For example, I know of one large aircraft manufacturer that for security requirements doesn't want to use any intelligent workstations. That company will use a large host, probably a VM-based PROFS environment, with fixed-function displays to meet its security

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requirements. Other large companies will install token-ring networks attached to 370s via gateways or communicating with other distributed systems such as the Series/1.

To what extent did the October announcement of PROFS Version 2, Release 1 complete the integration of office software?

I think it was a giant step forward in integrating a host-based offering. Now there's a final-form bridge between DISOSS and PROFS, with the ability to pass notes back and forth and to make usability enhancements. There's also a new calendar.

Our customers were a little bit frustrated about how PROFS is going to play into DISOSS. We've eliminated that frustration because PROFS users can now pass a message into a DISOSS system. Revisable-form documents can also be interchanged between them.

What remains to be done to complete the PROFS-DISOSS connection?

From a connectivity point of view, we're almost there. We'd like to see more consistency between the two products — use of the same calendars, for example.

From a usability point of view, we'd like to get [the two environments] to look as much alike as they possibly can.

What is IBM's commitment to the 8100 line?

We have significantly enhanced the 8100 over the past 18 months. We've announced several new processes and new DASD. Today, it actually has more function than the System/36. As we've made DISOSS enhancements, we've maintained currency between the DOSF line and DISOSS enhancements. IBM is very sensitive to protecting the investment that customers have made in the 8100.

But you have not made the 8100 central to your office strategy.

That's correct. We have not made it the lead system, and a lot of that has to do with our ability to be competitive with the large number of office applications that are out there — the DEC and Wang Laboratories, Inc. offerings. The System/36 provides us with the kind of price competitiveness that we think will serve us well in this market.

What is IBM's commitment to the Series/1?

We made a statement of intent in March 1984 that we intend to support Document Content Architecture and Document Interchange Architecture and SNA Distribution Services on the Series/1. While we haven't executed that intent statement yet, it is certainly our desire to bring to the Series/1 features comparable to what you see on the System/38.

What is IBM's commitment to the 3270 Personal Computer?

Its role in the office is a high-function Personal Computer. It will be a primary player where sophisticated 3270 emulation is the requirement. If you were to rate variations of 3270 emulation, 3270 Personal Computer is the high end.

What are your large users worried about in your office strategy? What are they pressuring you for?

They want immediate solutions for their departmental system productivity/office programs. And the announcements of the token ring really brought us to new levels of interconnect capabilities for these programs.

The world of ASCII is now able to play into the world of the IBM office. The announcements brought some logic to cabling structures that customers have been struggling with over the last several years in terms of how to wire their buildings.

I think the key word in the announcement was "openness." We'll start to see more different kinds of devices interconnecting in the systems network.

But the office strategy remains the same. We are attempting to structure the strategy into the four model work groups and to deliver functions all aimed at significant interconnectivity. Our attempt was to provide more structure and discipline to the implementation of office systems but at the same time remain flexible enough to respond to our customers' requirements.

There have been opportunities on the horizon that have been talked about for years that we've never really cracked. One is voice [applications]. Our first step into the voice area was the announcement of voice cards on the Personal Computer.

The other major area to penetrate significantly is image. The goal is to provide total integration of text, office, voice and image and to integrate the data requirements for them.

Next comes the integration of the private branch exchange and the telephone itself. The ability to integrate these functions is the key challenge still in front of us and the whole industry.

When will the "totally integrated office" come to be?

There were people five years ago who said, "Next year is the year of image." I believe it's going to be over the next five to seven years that full integration takes place.

Nobody uses the phrase "paperless society" anymore. But the things people talked about 15 years ago when they coined that phrase, we're still working on.

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(The following reports come from the Computerworld News Service.)

Cashing in on NTT Japan

By Takehisa Kondoh, Int'l Editor
CWN Tokyo Bureau

TOKYO — To hear some Japanese computer businessmen talk, September closed in this country with "IBM week." Japan's electronics circles were shaken by the Sept. 25 announcement by Nippon Telegraph and Telephone Corp. (NTT) that the Japanese company will join hands with the world's computer leader to establish a firm for enhanced data communications, a step many fear will speed IBM's market penetration here.

Top executives at Japanese computer makers, such as Fujitsu Ltd., NEC Corp. and Hitachi Ltd., took immediate, coordinated countermeasures against the two powerful concerns, prodding the Japanese Ministry of Posts and Telecommunications to delay, and possibly kill, the venture.

The new firm will be held equally by NTT and IBM Japan, Ltd., a wholly run Japanese subsidiary of IBM. An NTT announcement said that in addition to broad cooperation in data communications, the joint company will aid parent IBM in developing software for current Japanese users of IBM equipment and will support sales of smaller IBM machines in Japan.

Domestic computer and communications chieftains oppose the joint firm because they are afraid IBM may dominate the Japanese computer and office automation market. An executive from one Japanese computer vendor remarks, "With this tie-up, NTT could be a sales agent for IBM."

Traditionally, this telecommunications market is monopolized by strong Japanese manufacturers holding long-term procurement contracts with the formerly government-held NTT. Fujitsu and NEC have been two of the main contractors of communications equipment and data processing terminals for the nonmanufacturing NTT. By teaming up with NTT — Japan's biggest purchaser of terminals and telecommunications equipment — IBM aims to recover its market strength in Japan. The arrangement allows IBM to cash in on NTT's huge marketing network and 4,000 data communications systems engineers.

As a Japanese computer industry analyst describes it, IBM's approach to NTT in the past several years was "helter-skelter." The analyst adds, "Simply put, IBM has been going after the logo power of NTT as Japan's telecommunications monopoly."

There is a simple reason for IBM's drive. In 1979, IBM lost the top computer sales position here to a domestic firm, Fujitsu, and now ranks third after Fujitsu and NEC. What's worse for the U.S. giant, Fujitsu presently outsells IBM in the mainframe market, IBM's bastion.

The joint company would aid IBM in developing software for Japanese users of IBM equipment and support sales of smaller IBM machines.

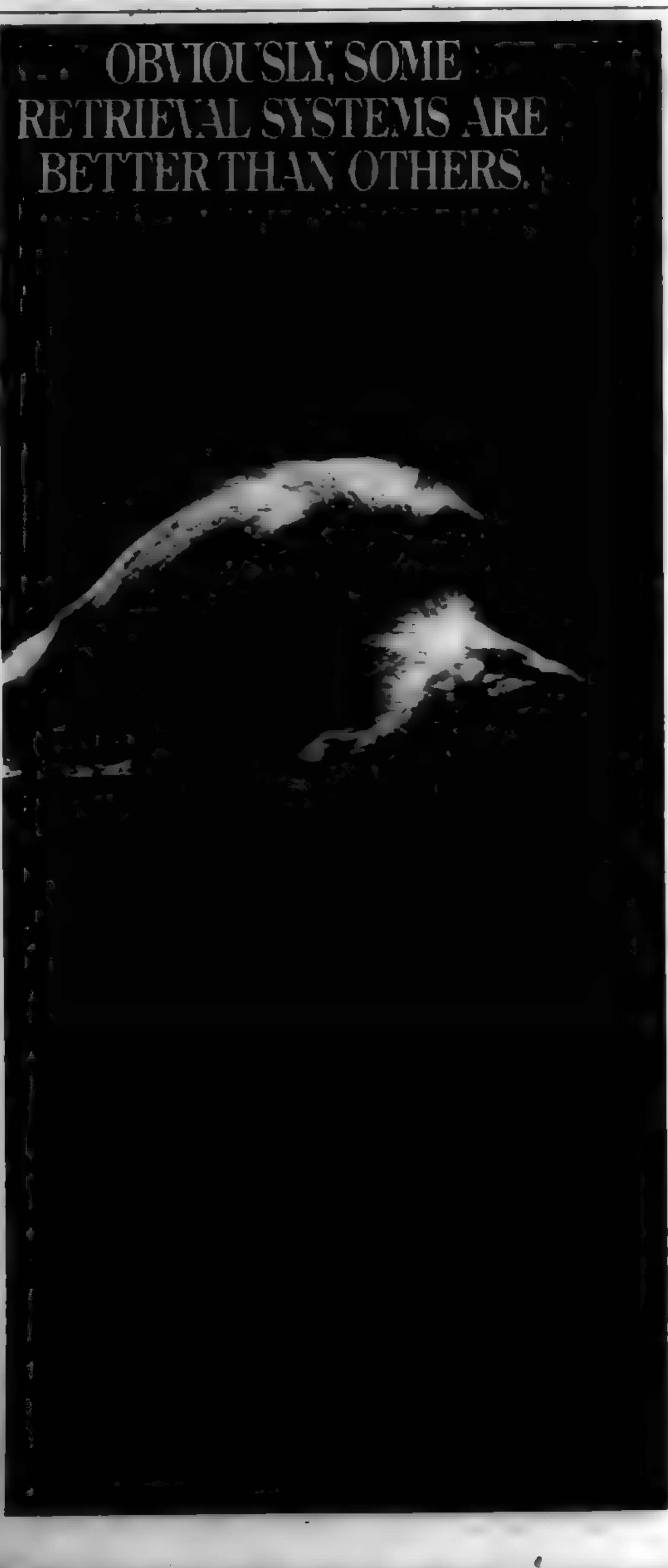
According to Japanese analysts' speculation, IBM may have badly needed NTT's know-how on the efficient networking of data processing terminals in order to restore quickly lost ground in the computer market. An official with a major computer manufacturer observes that business and personal computers and word processors, if distributed in a networked system, will bring sales two times greater than the revenue from mainframe computers.

For IBM, the immediate market goal in Japan is set on the value-added network, a form of multiservice digitalized data communications. Some Japanese officials say that IBM's future in Japan hinges on how deeply the computer giant will bite into NTT as the country's largest value-added network operator.

The better part of the joint-firm deal consists of the linkup between IBM's Systems Network Architecture (SNA) and NTT's Data Communications Network Architecture (DCNA). The contract also called on the new firm ultimately to supply the Information Network, IBM's SNA-based value-added network, in Japan.

IBM apperently is targeting NTT's network, for which Japanese computer firms have supplied large numbers of terminals. Government statistics say that Japan's value-added network market will expand from $230 million in 1983 to almost $3.7 billion in 1990.

In Japan, more than 70% of computer users, mostly business firms, depend on non-IBM equipment, and all of them run individual business communications on NTT cables. These users are concerned that NTT's progressive tie-up with IBM will surely cause them to reconstruct corporate communications systems.



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Crying foul over NTT-IBM

By Glenn Rifkin
CW Staff

TOKYO — Though IBM's joint venture with Nippon Telegraph and Telephone Corp. (NTT) will have modest goals initially, there is little doubt on either side of the Pacific that the implications of this connection are frightening to competing computer and telecommunications suppliers.

At the outset, the new (and as yet unnamed) company will produce a conversion of the IBM Systems Network Architecture-NTT Data Communications Network Architecture protocols, a project begun in December 1983.

Marrying IBM's de facto networking protocol standard in the U.S. with Japan's similar standard has staggering potential in its own right. Notes Yuji Ogino of International Data Corp. in Japan, "If they are successful, the IBM protocol will become the industry standard, and that sets up IBM to capture the largest market shares in the Japanese telecommunications and computer markets."

For the DP/MIS director in the U.S., the joint venture will have less immediate impact, but it does provide IBM with much-sought-after access to the technology and human resources that powerful NTT offers in the telecommunications game. According to Kaoru Kubo, vice-president and general manager of advanced communications systems for NTT International and chief negotiator of the NTT-IBM deal, the venture was not designed to get NTT into the U.S. market but to make it a power in such markets as China and Latin America.

Kubo acknowledges that IBM is agressively pursuing the telecommunications market in an effort to compete with AT&T.

Reaction to the announced joint venture was swift and angry in Japan. When asked who cried "foul" at the announcement, Ogino replied, "Everybody." He says such a connection would have been unthinkable several years ago, but trade frictions between the U.S. and Japan are currently so high that the Japanese government was forced to allow the deal to happen. Additional pressure from the U.S. government to get NTT to improve its import record from U.S. companies added to the successful marriage.

NTT may well form alliances with other U.S. companies. Indeed, the Japanese firm announced in September plans to exchange information and resources with AT&T. But thus far, IBM's move has been the most significant. "IBM has more political power than other companies," Ogino says.

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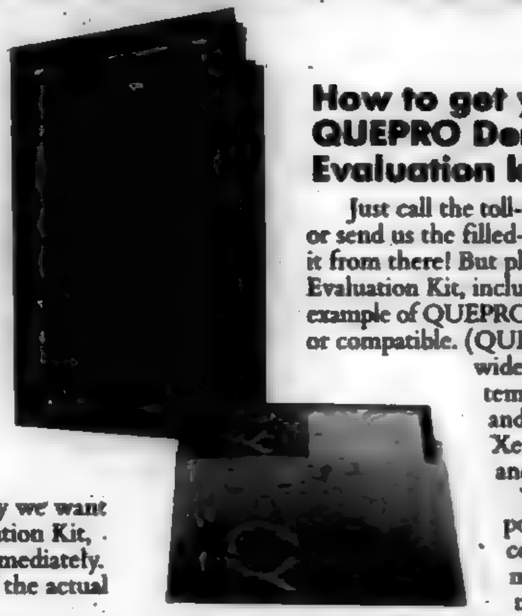

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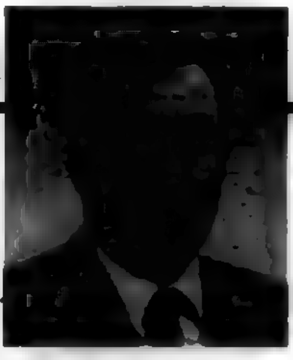

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IBM International

Norwegians look to Amdahl

By Knut Ivar Skeid, Editor
Computerworld Norge

OSLO — IBM Norway is a pure trading company; no development or production takes place here.

Earlier this year, IBM Norway tried to place some major orders to Norwegian manufacturers for parts production for their typewriter plant in Sweden, but the manufacturers weren't interested. Some Norwegian companies do have smaller contracts with IBM for production of some mechanical parts in IBM products.

In Norway, unlike in other European countries, Amdahl Corp. competes successfully against IBM in the plug-compatible mainframe market. Several bigger banks and insurance companies chose Amdahl instead of IBM as their major system supplier in the last couple of years. Amdahl also delivered the first supercomputer to Norway, actually a Fujitsu Ltd. VP-1100 with an Amdahl 470 front end.

Despite the lack of manufacturing presence, IBM is Norway's largest computer company, with a turnover in 1984 close to $250 million (U.S.). The No. 2 company is Norsk Data, which is only about half as big on the domestic market.

At a press conference in October, Eyolf Haug, president of IBM Norway, presented a plan for establishing a scientific research center at the University of Bergen in the western part of Norway. No other Scandinavian university will match the computer power at this site.

IBM will give the center to the university, and over the next five to seven years, the company will invest about $40 million (U.S.) in the project. The center will rely on an IBM 3090 as its main computer. IBM will place 10 to 15 of its international research personnel at the center, which will employ 30 to 40 people altogether.

The Bergen research project marks the second time IBM Norway has donated computer systems to Norwegian universities. The Norges Tekniske Hoyskole; the leading technical university here, was given an IBM 4361 system with a link to the European Academic Research Network. The gift was valued at $750,000 (U.S.).

The research center at the University of Bergen will host research in the fields of offshore oil technology and the fish-farming industry (where world-famous Norwegian salmon spawn) as well as general research in information technology.

IBM owns six other research centers throughout Europe, in Paris; Rome; Madrid; Winchester, England; Pisa, Italy; and Heidelberg, West Germany.

Picking off ICL customers

By Jane Lawrence, Deputy Editor
Computer News

LONDON — IBM's strategy in the UK aims mainly at picking off competitors' customers and picking up value-added network contracts.

The attack on IBM's chief competitor, British mainframe maker International Computers Ltd. (ICL), is certainly paying off. In recent months, IBM moved in on ICL contracts with the Ministry of Agriculture, retailer Woolworth & Co., Midland Bank plc and British Steel Corp., to name a few.

IBM has not taken over these accounts completely; but it achieved the foot in the door that it was looking for. Once in the door, IBM is almost impossible to dislodge, although many true blue customers are now buying a token Japanese mainframe to keep the titan on its toes. IBM acquires the new accounts via high-level contact with prospective users and by offering more computing power than ICL, which builds only small mainframes.

ICL is suffering from the onslaught. A British Telecom contract for 30 mainframes was meant to be split between the two suppliers when announced last year.

But in October, British Telecom said the remaining six sites in central London were almost certain to go to IBM. That would tip the score to 24 vs. six in IBM's favor.

IBM's other principal target for new business is value-added networking. Last year, the government turned down the proposed joint venture — Jove — between IBM and British Telecom. IBM's European president, Kaspar Cassani, said the company would continue its effort to set up a value-added network in the UK.

Setting up networks for customers could prove a lucrative business. Not only could IBM charge for management facilities and similar services, but responsibility for a network could give the company some control of its customers' buying patterns.

IBM often underscores its corporate conviction that the value-added network business has great growth potential, particularly because of the continuing convergence between computer and telecommunications technologies.

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IBM International

Brazil opens up to IBM

By Vera Dantas
Editor-in-Chief, Data News

RIO DE JANEIRO — IBM has always been considered a great danger to the national computer industry in this country.

Brazil's policy has sought not only to develop a home-grown industry but also to halt the advance of IBM Brasil Ltd., which dominates the mainframe market.

But times have changed. The national industry now finds itself strong enough to permit approaching foreign companies more closely. IBM also has changed its way of acting locally.

In 1977, IBM was very aggressive and tried to impose the marketing of the System/32. However, sales were blocked by legislation.

The Informatics Law, number 7232, contains 46 articles "with the objective of enabling national capacities in the activities of informatics" — in Brazilian terms, the computer industry.

Today, IBM wants to be a partner with local industry in national development.

Under the law, only Brazilian national computer companies could produce and sell microcomputers, minicomputers and peripherals here. The law does not permit joint ventures, so foreign companies were effectively barred from doing business here.

Today, IBM wants to be a partner with local industry in national development. This fall, IBM reviewed a program that aims to buy components made in Brazil for IBM's own use as well as for exporting.

The program, called "Partnership in the Technological Development," was launched at the fifth International Fair of Informatics, held in Sao Paulo, Sept. 23-29.

Instead of Personal Computers, IBM exhibited the Brazilian compatibles — micros, terminals and communications controllers made by IBM's partner companies. All the local manufacturers were invited to show their products at IBM's exhibit, and the first 11 to answer the invitation were selected.

The local IBM president, Robeli Libero, describes the partnership: "It will give better opportunities to the Brazilian vendors. It will reduce the cost of IBM programs and permit the increase of technological exchanging and new technologies."

A week after IBM had announced the program to the national industry this fall, the former executive secretary of the Special Secretariat for Informatics (SEI), Edison Dytz, criticized IBM for its undue influence on Brazilian industry. IBM donates computers to Brazilian universities, causing some concern among local authorities about the company's influence on academic research.

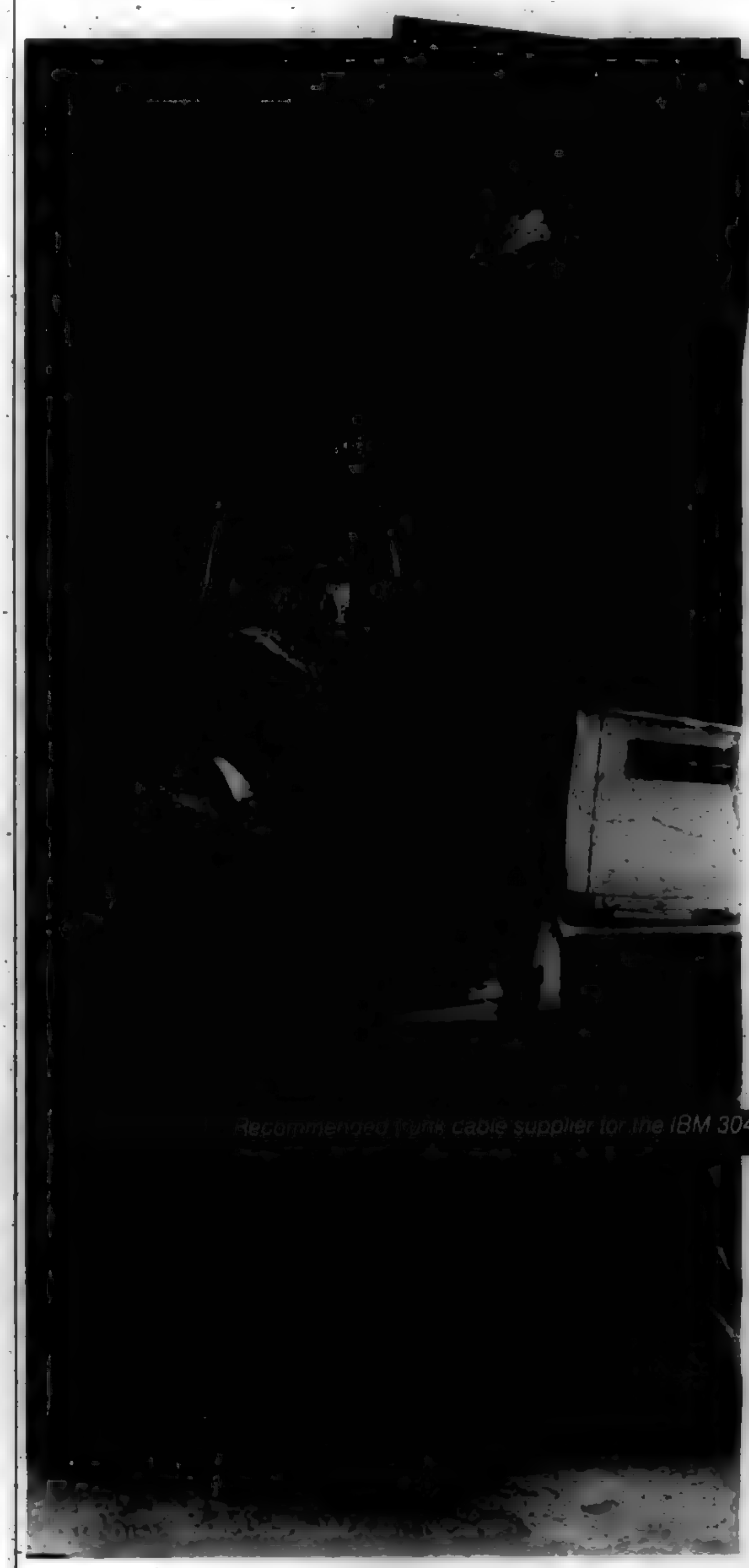
Dytz, recounting the impressions he received when he was head of SEI, says that the Brazilian vendors are selling themselves to IBM.

Doria Porto, currently SEI's executive secretary, agrees that there is a risk that the national industry could become a mere supplier of components and parts to the multinational — IBM.

According to the secretary, IBM has not yet sent to SEI its plan for purchasing equipment from Brazilian firms.

In the event that the industries involved in the project intend to import any components, IBM will have to submit its orders to SEI.

And if SEI finds that the negotiations wound the Informatics Law, it will deny importation, turning the joint project into a fiasco.



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IBM International

Staying on top down under

By Peter Scott, Editor
Computerworld Australia

SYDNEY, Australia — Isolated at the south end of the Pacific Basin, about as remote as it is possible to be from the computer manufacturers of the U.S., Australia has developed a vibrant computer-user community.

The country's users have earned a reputation for developing good software, for stretching hardware performance and for being prepared to try almost any product that promises a needed solution.

The market is dominated, as in most of the world, by IBM. But the number of other manufacturers represented is enormous. At the mainframe level, IBM faces the normal competition from the BUNCH companies and plug-compatible manufacturers plus the direct representation of the Japanese (Fujitsu Ltd.), Europeans (Nixdorf AG) and British (ICL Ltd.). All have prestigious installations and aggressive business plans. IBM is forced to work hard to retain its market share, growth and profitability here.

To overcome the aggressiveness of the opposition — particularly Fujitsu, which after several mediocre years is going all out to become a market leader — IBM has been forced to grant substantial discounts to hold onto several major accounts.

In May, the Western Australian government won a $10 million (U.S.) discount on a $36 million (U.S.) order shared by IBM and Amdahl Corp. in which IBM provided the bulk of both hardware and software.

Although IBM does not like to admit to such discounts, they are not uncommon.

Nonetheless, IBM's domination of the market is unquestionable. In 1984, its revenue reportedly reached $465 million (U.S.), and International Data Corp. Australia predicts IBM revenue will exceed $610 million (U.S.) this year.

The opposition can reach such a figure only by combining the revenues of the six or seven "next best" performers.

At the personal computer level, IBM again is the market leader, although it has experienced little luck arranging timely shipments of its products. Several times, eager potential users waited for Australian releases of Personal Computer products, their appetites whetted by reports of overseas progress. IBM Australia reported that machines were not available until the demands of the U.S. domestic market could be met or until some undisclosed problem is overcome. The PCjr was never released in Australia, and the Personal Computer AT was not formally shipped until September 1985.

On the other hand, IBM's Japanese-produced Personal Computer JX was released here in September, before users in the U.S. saw the machine. It is still too early to report on user reaction to the JX, but reports on the introduction itself say there was a single main factor in the early release: Apparently IBM was granted a preferred-supplier status for the JX by the Victoria state government.

IBM has been forced to grant substantial discounts to hold onto several major accounts.

In return for some large government orders of both mainframes and Personal Computers, IBM was forced to conform to offsets programs, which require the return of some technology or support to Australian industry.

IBM did so by establishing links with Australian software houses and building a factory in Victoria, where it assembles its major Personal Computer products for domestic sales and limited export.

The plant has been widely criticized as a "screwdriver operation" with minimal input to the Australian computer industry. While IBM denies such allegations, one International Data Corp. Australia researcher notes the company's involvement in the plant is carefully controlled. He says he believes Southeast Asian manufacturing facilities could entice IBM's assembly away from Australia if the price differential is great enough and the quality can be assured.

Nonetheless, the production of Personal Computers affects IBM's Australian operations little. In March, the government granted licences to 16 foreign banks.

With that many new banking operations to be equipped from scratch, competition among computer vendors heated up. IBM pulled out all stops and won a sufficient number of the orders to ensure good growth in its revenue for 1985-86 and beyond.

While the squabble intensifies over who really rates as Australia's second computer company, IBM, unchallenged and unconcerned, sets a pace all others find hard to match.

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IBM International

Quiet partners in W. Germany

By Claudia Marwede-Dengg
Senior Editor, Computerwoche/RFA

MUNICH — IBM Deutschland GmbH, West Germany's market leader in computer sales, practices policies specifically aimed at helping it blend into the corporate landscape here. The strategy of IBM's German subsidiary matches the policies of Big Blue throughout Europe: signing contracts with local suppliers and cooperating with local industry, universities and research centers to avoid public criticism for being an outsider.

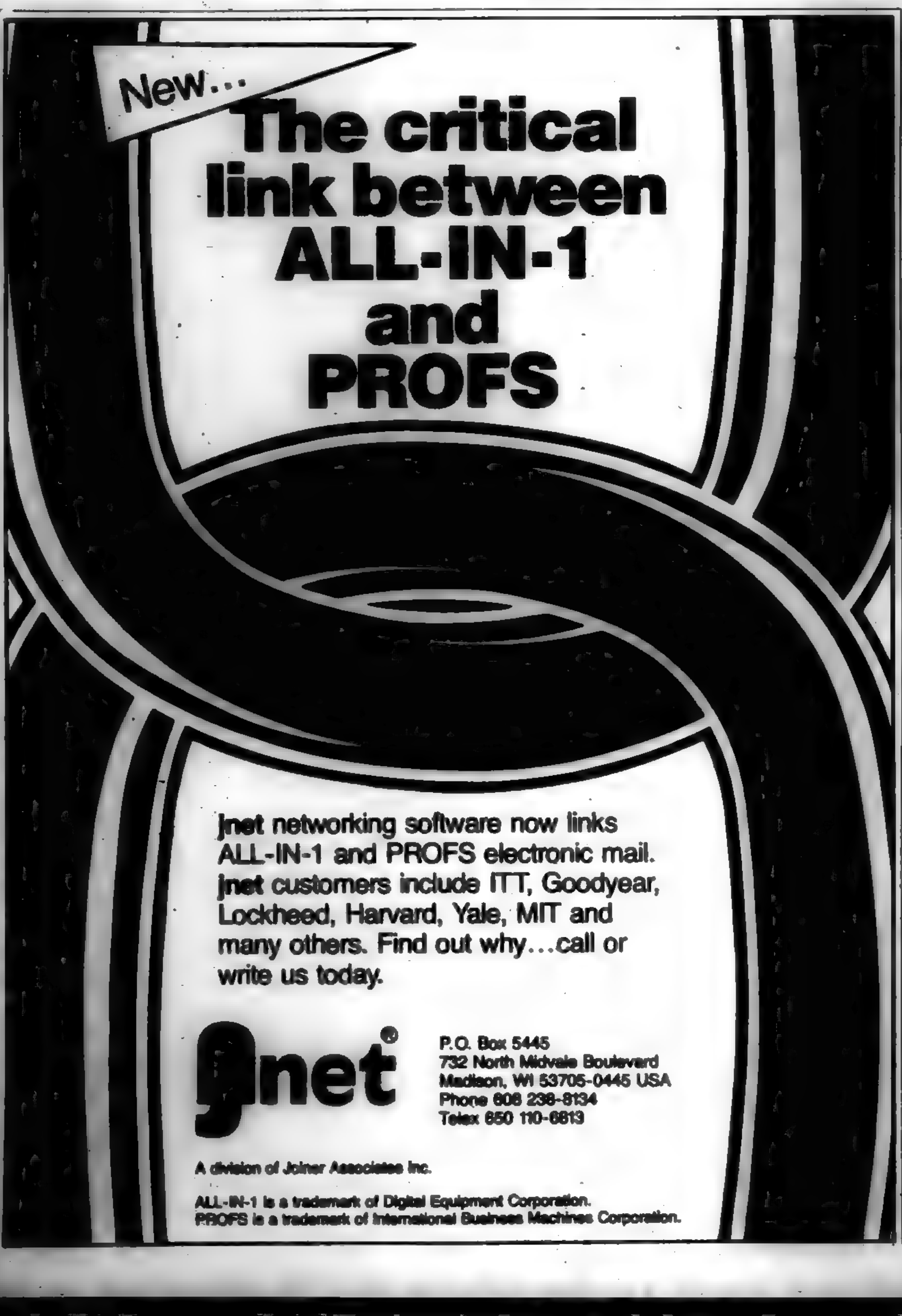
For example, the German electronics giant Siemens AG holds one agreement whereby it provides IBM with computer chips as well as a second agreement to distribute IBM 3380 disk drive systems. The most important contractor for IBM Deutschland might be Triumph Adler (TA), a Nuremburg-based typewriter maker. In a joint venture, TA supplies IBM with OEM equipment for the U.S. market.

For the past year, IBM has sought greater influence in universities and research centers. Such well-known universities as Karlsruhe and Heidelberg received large amounts of computer equipment as gifts. IBM is sending scientists and others to universities to support research projects.

IBM enjoys a long-standing research and development partnership with Gesellschaft fur Mathematik und Datenverarbeitung (GMD) near Bonn. The GMD was founded by the federal government as an institute for research in information and communications technologies.

In terms of government contracts, IBM won an order for the installation of the postal and telecommunications authority's national videotex network. It also landed a contract for the German Postal Services' "Audi Project," an automatic telephone information service project. Such spectacular orders are crucial to IBM's strategy for retaining market dominance.

> ***IBM has sought greater influence in research, partly through gifts of computer equipment to such well-known universities as Karlsruhe and Heidelberg.***



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Dutch control complex SNA

By Hans Braggaar, Deputy Editor
Computerworld Benelux

ZOETERMEER, Netherlands — IBM's most advanced and most complex Systems Network Architecture (SNA) network is controlled from here. With special software, the 25,000 SNA users worldwide potentially may access the International Network Services (INS).

This physical network with controlling computers delivers several IBM service bureau offerings. Among them are the UK-developed Application System software, the relational Business System 12 (BS12) software system (developed in the Netherlands) and videotex and on-line data base services, all grouped under the heading of International Business Services (IBS).

"Zoetermeer is the home of IBS, an umbrella offering with direct communications lines to 13 European countries, the U.S. and Japan," says Ashley Lattimer, sales manager for IBS. The worldwide INS uses physical networks offered by the European Postal Telephone and Telegraph services and also dedicated links to Israel and South Africa. The services offered through IBS are available in another 37 countries around the world.

"The Application System software is moving toward becoming IBM's mainstream information center product as a licensed software product and as a service bureau product," Lattimer says. The software was announced for the U.S. market two years ago.

Under the direction of British developer Tony Temple, Application System has emerged into a strong fourth-generation applications development language and decision support tool, popular in Europe and elsewhere. For the past two years, the software has gained acceptance in the U.S. as a product with a Europe-only history but with a promising future.

Since the early 1970s, IBM's service bureau (Data Centre Services) was a Europe-only affair. IBM sold its U.S. service bureau to Control Data Corp. in 1970. The Netherlands became the European know-how center for international computing, providing the operational expertise for the International Business Services offering. Much of the company's software development

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for internally used networks is done at one of IBM's larger development centers in Uithoorn, Netherlands, which controls a network of 30,000 workstations.

Under the IBS umbrella, IBM offers its BS12 software system. The system uses 12 relational commands to manipulate large volumes of data, including data entry and transaction processing. At the moment, Europe is the prime market for selling the BS12 services, according to Lattimer.

BS12 is based on E. F. Codd's publication "A Relational Model of Data for Large Shared Databanks" (1970) and was developed in Uithoorn in a joint venture with two Dutch scientists: Gerrit Baauw (former IBM Poughkeepsie, N.Y.) and A. J. W. Duijvestijn of the Twente Polytechnics in the Netherlands.

Under the direction of Dutchman Frits Carels at the Uithoorn center, BS12 became the primary tool for handling large volumes of multidimensional relational data structures, equivalent to SQL/DS and DB2 in the U.S. Lattimer says, "Under IBS, the power of BS12 can be combined with the user-friendliness of Application System."

> *The Netherlands became the European know-how center for international computing, providing the operational expertise for the International Business Services offering.*

Data is displayed by using the Graphical Data Display Manager. Both AS and BS12 run under IBM's Virtual Storage Personal Computing time-sharing service. SNA gateway software is installed in the NCP/VTAM domains of International Network Services network systems and SNA user networks worldwide.

Today, 3081s in Tampa, Fla; Zoetermeerm, Netherlands; and Tokyo support all computing and processing for the worldwide International Network Services network, while 4381s running MVS/XA handle all network activities and network management.

Early in 1984, the European International Network Services organization based in Brussels became an independent business unit of IBM. IBM operations in each European country run their local Information Network Services with the IBS network, controlled from the Netherlands in the middle. "Now we are in a strong position to extend on a global basis our services offerings," Lattimer says.

In Zoetermeer recently, a dedicated International Briefing Center was established. An advanced "electronic boardroom," as Lattimer calls it, the center is a place where international DP executives from IBM and guest speakers can discuss the role of data processing and international computing using the latest data processing technologies.

IBM thriving in foreign sites

By Amiel Kornel, International Editor
CWN Europe

PARIS — Calling the U.S. economy the main culprit in the current computer industry slowdown, IBM President and Chief Executive Officer John Akers said last month that IBM expects revenue growth in 1985 to come from markets outside North America.

Akers, speaking at a meeting of investment analysts in Scotland, expressed satisfaction over the company's overseas business, placing most of the blame for lower revenue on the U.S. economy. He pointed out that in Europe, the Asia-Pacific area and Latin America, IBM's business has been growing very well, with shipments exceeding last year's by healthy rates.

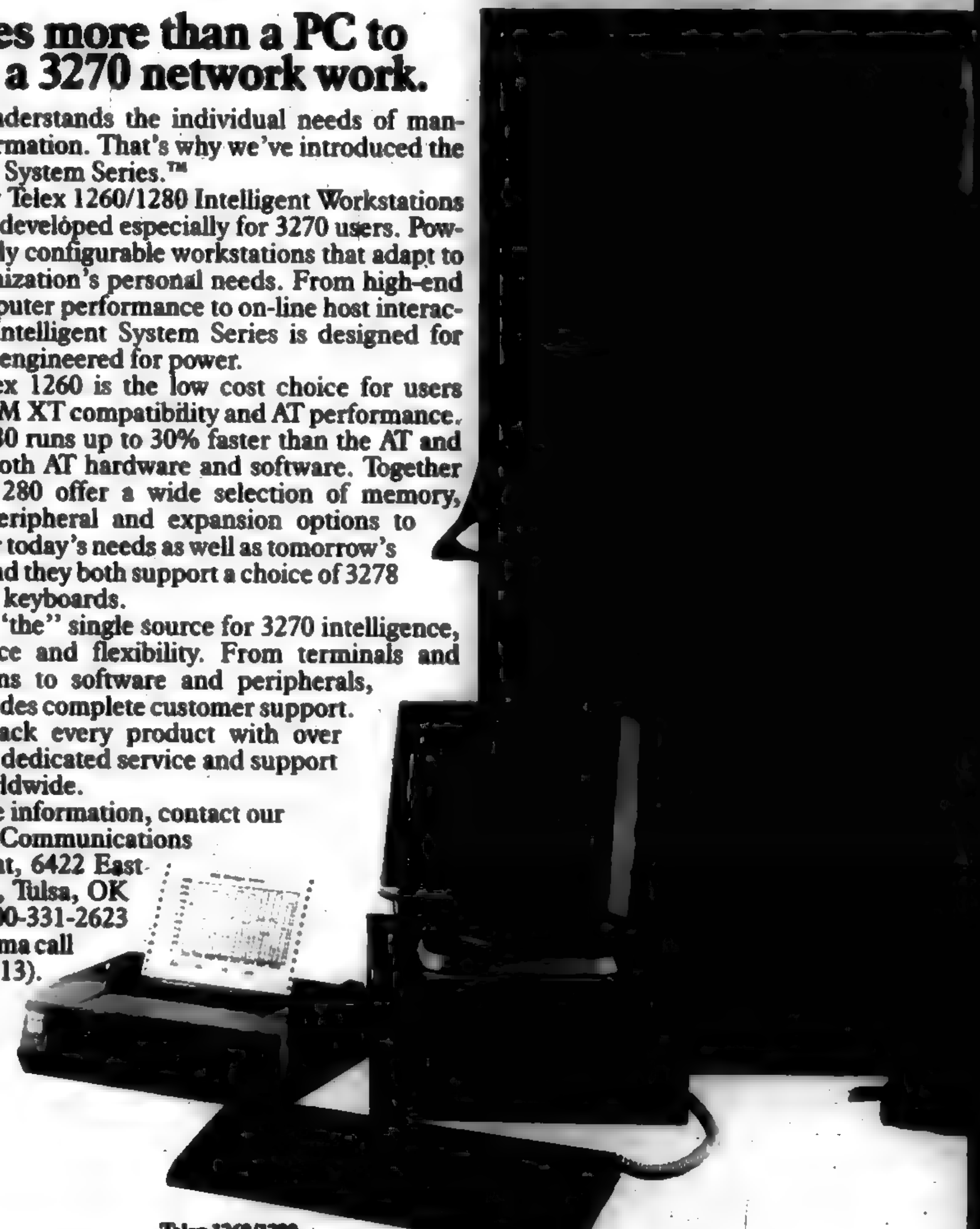
Presentations by top corporate officials emphasized the healthy picture of IBM's overseas subsidiaries.

"Through October, we continued to ship worldwide at rates ahead of 1984," Akers said, "with essentially all the growth coming from outside North America." He expressed pessimism over the chances of an improvement in the U.S. economy in 1986.

Allen Krowe, IBM senior vice-president, underscored Akers comments by saying that the strength of the dollar had masked the healthy growth of the company's foreign units. "In the currencies of our individual countries, our business is even stronger, but its strength is being masked by the recent high levels of the U.S. dollar," he noted.

Krowe also said that although a decline in the number of IBM employees in the U.S. is expected up to the end of the year, there will be "healthy increases in employment" in Europe and Southeast Asia.

But while stressing the importance of IBM's foreign business, he warned: "Countries with high corporate tax rates may find themselves at an increasing disadvantage in attracting foreign investment."



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Some European governments are under pressure from local businessmen who are irritated about tax breaks offered to U.S. and Japanese companies as incentive to expand subsidiaries in those countries.

Long-term prospects good

Akers said that long-term prospects for the industry and IBM are good. In addition to citing accelerating product cycles and decreasing production costs, he pointed out that the growing possibility to compete in areas such as telecommunications that have been under government control in many countries "spells opportunity for our industry and our company."

Kaspar Cassani, chairman of IBM Europe/Middle East/Africa, noted procurement contracts and joint ventures with major European firms as examples of ways in which IBM is fortifying its overseas position.

He said IBM would continue to increase procurement from outside companies, a concept worth $1.6 billion in 1984. IBM currently has contracts with Siemens AG of West Germany, France's Thomson-CSF S.A., N.V. Philips of the Netherlands and others to supply items such as chips and VDTs.

Cassani added that the production schedule of the company's new 3090 series was being accelerated at the Montpellier, France, plant that serves all Europe.

> *In Europe, the Asia-Pacific area and Latin America, IBM's business has been growing very well, with shipments exceeding last year's by very healthy rates.*

CE AT WORK

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A good citizen in Denmark

By Jens Michael Damm, Chief Editor
Computerworld Denmark

COPENHAGEN — Denmark is one of the most IBM-dedicated nations in the world. It is no coincidence that IBM is six to 10 times larger than its closest competitors — NCR Corp., Olivetti and Sted, Ericsson Ltd. and Denmark's RC Computer.

The "hit lists" prepared by International Data Corp. Scandanavia for the Danish computer market show that IBM is almost always an uncontested first, both in installed base and in profit for 1984. Whether it be deliveries for state institutions or private enterprise, the result is the same.

In 1984, IBM Denmark A/S achieved a gross sales volume of $374.2 million (U.S.), or $40 million more than in 1983. In 1985, the total is expected to be well above $400 million.

After taxes, the balance was $49.8 million in 1984, and IBM sent the Danish government a check for $32 million worth of taxes, which makes IBM one of the biggest taxpayers in Denmark. The previous year, the tax bill was $27.7 million.

If one looks at the turnover, IBM's 2,151 employees each sell $170,000 worth of computer products, hardware and software. IBM is also among Denmark's largest exporters. In 1984, exports amounted to $65.7 million. The value of IBM's exports is expected to exceed $100 million this year.

IBM, which from 1920 to 1950 was represented here by an agent, has in recent years made a considerable effort to rid itself of its multinational image. The "foreigner" image does not go down well with the Danish mind; consequently, IBM makes an effort to become a well-adjusted citizen — just look at the amount of taxes the company paid. Taxes paid by the international oil companies are considerably less.

IBM does not want to be simply an import industry with little export. The endeavors to become a good Danish firm are expressed in IBM Denmark's subcontractor program, International Procurement Office (IPO). Ninety-seven Danish industries deliver power supply units, printers, printed circuits and plastic cabinets for IBM plants around the world. They include, among others, the ITT company — Standard Electric — which produces the electronic content of IBM's 4201 Proprinter.

The value of the total IPO labor is about $30 million to $40 million. The IPO project provides work for an additional 300 employees found in 100 plants across the country.

In spite of IBM's dominance, the company is not sleeping contentedly. On the contrary, it expects to expand soon with a new office building of more than 100,000 square meters in the beautiful countryside north of Copenhagen.

In the middle of 1986, IBM will also begin building a 10,000-sq-meter seminar center here, which will relieve the IBM center at Liding, Sweden.

IBM International

Although officially the price of the 3090 has not been adjusted since its announcement, prices offered recently by IBM salesmen are well below catalog value.

In France, sales slipping

By Jo Cohen, Associate Editor
Le Monde Informatique

PARIS — Faced with slipping sales of its 3080 mainframes and poor performance by third-party dealers that distribute System/36 and 38 minicomputers and Personal Computers, IBM France is struggling to attain an "honorable" revenue by year end.

To succeed in presenting a serene image of its 1985 sales figures, IBM France might be obliged to dip into orders planned for the next financial reporting period, many analysts say.

Its most troubling sector is probably the large-systems market. Since the arrival of its 3090 series, IBM's French subsidiary has experienced a slowdown in sales of its 3080 models.

At IBM's Montpellier factory in southwestern France, where the big systems are manufactured for all European markets, an unsold stock of nearly 100 3080s are awaiting buyers. Although officially the price of these machines has not been adjusted since the announcement of the 3090, the prices proposed recently by IBM salesmen to several clients are well below catalog value. IBM-compatible makers such as National Advanced Systems Corp. and Amdahl Corp. already have reacted by lowering prices.

The reduction in sales of the 3080 is partly caused by many users deciding to wait for the introduction of the monoprocessor model of the 3090, the 3090 Model 100, expected for the beginning of 1986. This machine, with a performance of 14 million instructions per second, would compete directly with the 3081, already four years old.

What's more, secondhand 3080s have become the main competitors for new 3080 sales. The secondhand market for IBM machines has never been better, according to several computer service companies.

To maintain revenue in this difficult context, IBM is expected to deliver more 3090 Model 200s than initially forecast for France — 25 units shipped to clients by the year end, according to sources. This new delivery schedule would represent additional revenue of more than $150 million.

The company's problems at the lower end of its product line appear to be different than those rattling the mainframe sector. The problem is less one of international marketing strategy and more one related to difficulties specific to the national market. IBM's policy for low-end products is to make use of third parties, from which it hopes to garner 50% of its revenue.

The commercialization of the System/36 demonstrates this approach. Computer service companies have been contracted as agents by IBM to sell the machines. According to IBM dealers, the System/36 is selling fairly well. But a quota system imposed recently by IBM France suggests that sales here are considered insufficient when compared with the product's potential and with sales in other countries.

The disappointing results in France originated in structural problems, analysts say. Dealers are often small companies whose commercial resources are not sufficient for selling large numbers of IBM System/36 machines.

The situation concerning the Personal Computer is similar. Insiders agree that IBM will not achieve its sales quota. Projections range from 35,000 to about 50,000 units, compared with IBM's original forecast of 80,000 units to be sold by the end of the year. Once again, the reason for the lack of sales, analysts say, is a lack of strong partners at the distribution level. To this structural problem, specific to the French market, one can add several errors in marketing that have been corrected only recently. The Personal Computer was presented to potential dealers at the French launch as a machine geared towards small and medium-size companies. The notion of selling it as a productivity tool for managers of large companies was introduced only recently in IBM's discussions with dealers.

This year will likely be an important one in IBM's development here. The company has placed an emphasis on the sales of its systems; in the past, leasing was at the base of the company's force and stability. About 10% of the revenue now comes from leasing, compared with more than 50% at the end of the 1970s. This change puts the company in a greater position of vulnerability, as this year's worldwide results indicate.

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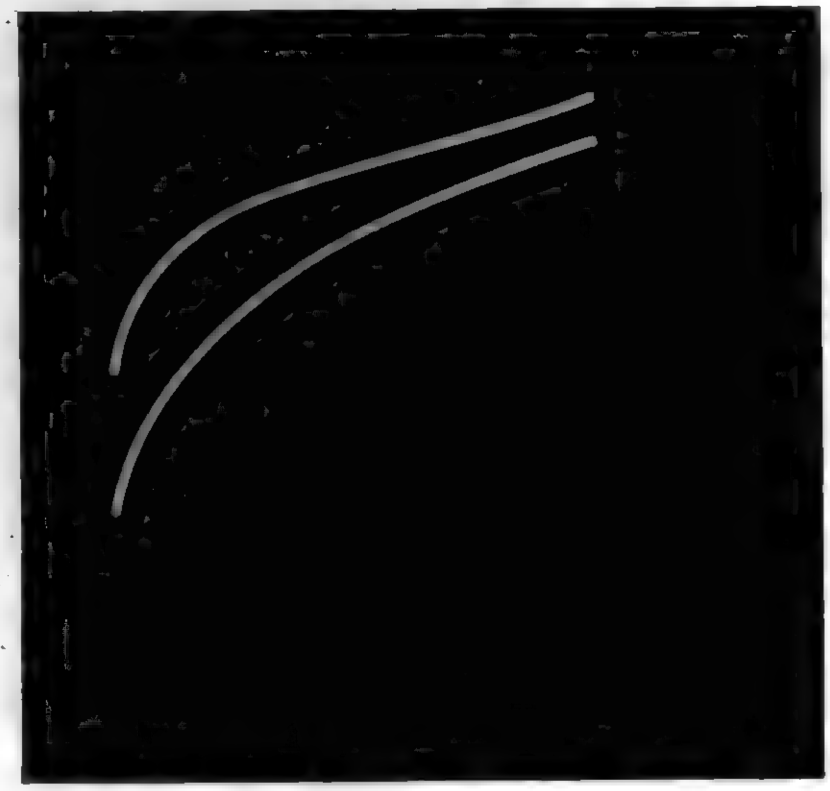

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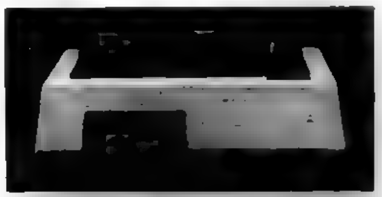

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IBM International

Lion's share in Sweden

By Peter Tegelberg, Staff Writer
Computerworld Sweden

STOCKHOLM — Software and peripherals currently drive the growing market for IBM products in Sweden. In 1984, IBM Sweden employed 4,200 people and saw a turnover of $739 million (U.S.), up from $718 million in 1983. Net profit was $44 million (in 1983, $32 million).

Export sales accounted for $263 million gross (in 1983, $237 million), of which the lion's share came from products manufactured at the Jarfalla plant just outside Stockholm. The increased export sales reflect a growing demand for the plant's two main product lines — printers and controllers for disk storage systems.

> ***The 3090 sits at the top of the line, but the IBM Personal Computers are heavily advertised. Analysts expect IBM Sweden during 1985 to sell about 14,000 micros, which would represent a 50% market share.***

The 3090 currently sits at the top of the line, but the IBM Personal Computers and the smaller minicomputers are heavily advertised. Analysts expect IBM Sweden during 1985 to sell about 14,000 micros, which would represent a 50% market share. The price of a standard Personal Computer with 256K-byte memory, two disk drives and a monochrome screen is $3,168, excluding value-added tax.

At the same time, there are few software programs on display in most IBM computer stores. Mainly they are the company's own. IBM, however, regularly compiles a catalog listing all Personal Computer programs available. Five programs in the Assistant series were released in Swedish versions at $150 to $190 each.

Software focus

In the U.S., IBM made a strategic decision to increase its share of software sales from 10% in 1984 to more than 30% in 1994. In accordance with this goal, the IBM Nordic Laboratories, located outside of Stockholm, is growing fast. Currently, the laboratory employs 200 people, and frequently advertises for new personnel. The laboratory once developed special hardware products but now focuses entirely on software development in three areas:

- Financial systems — Financial Management Systems (FMS), used for producing financial reports; versions are available for large and medium-size companies.
- User-friendly products — Application Prototype Environment, a fourth-generation development tool.
- Plan and follow-up systems for large computer centers — Service Level Reporter to measure service level according to specifications such as response performance. Operation Planning Control for planning the operation in a computer center.

IBM markets worldwide all products developed at IBM's Nordic Laboratories.

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Ask IBM

Computerworld Extra *solicited the following questions from five executives in large computer-user organizations. We then asked IBM to respond.*

Kenneth King, vice-provost for computing at Cornell University in Ithaca, N.Y., asks, "IBM is partner with Cornell in the creation of a national supercomputer center, based on a large-scale IBM host with Floating Point Systems, Inc. attached scientific processors.

"How serious is IBM about marketing to the high-end scientific and engineering fields in the long-term? Does IBM intend to develop higher performance products with power comparable to the machines being developed by major Japanese companies?

The IBM 3090, with outstanding scalar and parallel capabilities, and the recently announced 3090 Vector Facility are examples of IBM's continuing interest in and commitment to high-end scientific and engineering computing requirements.

Projects such as the Cornell study and others in which IBM is a participant further demonstrate IBM's corporate commitment to providing products and services that address these requirements.

Continued research into such areas as very large-scale integration will provide the technology foundation for increased computer system power and flexibility. IBM will continue to enhance product offerings to meet the needs of our customers.

Ken Palmer, vice-president of information systems technology at the Western-Southern Life Insurance Co. in Cincinnati, asks, "What breakthroughs in artificial intelligence might we expect from IBM between now and the early 1990s, particularly for financial institutions? How might these breakthroughs affect traditional MIS organizations and/or MIS' role in the corporation?"

IBM has a long history of accomplishments in the field of artificial intelligence, an umbrella term applied by computer scientists to complex problem solving, perception, reasoning, planning and other functions associated with human thought.

IBM's contributions to the field of artificial intelligence are most appropriately characterized as part of the continual evolution of computer systems, rather than as "breakthroughs."

IBM offers four mainframe products that use artificial intelligence techniques: Expert System Environment/VM, VM/Prolog, LISP/VM and Intellect.

We believe that there is great potential for using AI techniques effectively in a broad range of applications, including the financial and insurance industries.

IBM also believes that AI techniques can be integrated into existing MIS departments and can help the departments be more responsive to the changing needs of end users.

While would not speculate on future products, research continues on expert systems, computer algebra, natural language processing, speech recognition, handwriting and character recognition, robotics and vision.

Larry Myerley, manager of technical support services for Cities Service Oil and Gas Corp., Tulsa, Okla., asks, "Users have stated their requirements for integration of data associated with an installation's management of various IBM product lines and environments.

"This concept of a single, central repository of data for hardware/software management, networks, applications support and administration has not become a reality but seems to be a strategic direction.

"What is IBM's current position and direction for the development of such a facility?"

We are continuing to explore technical alternatives to satisfy the requirement for a data management facility. Beyond saying that, we will not speculate about future plans.

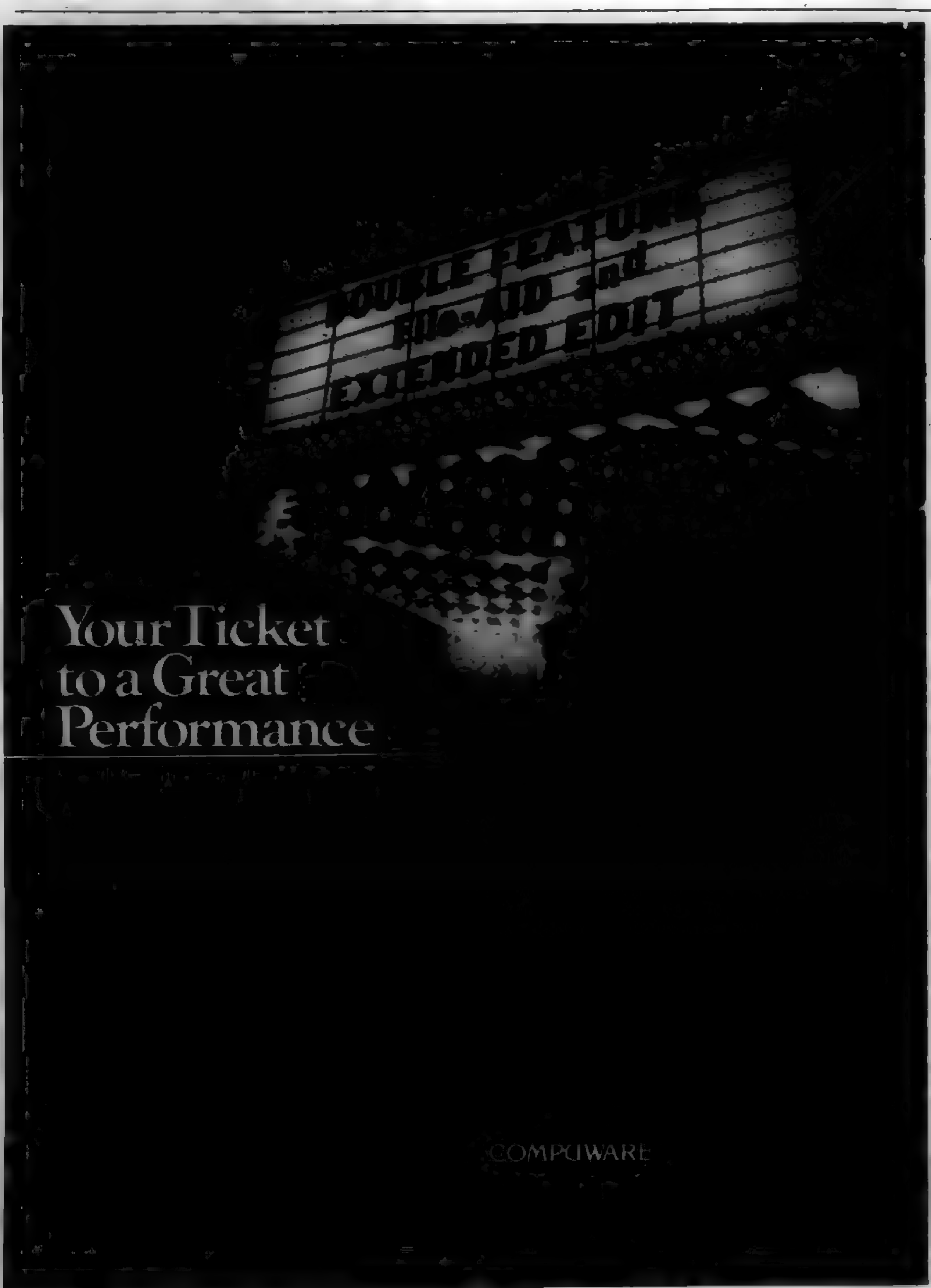
Ken Gabrys, manager of computer facilities and operations for Amoco Corp. in Chicago, asks, "There is an emerging requirement for on-line business functions for continuous processing 24 hours a day, seven days a week.

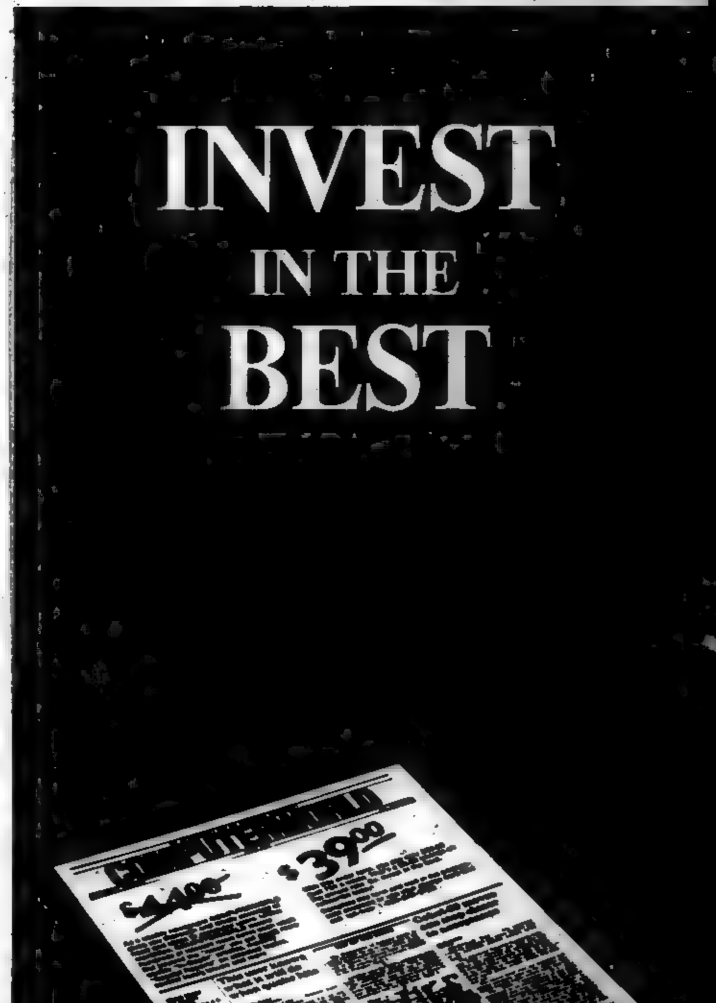
"In the 3080 and 3090 hardware environment using the MVS operating system with either the CICS or IMS subsystem, how will I be able to address this requirement in a straightforward way, looking at both reliability and maintenance?"

Two of the IMS development group's high priorities have been and continue to be supporting the high-end customer's growth rates and achieving higher availability for IMS end users. The February 1985 announcement of the 3090 and IMS/VS Version 2 with XRF is a clear demonstration of this commitment.

The IMS development team continues to place high priority on further reduction of the requirement for scheduled outages and minimizing the impact of unscheduled outages.

The recent CICS/OS/VS 1.7 announcement demonstrates our efforts to improve CICS/VS continuous operations and availability.

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Ask IBM

The Resource Definition On-Line function now allows definition of VTAM terminals, Multiregion Operation and Intersystem communications sessions, MVS operating system consoles, programs, transactions and maps to be added or changed on-line without the need to stop CICS operation.

The automatic installation facility allows VTAM terminals to be defined dynamically when the user logs on. CICS/VS also shows significant improvements in the time it takes to initialize or restart CICS, further reducing the impact of planned or unplanned outages.

In addition, IBM has made a statement of direction that it intends to improve the availability to the Systems Network Architecture terminal user of a CICS/OS/VS subsystem in a MVS/XA environment by enhancing the CICS recovery process with selected XRF functions to be consistent with CICS structure and facilities.

John Hogan, head of technology and strategy for European consumer business at Citibank, N.A., in London, asks, "For virtually any software problem an installation encounters, there is usually a solution within the IBM product line. The difficulty is trying to get multiple solutions to run together in the same environment. One of the best examples is in various on-line software products, where there are a million different editors available, such as those under TSO, CMS, word processing software . . . the list goes on. Right now they each have a different style of communication with the user.

"A more significant example is in the data base world of IMS, DB2 and System/38. IBM's Data Dictionary supports different data base management products unequally, or not at all in some cases, which creates problems for people trying manage data bases. When will IBM strengthen the role of the 'keeper of the standards' and develop an overall architecture?"

No response.

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Whether in telecommunications or computers, IBM is reaching out in all directions.

MEET THE CHALLENGE IN 1986 AT GENERAL ELECTRIC

OPPORTUNITIES IN: NASHVILLE, TN and WASHINGTON, DC

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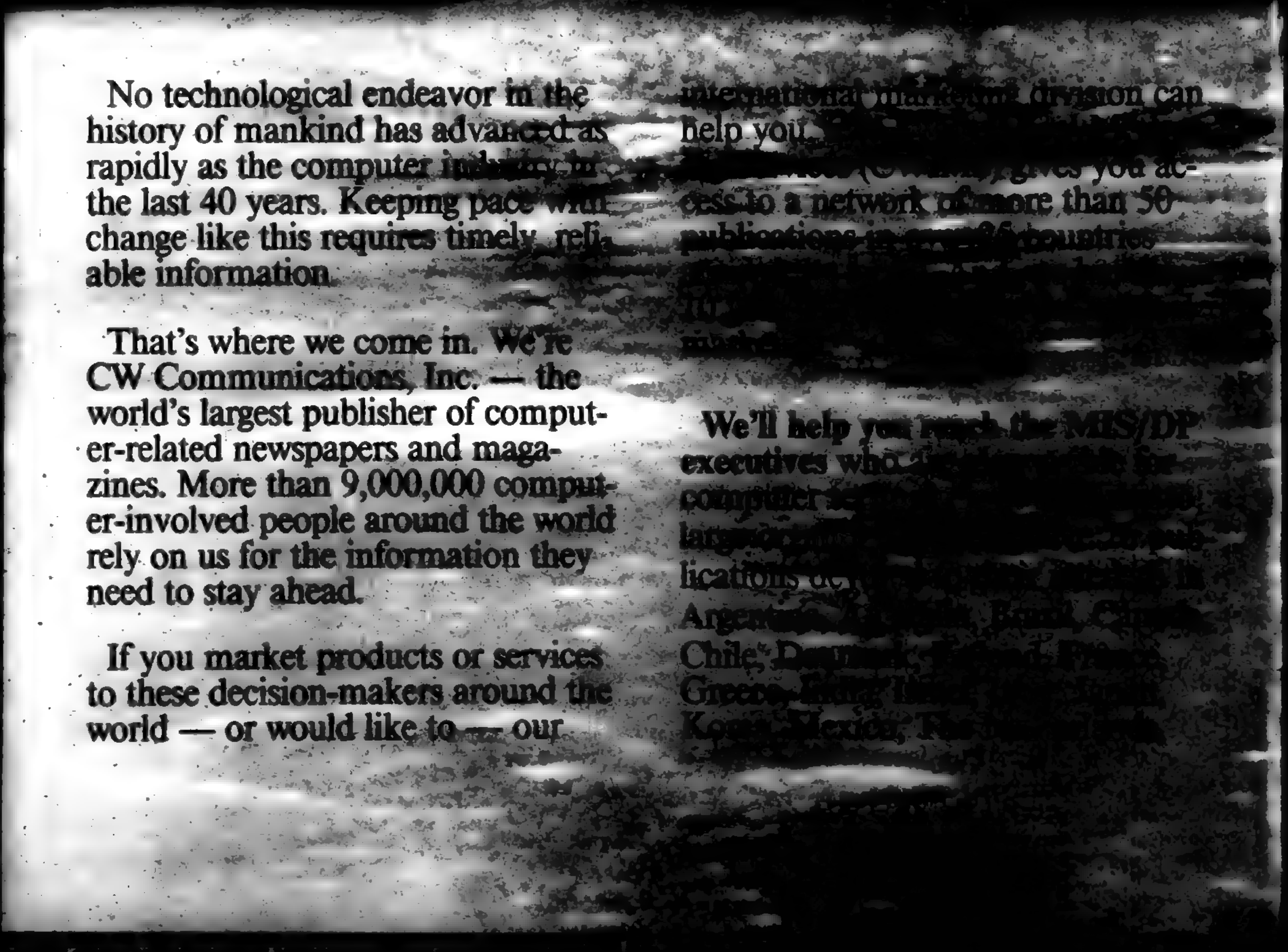

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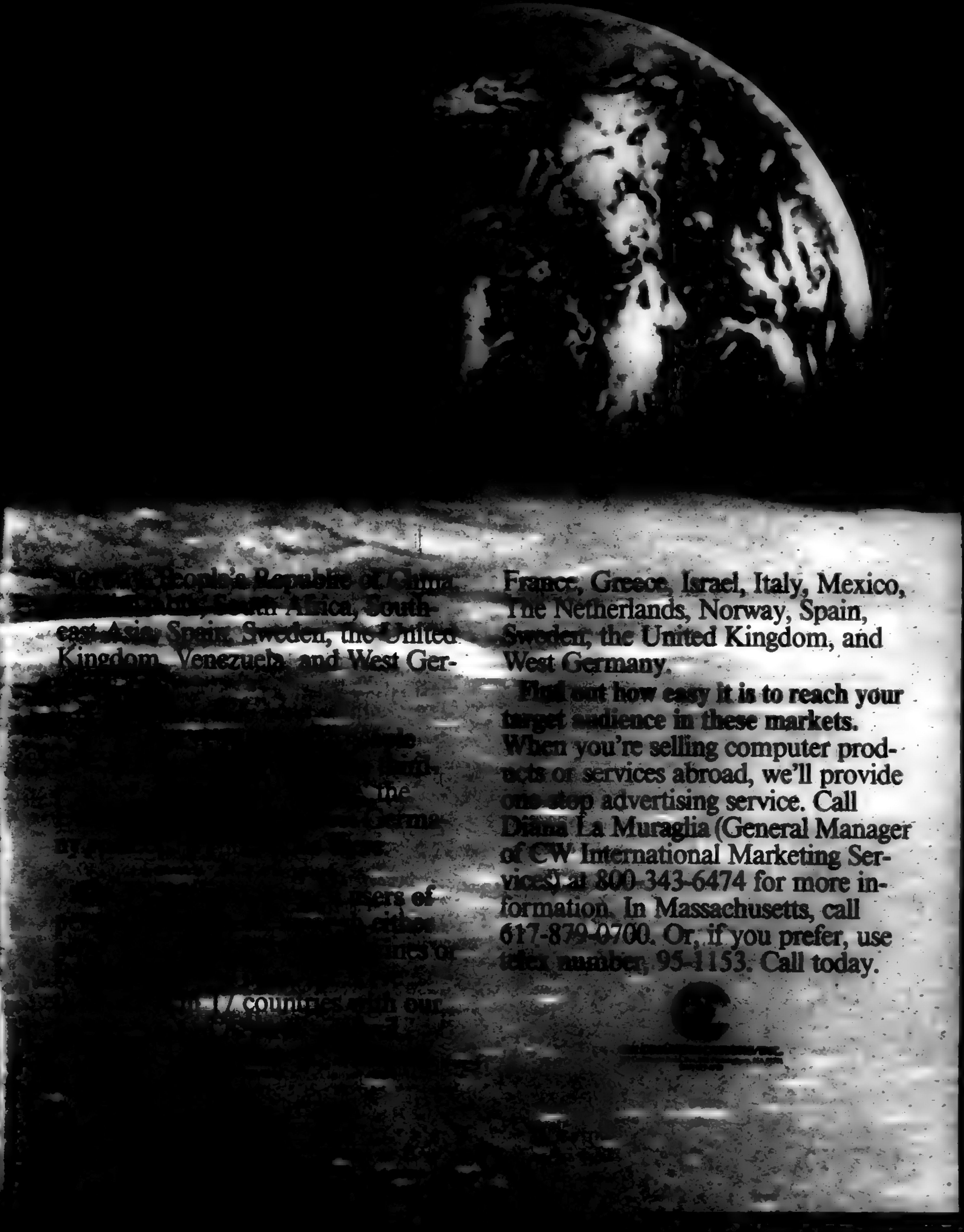

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TOP OF THE NEWS

Some users of the IBM 3090 mainframe have saved as much as $60,000 by retrofitting power supplies used with earlier processor models. Page 35.

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The new version of Lifetree Software, Inc.'s popular Volkswriter word processing program includes mathematical functions. Page 41.

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Pentagon officials continued the push for suppliers to provide documentation electronically. Page 2.

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The field marshal for IBM's applications software strategy defended pricing policy and countered critics' charges. Page 14.

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Ken Fisher's Encore Computer Corp. said it will dismiss part of its work force and fold some products. Page 4.

■

Apple Computer President John Sculley reportedly said last week that future Apple products will use the AT&T Unix operating system. Sculley made the comment when he was questioned by reporters outside a Silicon Valley forum, but the company refused to confirm that report. "It may or may not be true. I have no way of knowing," Apple spokeswoman Linda Merrill said. Anticipation is building for Apple's traditional product unveiling at its Jan. 24 stockholders meeting.

■

Insiders at AT&T Information Systems confirmed and further described a forthcoming IBM Personal Computer-compatible laptop computer, dubbed Safari 7. The device, which looks like a briefcase with a handle when the flip-up screen is closed, boasts a 9½-in. diagonal LCD screen said to be next-generation in clarity, resolution and contrast. The adjustable 25-line by 80-col. screen has 640 by 200 picture elements and can, through shading, simulate four colors. A user-installable LCD backlight option enables use in poorly lit areas. Safari 7 weighs 14 pounds without bat-

See NEWS page 5

Wall Street snubs DBMS

By Charles Babcock

NEW YORK — The major players in the booming securities industry are relying on aging or outdated data management systems, according to a *Computerworld* survey of leading brokerage houses.

The typical brokerage environment today is a mixed one in which some tasks are allotted to a data base management system like Cullinet Software, Inc.'s IDMS, but heavy production processing remains in the hands of an older system, typically IBM's VSAM file management system. Even at securities industry leader Merrill Lynch & Co., which is converting to a central DBMS, the system of choice is IBM's IMS, first introduced in 1969.

See WALL page 13

Microcom opens modem standard

Vendors choose up sides in network protocol fray

By Bob Wallace
Special to CW

NORWOOD, Mass. — Modem vendor Microcom, Inc. will move to turn the tide in the battle of the network protocols when it releases a large portion of its popular asynchronous error checking protocol into the public domain tomorrow.

The Microcom Networking Protocol, which the firm has been developing and promoting for the past 2½ years, is a method of catching and correcting errors in data transmitted between modems. Both MNP and X.PC, a similar protocol backed

See MICROCOM page 10

DEC clusters 8650 against mainframes

By James Connolly

MARLBORO, Mass. — Taking aim at the IBM mainframe world, Digital Equipment Corp. last week announced a superminicomputer designed to better its VAX 8600's speed by 44% and, when clustered, to match the performance of IBM's largest systems.

DEC's Olsen

In introducing the VAX 8650, DEC President Kenneth H. Olsen essentially dismissed other superminicomputer vendors as serious DEC competitors. These rivals, Olsen contended, sell slower processors and fail to offer the networking and software compatibility provided in DEC's VAX line.

The 8650 was announced only two weeks after DEC's traditional rival, Data General Corp., bettered DEC's previous high-end machine [CW, Nov. 25]. The DG Eclipse MV/20000 supermini features an estimated performance of 5.5 million instructions per second, topping DEC's VAX 8600, with its 4.4-MIPS performance. While the 8650 features an estimated 6.8 MIPS, its $475,000 price tag is twice that of the MV/20000. Additionally, DG offered a dyadic MV/20000 with a claimed performance of 10 MIPS at a cost of $337,000.

Olsen surveyed the supermini battlefield at last week's press conference and commented, "It appears to me that we are the only ones who can offer a full network. We offer complete services for networking. The products are here now and available now."

One DEC official, noting that DEC encounters IBM more than any other vendor in competitive situations, said a cluster of eight 8650s will provide more power than

See DEC page 6

CW EXCLUSIVE

Short order: Denny's scrambles disaster team

By Jeffry Beeler

LA MIRADA, Calif. — A major restaurant chain recently simulated the total destruction of its only corporate data center and successfully completed the first unannounced test of its disaster recovery plan.

Less than 20 hours after reporting the facility "destroyed" in an imaginary fire, Denny's, Inc. had dispatched eight specially trained employees to Dallas and had reactivated its key systems capabilities in a commercial backup data center.

None of the eight participants, whose involvement in the recovery effort began with a series of phone calls that rousted them from bed at 3 a.m., knew ahead of time precisely when the drill would take place. The only Denny's employees who were notified in advance of the Nov. 19 exercise were the company's internal audit staff and its vice-president of information services, Richard Kislowski. "As far as I can tell, it was a surprise to everyone else," according to Evan Ride, Denny's director of computing.

Last month's drill was not the first time that the nationwide restaurant chain had tested the contents of its 400-page disaster recovery manual. Since 1983, Denny's has conducted two such tests each year, one in the spring and the other in the fall. With each succeeding exercise, the firm has introduced an added measure of realism and difficulty as its experience in disaster recovery matters has steadily grown.

But until Nov. 19, Denny's had always carefully forewarned its recovery team members of the next simulated disaster and had even furnished them with exact dates and times. Last April, for example, the group was mustered hastily on a Saturday and plotted its strategy in detail before departing a day later for Dallas and beginning its recovery drill in

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NEWSPAPER

Pentagon pushes for standards

Urges development of text, graphics exchange formats

By Mitch Betts

WASHINGTON, D.C. — Taking a cue from General Motors Corp.'s push to persuade suppliers to use its Manufacturing Automation Protocol (MAP), the U.S. Department of Defense is urging weapons manufacturers to agree on integrated text and graphics exchange standards, Pentagon officials said last week.

The Pentagon's goal is to establish standards so that the technical documents and drawings now delivered in paper form to the military will instead be sent electronically to a digital data base.

At the third annual Defense and Government Computer Graphics Conference, Pentagon officials provided new details about ambitious plans to have defense contractors use their computer-aided design and manufacturing systems to provide the military with on-line repair manuals [CW, Sept. 16]. The program is called Computer-Aided Logistic Support (CALS).

Bruce A. Lepisto, project officer for the Pentagon's Weapons Support Improvement Group, said the department will use its leverage to accelerate the development of text and graphics exchange standards. By 1990, the department expects to be able to require in the contract that contractors transmit technical manuals and drawings for major new weapons systems in digital form, he said.

"Industry architectures are evolving rapidly without DOD interface standards," Lepisto said, "so DOD has decided to drive a stake in the ground and support a set of standards."

DOD to pursue data exchange standards

According to a Sept. 24 memo from Deputy Defense Secretary William H. Taft IV, the DOD will pursue interim and long-term data exchange standards at the same time. The U.S. Air Force has immediately taken the lead to define an interim data exchange standard, including the Initial Graphics Exchange Specification/Product Definition Exchange Specification for graphics and the Standard Generalized Markup Language for text.

These standards are not sufficient, however, because they do not permit the mixing of text and graphics, Lepisto said. The Defense Material Specifications and Standards Office and the National Bureau of Standards will lead the effort to develop more integrated standards, he said.

Russell R. Shorey, director of the Weapons Support Improvement Group, said the CALS program began about two years ago when defense contractors, who were increasing their investments in computer-aided design and manufacturing, warned the DOD that it was being left behind.

Harvard, IBM train MIS faculty

By Eddy Goldberg

BOSTON — The Harvard Business School has teamed up with IBM in a project to produce top-level faculty for teaching positions in the MIS field.

The purpose of the $2 million, four-year joint project announced last week is to overcome the present shortage of qualified MIS faculty and to increase leading-edge research in MIS.

"One thing we've been worried about is the lack of faculty to fill several hundred teaching positions across the country," said Prof. F. Warren McFarlan, who is coordinating the project at Harvard. McFarlan said that many computer courses at colleges and universities are being closed out because of the teacher shortfall. He views the problem as a long-term phenomenon and sees a continuing need for expanding the program.

Program to train mid-career executives

In addition to bringing students up through the school's three-year doctoral program in information systems, the project also will offer a 16-month program to train mid-career executives. "We're looking for people with successful careers in the information field, from MIS departments or software research groups, for example, who have reached a point where they'd like to take a shot at a university teaching position," McFarlan said.

He added that even the best universities have difficulty recruiting high-quality faculty in the information systems field, citing Stanford University in California as an example.

According to McFarlan, Stanford, unable to recruit satisfactory instructors, has no information systems faculty at its business school.

The joint project, which began this fall, is scheduled to last through the 1988-1989 academic year. After that, the Harvard Business School will continue the program on its own. McFarlan views the $1 million from IBM as "bridge financing to develop the program to get to a steady state of eight to 10 graduates each year."

There are now eight students in the information systems doctoral program. Only two are scheduled to complete their dissertations this academic year, and only four were admitted this past fall. McFarlan said that plans are to admit five or six doctoral students next year and to accept the first two executives for the 16-month Program for Future Faculty. By 1988-1989, he said he hopes to see eight to 10 entrants every year.

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COVER ILLUSTRATION BY ALAN HOPKINS

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Encore trims work force, product line

By [illegible]

MARLBORO, Mass. — Encore Computer Corp. will lay off one-sixth of its work force over the next few weeks and eliminate some products by the end of January, the company said last week.

The superminicomputer start-up, founded by former Prime Computer, Inc. President Kenneth G. Fisher and top executives of Data General Corp. and Digital Equipment Corp., will dismiss 40 employees out of a total of 240.

The 2-year-old company said it intends to trim its line of workstations and focus resources on its flagship product, the Multimax superminicomputer, according to spokesman Charles Casale. But he said the company has a strong cash position with $24 million in reserves.

"If there is still money available to them, they will be a lot better off after the reorganization," said analyst George Colony, president of Forrester Research, Inc. in Cambridge, Mass. Encore has been plagued by too many top-level people with too many different ideas about where the company should go, he added.

The company's stellar management team was headed by founders Fisher, who is chairman; C. Gordon Bell, a former vice-president of engineering at DEC; and Henry Burkhardt, a founder of DG.

However, in recent months, there has been a steady stream of resignations among middle- and top-level executives, including Burkhardt and Vice-President Robert Puffer, along with a half dozen others.

James Pompa, president and chief operating officer of Encore since the beginning of November, has led the reshuffling.

The company will eliminate the entry-level Hoststation 100 terminal and the top-of-the-line $14,000 Hoststation 550 but will continue to offer the $3,800 Hoststation 110, Casale said.

The company said it has shipped one Multimax, which is not yet installed.

U.S. moves on chip dumping

Government files case against foreign vendors

By [illegible]

The Reagan administration dramatically shifted its stance in the international semiconductor industry trade conflict last week, affirming a charge of Japanese chip dumping and preparing to file its own predatory pricing charges against Japanese vendors.

A cabinet-level Economic Policy Group is expected this week to file the first government-initiated case charging Japanese vendors with dumping, or selling below production cost in the U.S., 256K-byte dynamic random-access memory (RAM) chips. In a preliminary ruling last week, the U.S. Department of Commerce took the first step toward imposing duties on Japanese-made 64K-byte dynamic RAM chips with a favorable ruling on antidumping charges filed by Micron Technology, Inc. of Boise, Idaho.

The Commerce Department said last week it had not received recommendations on the 256K-byte chip dispute, but U.S. Trade Representative Clayton Yeutter was quoted as saying an announcement was expected within days.

The San Jose, Calif.-based Semiconductor Industry Association (SIA) acknowledged the upcoming government action and praised the effort. "The proliferation of such cases is an indication that there is widespread abuse of the U.S. dumping laws, which were originally created to protect free and open trade," according to SIA spokeswoman Sheila Sandow. The SIA has officially petitioned for more open chip markets in Japan.

While industry observers conceded that protectionist action in the 64K-byte dynamic RAM market will come too late to help beleaguered U.S. manufacturers, the overall effect of a more aggressive government stance could influence future Japanese corporate behavior.

"There won't be much immediate effect on the market," said Howard Bogert, a vice-president of Dataquest, Inc. in San Jose, Calif. "More important is the psychological effect. I think the Japanese government and businessmen will weigh [the Commerce Department action] as a very important sign of U.S. thinking and modify their future behavior."

Micron Technology, one of the few U.S. firms with a major stake in the low-end memory chip market, hailed the Commerce Department's favorable ruling. "It would seem to indicate that the Japanese are not the low-cost producers that they would like us to believe," said Micron attorney Lawrence Grant, referring to Micron's allegations that Japanese chips are sold well below cost.

The Commerce Department ruling required the Japanese firms cited by Micron to post bonds of various amounts on 64K-byte dynamic RAM chips that they export to the U.S. Based on pricing information it received from the companies, the department required a bond of 94% of the chip price to be posted by Mitsubishi Corp., 18% by Hitachi Ltd., 13% by Oki Electric Industry Co., 8.9% by NEC Corp. and an average of 38.8% by other companies. A source said Mitsubishi's higher penalty resulted from the firm's failure to provide complete pricing information in the investigation.

The Commerce Department is expected to make its final ruling by Feb. 14. If that confirms the preliminary decision, the case will go before the U.S. International Trade Commission (ITC) for consideration of punitive tariffs against the Japanese vendors. The ITC decision, due by March 31, could require the accused firms to forfeit all or a portion of the bonds posted on chips exported starting last week.

Micron and Texas Instruments, Inc. would be the primary U.S. firms directly affected by such penalties, which could result in higher Japanese 64K-byte dynamic RAM prices. A spokesman for TI refused to comment on the Micron case.

EPROM chip case

A decision is also expected early next year in an antidumping case filed by three California makers of erasable programmable read-only memory (EPROM) chips. "We are pleased with the Micron decision, and we hope all goes well with the EPROM case we filed," said a spokesman for Advanced Micro Devices, Inc. Advanced Micro Devices, Intel Corp. and National Semiconductor Corp. have filed the EPROM case, charging dumping by some of the same Japanese companies named in the 64K-byte dynamic RAM suit.

Separately, three of Japan's leading chip vendors said they have delayed or are reconsidering plans to expand their chip production facilities in the U.S. The delays will affect proposed plants to be built by Toshiba Corp. in California, Hitachi in Texas and Fujitsu Ltd. in Oregon.

In a related development, NEC announced a 20% price increase on its 64K-byte and 256K-byte dynamic RAM chips, a move greeted with skepticism in the U.S. "It's like a move in judo, where the object is to use your opponent's momentum to make him fall on his face," Dataquest's Bogert said. "Now that the U.S. has essentially conceded that market, why not raise the price?"

Computerworld West Coast Correspondent Maura McEnaney and Asia Bureau Chief Takahisa Kondoh contributed to this report.

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Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (5 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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POSTMASTER: Send Change of Address to Computerworld, Circulation Department, P.O. Box 1016, Southeastern, PA 19398-9984.

Amdahl hikes high-end disk drive capacity

By James Connolly

SUNNYVALE, Calif. — Amdahl Corp., seeking to serve its own line of mainframes and to answer IBM's high-end disk drive additions, last week doubled the capacity of the Amdahl 6380 series of drives.

The 6380 Models AE4 and BE4 are intended to address the storage needs of existing Amdahl mainframes, other IBM-compatible mainframes and the high-end Amdahl 5890 series of processors announced in October and scheduled for delivery in 1986 and 1987. The storage systems were designed to be compatible with the 5.04G-byte IBM 3380 Model E disk drives announced in February.

Amdahl officials said the new 6380 models double the capacity of previous 6380 models to 5.04G bytes while continuing to use Amdahl's sealed disk enclosure technology, high-density packaging and the same floor space as earlier 6380s.

The AE4 string controller reportedly can be attached to the current Amdahl 6880 Model G2 or G2E control units. In addition, the string controllers can be intermixed with new BE4 or existing 6380 Model M4 or 6380 Model B4 models.

An AE4 costs $104,110, and a BE4 costs $78,510. Upgrades from the 6380 Model AA4 to the AE4 and the B4 to the BE4 cost $40,000. The M4 single-capacity model can be upgraded to the B4 for $9,750. A typical 20G-byte configuration, consisting of a G2 controller, an AE4 and three BE4s, costs $398,610 plus a monthly maintenance charge of $1,143.

E models will be available in the fourth quarter of 1986 and field upgrades in the first quarter of 1987.

TOP OF THE NEWS

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teries and measures 16 inches across, 3½ inches high and 13¼ inches deep. Features include two Harris 80C88 microprocessors; 256K-byte random-access memory, expandable to 1M byte; a 360K-byte so-called Silicon Disk; and a 360K-byte 5¼-in. floppy disk drive. A 10M-byte hard disk drive is optional. Safari 7 may be announced in a month or two, sources said.

■

The microcomputer software industry's largest acquisition deal was completed last week as Ashton-Tate purchased Multimate International Corp. Ashton-Tate claims that the move makes it the world's second largest independent micro applications software vendor, with outsiders estimating that total revenues will exceed $140 million. The final purchase price was about $22 million in cash, up from the $19 million stock and cash combination outlined when the deal was announced last summer. No immediate changes are foreseen in Multimate products or distribution.

Elxsi expands System 6400 multiprocessor

Twelve-CPU model designed for Gigabus

By James Connolly

SAN JOSE, Calif. — Elxsi, a recently acquired subsidiary of Trilogy Ltd., is scheduled to announce expansion of its System 6400 multiprocessor with the addition of two processors to the existing 10-processor maximum configuration today.

The expansion is said to be designed to take better advantage of Elxsi's Gigabus 320M-byte/sec. system bus. A company spokesman said the enhanced system performs 72 million Whetstone instructions per second, compared with 60 million Whetstones in the earlier maximum configuration.

Elxsi, which introduced the parallel processing System 6400, was acquired by Trilogy in October and plans to build future products using integrated circuit packaging and other technology developed by Trilogy during the parent company's attempts to build wafer-scale circuits.

Elxsi reportedly modified its message-based EMBOS operating system to handle the additional processors in the expanded System 6400. The System 6400 also was designed to run AT&T Unix System V and University of California at Berkeley Unix 4.3.

Each of the 12 processors includes three boards utilizing emitter-coupled logic and large-scale integration proprietary gate arrays. The system reportedly features up to 4G bytes of virtual address space per processor and a central computer memory of up to 192M bytes.

The 12-CPU system is housed in two cabinets, each 32 inches deep and 59 inches wide.

Elxsi officials said the System 6400's performance is comparable to that of a Cray Research, Inc. Cray-1S supercomputer in many applications such as circuit design, aerospace research and seismic simulation.

Available during the first quarter of 1986, a fully configured System 6400 costs $3 million.

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Ada 'Software Valley' in West Virginia

By Mitch Betts

WASHINGTON, D.C. — U.S. Sen. Robert C. Byrd (D-W.Va.) and West Virginia University have teamed up in an ambitious effort to create a "Software Valley" in their state, hoping to lure software development firms specializing in the Ada language to West Virginia.

According to Byrd and his aides, the focal point for the economic development effort will be Software Valley Corp., a nonprofit information clearinghouse for West Virignia high-tech firms that was created earlier this year. It is expected to help the growing coalition of businesses and institutions to share Ada technology, train Ada software engineers and attract high-tech firms to West Virginia.

"The first goal of Software Valley is to assist its members to take part in the total market for Ada software, which is expected to exceed $20 billion annually by 1990," Byrd said at a Software Valley conference held in Morgantown, W. Va., on Nov. 25.

The Software Valley envisioned by the volunteer sponsors would stretch along Interstate 79 from north central West Virginia to the U.S. Department of Defense's Software Engineering Institute in Pittsburgh.

Byrd said one goal is to alleviate the nationwide shortage of Ada software engineers through training programs.

"Ada training will offer West Virginia an opportunity to become the first region that is nationally recognized for Ada software engineering excellence," he said.

To that end, EVB Software Engineering, Inc. of Rockville, Md.; Intermetrics, Inc. of Westboro, Mass.; and Magnavox Electronic Systems Co. of Fort Wayne, Ind., are donating Ada training courses. Verdix Corp. of Chantilly, Va., and System Designer Software, Inc. of Woburn, Mass., are donating Ada software to the university.

In addition to the training courses, the nascent Software Valley Corp. established an electronic bulletin board for information exchange, said it plans a network link from the National Aeronautics and Space Administration's technical archives to the university and established ties to the state's venture capital community.

'Incubator' building possible

Also, the sponsors are seeking state economic development funds to build a Software Valley "incubator" building for start-up companies, according to Byrd's aides.

The aides said that about 250 people attended the Nov. 25 conference, which featured an announcement by Cray Research, Inc. of Minneapolis: Cray said it wants to obtain or develop an Ada compiler for use on its supercomputers.

Byrd said that another specific goal of the Software Valley movement is to transfer the research of the Software Engineering Institute to the commercial marketplace.

DEC clusters 8650, CPUs

From page 1

the IBM 3090 Model 400 quadratic processor scheduled for delivery in 1986.

The 8650 features a cycle time of 55 nsec, a 44% improvement over the 80-nsec speed of the year-old 8600, and executes various benchmarks about 45% faster than does the 8600, DEC said.

The 8650 supports 250 users in a typical office situation, according to officials.

In connection with the emphasis on clustering up to 15 VAX machines, DEC also announced enhancements to several of its software packages. These include an enhanced version of VAX DBMS V3.0, a Codasyl-compliant data base management system that now allows operation in a VAX cluster environment and access to remote data bases through DEC's Decnet networking software.

DEC's relational data base management system, VAX RDB/VMS V2.0, was enhanced to allow any RDB-equipped node on a VAX network to access transparently RDB data bases running on any other node.

DEC also announced VAX ACMS V2.0, which was designed to provide distributed transaction capabilities in Vaxclusters and networks. The latest version reportedly allows use of a menu to move applications among nodes with ACMS searching for available nodes.

Other announcements included the following:

- VAX Common Data Dictionary V3.2, a version that supports DEC's VAX RPG-II and 8-bit characters, so full international character sets can be used on the company's VT200 terminals.
- VAX Datatrieve V3.3, a version of a data storage and retrieval system allowing support for the VAX RDB/VMS segmented string data type throughout the RDB interface, and support for logical names in user-defined tables.
- VAX TDMS V1.5, terminal data management software that enables programmers to design forms and interactions between programs and terminals or between users for use with application programs.
- Vaxinfo I, II and III, packages of the enhanced software priced at 10% to 25% below the cost of individual pieces of software.
- Vaxset and VNXset, integrated packages of software engineering tools featuring 25% discounts from individual licensing costs.

The 8650, which will be available in 90 days, costs $475,000 with 4M bytes of main memory, two Unibus I/O adapters, a disk controller and a VMS operating system license. A similar system configured for use in a cluster costs $526,000.

A field upgrade package designed to convert an 8600 into an 8650 will be available in April for $125,000, the company said.

DEC officials said developing the 8650 involved changes to seven of the 17 CPU boards in the 8600.

Most of the gains in performance were achieved through improvements in gate array design and in surface mount technology that allows packing more chips on a board, according to the company.

For example, the new memory subsystem holds one 16M-byte board in the space formerly needed for two 4M-byte boards. The maximum main memory of 68M bytes can be achieved through four 16M-byte boards and one 4M-byte board.

The 8650 runs VMS and DEC's Ultrix-32 version of AT&T Unix. A fully configured system reportedly addresses 4G bytes of virtual memory, manages 160G bytes of on-line storage and allows 512 direct communications lines.

DEC officials said that more than 1,000 8600 systems have been installed since deliveries began in February and that the 8600 will remain available for customers who do not need the power of an 8650.

Digital Equipment Corp

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MIPS[1]	1.06	1.9	1.7	4.4	6.8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Purchase Price[2] (Memory Size)	$145,000 (2M)	$320,000 (4M)	$195,000 (2M)	$350,000 (4M)	$475,000 (4M)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Channels	1-8	1-8	1-8	1-12	1-12
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Price per Extra Megabyte of Memory	$4,500	$4,900	$4,500	$4,000	$4,000

1. [illegible]
2. [illegible]

Specifications for the high end of Digital Equipment Corp.'s VAX line.

■

DEC watchers: 8650 no surprise

By Donna Raimondi

The machine Digital Equipment Corp. introduced last week to push into the big systems market was no surprise to DEC watchers.

The capabilities in the VAX 8650 were inherent in the VAX 8600 model, announced a year ago. The progression from the VAX 8600 to the VAX 8650 reminded DEC users and analysts of the progression DEC made from the VAX-11/780 to the VAX-11/785. One difference, according to Craig Symonds, an analyst with Gartner Securities Corp., is that there was a six-year wait for the VAX-11/785 but only a one-year wait for the VAX 8650.

The system is basically a redesigned version of the VAX 8600. "Clearly, this product had been planned and under development for a while," Symonds said.

Several analysts viewed the 8650 as most valuable to the installed base of DEC users. One such user, Mary Jo Moccia, vice-president of DP services at the Midwest Stock Exchange in Chicago, underscored that observation. "We will upgrade to the 8650 to increase our capabilities," she said. Moccia operates a Vaxcluster with two VAX 8600s and four VAX-11/785s. "We have about 145 to 160 devices on the VAXs," she said, "and we process a half million records each day, so anything that expands that capability is a great advantage to us."

The Midwest Stock Exchange is buying the upgrade sight unseen, Moccia said. "I haven't used it yet, but I am assuming it will do what they are saying. It's a field upgrade, the same as the 780 to 785 was. When we did that upgrade, there was no effort and no effect on the software."

With DEC's emphasis on clustering 8650s, it is difficult to understand what the market for the product is, according to Symonds. "We are talking about a mini with the performance of a mainframe," he said.

Breaking into the mainframe market will require time and effort on DEC's part, Symonds said. "I think the VAX formation with clusters is clearly positioned to do that," he added. "The question is, do MIS managers believe it, and if they do, can they take the risk?"

Although the 8650 can be classified as a big system, it will probably not make a dent in the traditional big mainframe market, said Richard Mikita, an analyst with International Data Corp. in Framingham, Mass. DEC would have to convince people to switch software, Mikita said, and the IBM users are not likely to do that. The 8650's value is in the capacity it gives to clustering, he said.

According to Myron Kerstetter, program director of small computer systems at the Gartner Group, Inc. the 8650 may appeal to Decsystem-10 and Decsystem-20 users who were angered by DEC's decision not to develop next-generation products for that line. Additionally, it will blunt competition from a flood of products from start-up companies that have targeted the mid-size range.

The real news in DEC's announcement is in the software enhancements, which allow DEC's data bases to be accessed by any user on any node. A truly distributed data base gives DEC tremendous competitive advantage in selling its system, Symonds stated.

Kerstetter agreed. "The cluster was kind of crippled without that capability," he said. The data base access enhancements give the clustered system the image of a single system. It allows users to apply the total processing power of the cluster to a particular transaction processing load, he added.

IBM's response to the fact that 80% of data is generated outside the central mainframe complex has been to gather up that information and load it up on the central CPU, Symonds said. But it is more cost-effective to build a distributed solution to the software, like DEC has now done, he added.

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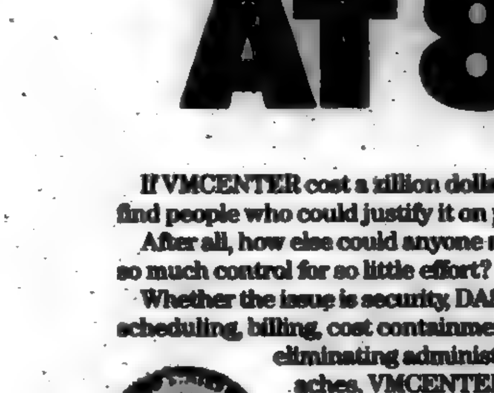

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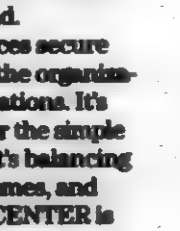

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Success limited in offshore programming

Shanghai Software micro applications gaining acceptance

By Edward Warner
Computerworld News Service

SAN FRANCISCO (CWN) — In the early 1980s, the buzzword was "offshore manufacturing," as computer companies like Atari, Inc. transferred their manufacturing operations to Asian nations where labor costs were lower.

Inspired by the manufacturers, Roderick MaCleod has been working for nearly as long to make offshore programming just as well accepted, so far with limited success. Although MaCleod's San Francisco firm, Shanghai Software Consortium, has about 30 top Chinese programmers working for it — in Shanghai — MaCleod said that he has found Americans still perceive the Chinese as technologically unsophisticated, a misperception that nonetheless scared off potential customers.

Since its founding in 1981, Shanghai Software has done little of what MaCleod calls offshore programming, under which the Chinese programming team contracts directly with a vendor to write a software package. Instead, the programmers have been writing for Shanghai Software itself, producing mostly microcomputer applications that are in turn sold by Shanghai Software to software vendors with retail distribution systems. While the Chinese programmers did help produce a custom loan analysis package for Gibraltar Finance, a California savings and loan association, a more typical product is Creative Count, an IBM Personal Computer spreadsheet that is now owned and marketed by Activision.

Shanghai Software, of which MaCleod is president, is not the only U.S. firm hoping to make a name in offshore programming. Another Northern California company, Pleasant Valley Software Corp., is said to have a team of programmers in India available for contract programming. One U.S. software firm, Texas-based DAC Software, Inc., has much of the programming for its microcomputer software done in Mexico.

But, according to analyst Damian Rinaldi of Framingham, Mass.-based International Data Corp., the lure of low-cost programmers has yet to overcome the need for personal interaction between programmers and end users. "Nine thousand miles away," Rinaldi said, "is still 9,000 miles away" no matter what the savings.

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> *American programmers too often develop a prima donna complex, something not encouraged by the Chinese culture.*

MaCleod said his employees are among the top programmers in China, working at the institutes and universities where China's computer development effort is based. During lulls in their work, the programmers contract to write for Shanghai Software. They work in teams at one location under the supervision of an American manager.

While the Chinese programmers work for less pay than American programmers, MaCleod said, their greatest strength is their consistently high quality and reliability. American programmers, he added, too often develop a prima donna complex, something that is not encouraged by the Chinese culture.

Shanghai Software's great leap into Chinese-written applications software did not occur effortlessly. A minimum eight-hour time difference exists between San Francisco and China, making telephone contact between Shanghai Software and the development team almost impossible. Instead, Telex messages are used for communication, but a day's delay often arises between the time the message was sent and when it was received.

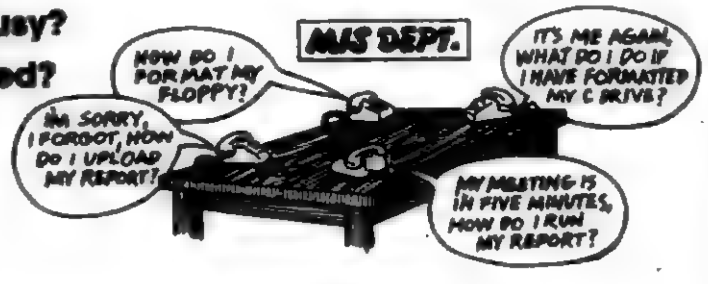
Ultimately, MaCleod said, the messages have become a way for each side to clarify its thoughts.

Also to be overcome, MaCleod said, was each side's assumption that it had the best approach to problem solving. A typical instance, he explained, is the differing approach Chinese and American programmers take to debugging. American programmers, MaCleod said, will step aside during debugging to let the debugging expert work things out. As for the Chinese, he said, "Everybody gets together and does it in a group, . . . but it gets things done."

MaCleod said he has since learned that the U.S. way "isn't always the best way."

A bigger cultural problem looms, however, one that Asian nations from Japan to Taiwan are now wrestling with as well. How do you stimulate individual creative effort, MaCleod asked, among programmers who are socialized toward group-oriented values? "There does seem to be something in the social environment — the experts have said the Chinese are more group oriented — that makes [the Chinese] more interested in perfecting an existing product," he observed.

Creativity aside, MaCleod said, the long association of the Chinese with the world's first calculating machine — the abacus — has made them "naturals at computer programming."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WORLD DIGEST
Computerworld News Service

ROME — Two months after the partial privatization of Italy's state-owned telecommunications company, insiders are saying that the transaction did little to liberate Italy's telecommunications market, and instead, telecommunications equipment suppliers are about to gain control of the firm.

The company in question is the Societa Italiana per L'Esercizio Telefonico S.p.A., also known as Sip. Thirty percent of Sip was sold to investors this year, but reportedly in a manner far different from last year's privatization of British Telecommunications — and with different results.

MILAN, Italy — The recent surge in growth of Italy's computer-aided design and engineering (CAD/CAE) markets is expected to begin diminishing as demand shifts to small firms buying mostly low-end products.

While the Italian CAD/CAE market has grown about 96% each year in the last two years, from $19.3 million in 1982 to $73.8 million in 1984, the rate is slowing and should stabilize at 25% or 30% through 1990, according to Reseau Research of Milan.

HONG KONG — Anguished users in Hong Kong are asking Omicron, a British software firm, not to make good on its threat to close its former Asian distributor and cease customer support. The threat arises from a dispute concerning the distributor's unpaid royalties.

At particular risk are Hong Kong users who bought modified versions of Omicron's multiuser accounting package from the software's sole Hong Kong distributor, Advanced Computing Resources Ltd.

Omicron successfully sued the distributor in a Hong Kong court in November for one month's royalties plus expenses. Omicron then drew up a shutdown order against the firm under local law.

SEOUL, South Korea — South Korean electronics giant Lucky-Goldstar plans to increase production capacity at a plant outside Seoul in order to produce the Honeywell, Inc. DPS 6 line of minicomputers.

The DPS 6 is manufacturered in the U.S. by Lucky-Goldstar's partner, Honeywell.

Two manufacturing lines at the South Korean plant will be dedicated to Honeywell's DPS 6 line.

SYDNEY, Australia — ICL Australia sent shock waves through the computer industry last week when it laid off 75 employees, about 10% of its work force.

The move was intended to improve profitability, which had been "disastrous" since the boom days of the 1970s, according to the firm's managing director, Chris Wilkinson.

The layoffs will occur primarily in the administrative and corporate support services areas of the organization, including the marketing department, which will lose half of its staff.

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JOHN CULLINANE

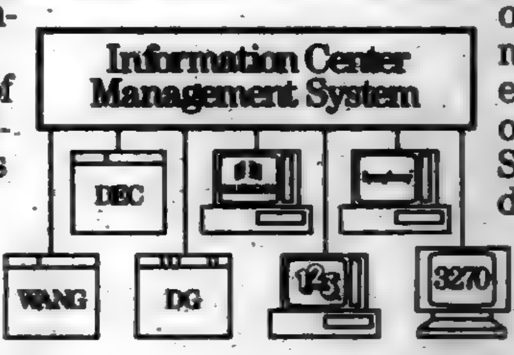
On the Information Center Strategy

Today, virtually every IBM mainframe user is attempting to implement an information center. Formulating a successful information system strategy for the 80's and 90's requires it.

However, one of the major problems many companies face is the variety of software and databases located on different mainframes, departmental minis and personal computers. The challenge is to create an environment that integrates this diversity, is responsive to the corporate user community in meeting its information needs and, most importantly, provides access that is consistent and transparent. This is why open system architecture is key in implementing an information center strategy.

> "Open system architecture is key in implementing an information center strategy."

It also makes particular sense for a software company like Cullinet to adopt a policy of open system architecture that allows corporations to standardize on Cullinet's products without losing a significant investment in other vendors' products—whether they are mainframe applications, microcomputer software such as Lotus 1-2-3, Symphony and other PC products or departmental minis from companies like Digital, Data General, Wang, Hewlett-Packard and others.



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Our strategy makes sense not only because Cullinet products are designed to work together, now and in the future; but also because our open system architecture means that data processing management will be able to accommodate satisfied users of other software while anticipating the introduction of new products.

For more information about the Information Center Management System and the full range of Cullinet products, I encourage you to phone, toll-free, 1-800-225-9930. In Massachusetts, the number is 617-329-7700.

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Cullinet

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Microcom opens modem standard

From page 1

by Tymnet, Inc., can be used to minimize errors in data transmission and thus increase data throughput.

MNP was originally made available for licensing in July 1983 and has been locked in a popularity battle with Tymnet's X.PC, which has been in the public domain for more than a year.

Most major modem manufacturers and value-added network operators have thrown their support behind one of the two sides.

MNP supporters

Among the modem manufacturers supporting MNP are Case Communications, Inc., Cermetek Microelectronics, Inc. and Racal-Vadic, Inc. as well as Microcom itself. Concord Data Systems, Inc. allows users to choose either of the two error checking schemes as an optional feature on its modems.

Hayes Microcomputer Products, Inc., Racal-Vadic and Prentice Corp. have all announced support of X.PC in the past six months, but none of the three has made the protocol available in its products.

Tymnet X.PC specialist Steve Y. R. Kim claimed the trio of modem manufacturers, along with MCI Communications Corp. and software producers Microstuff, Inc. and Microsoft Corp., are in the process of implementing X.PC into their products.

Microcom will no longer charge a $2,500 license fee for Classes 1, 2 and 3 of its MNP, which will now be available to interested parties for a $100 documentation fee. Classes 4, 5 and 6 of MNP will remain proprietary. Class 4 is a refined version of MNP Class 3. Class 5 offers the capabilities of Class 4 plus a data compression feature. Class 6 supports data transmission at speeds up to 19.2K bit/sec. while maintaining modem compatibility with most popular dial modems.

Announcement scheduled

The vendor is scheduled to announce the move at an meeting of the U.S. CCITT Study Group D Modem Working Party's Sub-Working Party on Error-Checking Protocols in Marina Del Ray, Calif., tomorrow, according to company spokesman Doug Landfield.

The announcement is designed to increase usage of the protocol, a move that Microcom hopes will enhance MNP's chances of becoming an international standard.

Robert Fenichel, chairman of the U.S. CCITT Study Group D Working Party, said the sub-working party will be meeting for the first time and the gathering may attract as many as 25 attendees.

He said all the sub-working party findings will be presented to the parent group Wednesday for possible submission to the CCITT.

Wallace is a staff writer with On Communications, *a CW Communications, Inc. publication.*

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So

Vendor's MIS can't wait for other users to work out bugs

By John Gallant

WESTWOOD, Mass. — Playing it safe is a luxury Bruce Pocock cannot afford.

Some DP managers can postpone installation of the latest hardware or hold off implementing the most recent version of a software package rather than chance upon an unforeseen bug or a hidden incompatibility. They wait until the enhanced system meets the tests of time and wider use.

But as director of data center services for Cullinet Software, Inc., Pocock is the top technical guru in an organization teeming with techies. He knows that keeping the leading independent data base management system vendor's management and software developers in tune with the latest high-tech developments is perhaps his most important role.

> *'I manage the data center with an eye to the state of the art.'*
>
> — Bruce Pocock
> Cullinet Software

"Because our product is software, we have to keep up with what's new in hardware and software," Pocock said. "So I manage the data center with an eye to the state of the art."

Tall and slender, the bearded Pocock characterizes himself as a market watcher as well as Cullinet's central service provider. "I keep very close tabs on the market and disseminate that information to both our developers and our managers. I have to facilitate that upward and lateral information flow, so I try to have a wide sense of what is going on. Other sites can stay several releases behind, but our environment is very dynamic. That puts a lot of pressure on me because not all new products work. That's my biggest source of aggravation."

Pocock is responsible for supporting as many classes of users as there are data centers within Cullinet. His more than 40-member staff, which is divided into five functional groups, oversees four data centers. One is the Cullinet-BWCS Software, Inc. development center in Oak Brook, Ill. The Cullinet-BWCS Software subsidiary is the former Bob White Computing & Software, Inc., which Cullinet acquired for its banking applications. Another is Cullinet's National Education Center in Framingham, Mass., which supports both on-site and remote user training.

In Westwood, where Cullinet has four buildings linked by twisted-pair wire that the company purchased from a telephone company and installed itself, Pocock directs operations in the software vendor's two primary data centers. Cullinet's commercial data center supports the company's time-sharing customers. The corporate data center is the backbone of Cullinet's own production systems and all its product development, support and testing.

The four data centers house six IBM and National Advanced Systems Corp. mainframes, from an IBM 4341 Model Group 2 under MVS/SP to an IBM 3084 Model Q under MVS/XA and almost 100 IBM 3380 and 3350 disk drives containing more than 140G bytes of data. More than 1,500 terminals located at Cullinet facilities throughout the world are tied into the corporate data center through two 56K bit/sec. and four 9.6K bit/sec. communications lines. Anywhere from 20 to 25 on-line systems are running at any one time, Pocock said.

The data centers support the activities of four primary groups of users, including Cullinet's approximately 180-member applications product development and 80-member systems product development groups, the roughly 150-member technical support group and in-house end users of production applications.

Development and implementation of those production systems is the responsibility of Cullinet's MIS department. The end-user-oriented MIS department evolved separately from Pocock's data center organization, which is responsible for managing the firm's data communications net, hardware and software.

In addition to his main duties, Pocock recently had to oversee the transfer of the bulk of Cullinet's computer and communications equipment to a new data center. The move coincided with what he labeled a total systems reconfiguration, including the upgrade of one of the company's IBM 3081 mainframes to a 3084 and a 40% increase in the DASD capacity. In his understated manner, Pocock said the move went off without a hitch.

Contrary to the experience of other DP professionals, Pocock said he finds supporting end users a relatively easy task. "The end-user environment is carefully planned here. There are scheduled system implementations and scheduled upgrades," he said.

"But within the development environment, things change much more quickly. That's the challenge of supporting software developers," Pocock said. "The data center is often the development staff's last concern. Their needs grow very quickly. Also, development work causes a lot of totally unplanned for occurrences."

But the plethora of technical personnel within Cullinet is also something of a blessing. "Developers know what you can and cannot do," Pocock said. "Sometimes it's hard explaining satisfactorily to end users why their needs can't be met right away. But developers understand DP, and they can be very creative in offering solutions or alternatives."

Pocock said he has yet to call upon the technical staff for assistance. "So far, it hasn't been necessary to rely on them," he said, "but it's nice knowing they're there."

Despite the administrative demands of his position, Pocock maintains a hands-on approach to his work. "I am a very technical person. I am capable of doing almost anything, and I like to stay technically involved," Pocock said. "That's a self-imposed pressure. But I like to see problems handled quickly and with a smile."

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Dayton	Oct 9
Denver	Oct 29, Nov 20
Detroit	Oct 22, Nov 12
Houston	Oct 31, Nov 21
Kansas City	Nov 6
Los Angeles	Oct 22, Nov 19
Minneapolis	Oct 10
New Orleans	Nov 19
New York City	Oct 10, 25, Nov 6, Dec 12
Newport Beach	Oct 17
Oklahoma City	Nov 7
Omaha	Oct 24
Orlando	Oct 15
Phoenix	Oct 9
Portland	Oct 10
Rochester	Oct 10, Dec 5
Sacramento	Oct 8
St. Louis	Nov 14
Salt Lake City	Nov 14
San Antonio	Oct 23
San Diego	Nov 7
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Denny's tests disaster team

From page 1

earnest, Kislowski said.

Like Denny's, practically every other large user organization boasts a disaster recovery plan in one form or another. But fewer than 5% of the users conduct periodic drills under realistic conditions to find out whether their plans are as sound in practice as they seem on paper, Kislowski claimed.

Moreover, of the 5% of the data centers that do test their plans, only a tiny fraction control extensive point-of-sale (POS) networks from one central location. Denny's operates a dial-up polling network that serves not only the firm's 1,200 family restaurants but also its wholly owned chain of 800 Winchell's doughnut shops.

Denny's also operates a second network that supports routine administrative applications like payroll and a third network that automates the order entry process for the company's more than 1,800 outlets. "That distribution network is probably our most critical application," Ride said. "Without it, we would be unable to order food or other goods, and our whole business would grind to a halt in just a day or two."

All three of the networks rely exclusively for their support on the lone Denny's data center south of Los Angeles. So if the installation, which houses an IBM 3033 and an Amdahl Corp. 5850, suddenly succumbed to a disaster, the company would instantly lose the operational hub for all its key functions.

"We operate under a very different kind of environment from what is typical of many other large POS networks, most of which depend on multiple data centers that can provide each other with backup," Kislowski said.

Mindful of the pitfalls inherent in maintaining just one corporate computing site, Denny's timed the latest of its disaster recovery drills to coincide with Ride's recent trip to Dallas for an IBM Guide users group meeting. At approximately 3 a.m. PST on Nov. 19, Ride called the Southern California data center from his Dallas hotel room, alerted an operator to the fictitious disaster and instructed him to initiate a drill.

> **"**
>
> ***At approximately 3 a.m. PST on Nov. 19, Evan Ride, Denny's director of computing, called the data center, alerted an operator to the fictitious disaster and instructed him to initiate a drill.***

The operator then rushed to a neighboring Denny's building and called all eight members of the company's disaster recovery team at their homes. By 7 a.m., six of the eight team members were winging their way in two groups toward Dallas, with the remaining two scheduled to follow later in the day.

Accompanying one group on its five-hour flight was a set of operating system tapes that had been retrieved earlier in the morning from Arcus Off-Site Storage Corp. in the Southern California community of Norwalk. The tapes were required to get the operating system in the backup center up and running in preparation for the arrival of Denny's application data, which was shipped from Arcus early in the afternoon.

By 9 p.m., the emergency setup team had restored the firm's operating system and TSO functions on an IBM 4341 belonging to Comdisco Disaster Recovery Services, Inc., which maintains the Dallas backup data center. An hour and a half later, the systems restoration process was complete as the makeshift facility began demonstrating its ability to run Denny's key batch applications.

Although the drill was by and large a success, it did uncover 26 areas where the company's disaster recovery plan needs improvement. In particular, the exercise dramatically underscored the importance of anticipating every possible financial contingency. The failure of one drill participant to carry credit cards and sufficient cash temporarily stymied payments to Arcus and delayed tape deliveries for two to three hours, according to Denny's data center manager, Shep James.

Next spring, the restaurant chain said it expects its data center recovery drill to be repeated, although the scope of the upcoming mock catastrophe will probably be greatly magnified. "In our future tests, we're planning for a disaster like a major earthquake in which all of Southern California, including Los Angeles International Airport, disappears as a functioning business unit," Kislowski said. "We want to condition people to think on their feet and see if they have enough brains to fly to Dallas from an alternative airport in San Diego, Las Vegas or Phoenix."

FCC rules on separation of services

By Bryan Wilkins

WASHINGTON, D.C. — The Federal Communications Commission further eased its Second Computer Inquiry separation rules recently by waiving requirements that AT&T must provide enhanced services such as airline voice reservation systems through a separate subsidiary.

The FCC, which is reviewing the Computer Decision II regulations, took a similar step in October regarding the separation conditions attached to selling customer equipment, voting to permit AT&T to mingle equipment sales with its basic long-distance network services, subject to certain conditions.

AT&T said its enhanced services were irrelevant without the similar treatment accorded to the equipment component of the same service, and the requirements prevented it from meeting customers' needs in "the give and take" of the customer premises equipment marketing process.

The FCC attached the following conditions to the waiver:

- The enhanced services must use computer facilities that are not co-located with AT&T network facilities.
- The interface of the enhanced services must be available to other enhanced service providers.
- The services must be offered through an entity other than the regulated AT&T Communications.
- The enhanced service must use regulated, tariffed lines.

The waiver request was opposed by GTE Corp., most of the regional Bell holding companies and the major computer and value-added communications service providers.

The FCC said that granting the waiver did not prejudge its decision on the pending Third Computer Inquiry proceeding that would make concrete the type of relief to be granted to AT&T by deregulating enhanced services and by eliminating the separate subsidiary requirement where competition was present.

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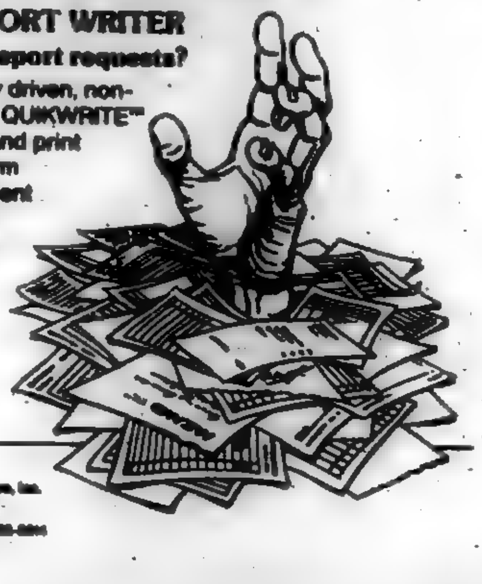

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Wall Street snubs DBMS

From page 1

"It's hard to find a data base management system that isn't more up to date than VSAM and IMS," said Gerald C. Chichester, chairman of Focus Research Systems, a West Hartford, Conn., software market research firm.

At the same time, both outside observers and MIS directors for the brokerage houses said their high transaction volume, frequent updating and need for swift, reliable access to data have kept them from embracing modern systems. Although they acknowledged that they would benefit from easier user access and more variable data output, they have shied away from any form of relational data base management, including the relational capabilities of IDMS, to avoid increasing their processing overhead.

"In a manufacturing industry, the data base represents record keeping. In the brokerage industry, those data bases represent the product itself," Chichester said.

"One is less willing to accept risk when the information stored on the computer and the product are one and the same," he added.

'More backward than it should be'

Another observer stated the case more bluntly. "It just mirrors the data processing world of Wall Street. It's a little more backward than it should be," according to Michael Braude, vice-president of software services at the Gartner Group, Inc.

With the exception of Morgan Stanley & Co., most of the brokerage houses are dependent on 10- or 15-year-old systems, and that dependency is increasing as applications are added to those systems.

"A brokerage house is not like the insurance industry where you have a file and nothing happens to it until the next transaction," said Jeffrey Gevarter, first vice-president for information systems at Prudential-Bache Securities, Inc.

A brokerage house has to update all of its accounts after each day's trading. The value of a customer's portfolio will change even on days when he makes no trades because of interest rate changes and the movement of the market, and the brokerage house has to be ready to tell the customer what the investments are worth. Yet the amount of available update time keeps shrinking, Gevarter said.

Prudential-Bache does business on the Pacific and the over-the-counter stock exchanges, and by the time they report their trades, it may be 8 p.m.

The New York Stock Exchange, which used to open at 10 a.m., now opens at 9:30 a.m., and Gevarter must have all accounts updated by 8 a.m.

Cannot afford luxury of DBMS

"It's a very, very tight window, and it's getting worse. In terms of processing time, we just cannot afford the luxury of a data base management system," he said.

Prudential-Bache began building its operations around Cullinet's IDMS data base management system several years ago, but it has since veered from too much dependence on it.

When it adds applications, Prudential-Bache tends to rely on IBM's VSAM file management system. "Less than 50% of our applications are on IDMS," Gevarter noted.

And for one application in particular, he said, "If I had it to do over, I never would have made it a data base system."

VSAM first became available in 1973. One MIS director of a brokerage house derided the "modern, benighted thinking" that considers VSAM an outmoded tool, while another said he was "comfortable in thinking of it as a data base management system, a brute force data processor."

Other authorities say they disagree.

James Martin in his book, *Managing the Data-base Environment*, called VSAM a non-data-base environment in which each application functions with its own file system. Once the file system is set up, the data is stored and retrieved the same way each time, making it difficult to change the application.

"Using VSAM is superconservative," said Ed W. Acley, senior consultant with the International Data Corp. in Framingham, Mass., a market research firm. "IMS is the next most conservative approach."

In addition to Prudential-Bache, a number of brokerage houses use a combination of VSAM and Cullinet's IDMS and said they are unlikely to drop their dependence on VSAM.

"We're quite happy in a mixed IDMS and VSAM environment," said Robert Chamberlain, vice-president of data resources administration at the Shearson Lehman Brothers, Inc. division of American Express, Inc. Shearson Lehman used VSAM for batch processing before acquiring IDMS and continues to rely on it for some new systems. Chamberlain said VSAM is valuable for its speed and "data delivery power."

In a similar manner, Dean Witter Reynolds, Inc., a Sears, Roebuck & Co. subsidiary, relies on VSAM to do its mainstream processing with selective applications tied to IDMS. Dean Witter has experimented with Cullinet's relational aspects of the Cullinet product but has no plans to put them into production, said George R. Ross, executive vice-president in charge of data processing.

> ”
>
> *'It's hard to find a data base management system that isn't more up to date than VSAM and IMS.'*
>
> **—Gerald C. Chichester**
> **Focus Research Systems**

At most brokerage houses, the need for speed and reliability not only yokes the back office to the established file or data base systems, it forestalls conversion to new ones.

Prudential-Bache's Gevarter acknowledged that using VSAM leads to duplicate files because applications using the same data have no means of sharing the way applications built around a common DBMS could.

"We replicate our data in three or four places," but that leads to quick processing speed, he said. IDMS has "too much overhead" for swift processing, he said.

The prospect of converting to a full DBMS is something MIS directors at the brokerage house don't like to talk about.

Work involved is 'mind boggling'

"There are so many man-years of work involved it's mind boggling," said a Paine Webber, Inc. vice-president, Ted Hochman, whose firm uses Computer Corporation of America's Model 204 for most production applications and has implemented IDMS for selected tasks.

One firm that has made the decision to go to a centralized DBMS is Merrill Lynch. James Murtha, vice-president of the Information Architecture group, said his staff had years of experience with IMS before it was decided to reorganize around it.

At an institution that processes two million transactions a day, "there was some reluctance to go into DBMS. We had heard of companies that got burned with the overhead," Murtha said.

Merrill Lynch has 18 projects under way to write applications to run off a handful of central data bases. The largest, Merrill Lynch's six-week record of transactions, occupies 22 3380 disk drives and had to be divided into 24 subsets for rapid retrieval and updating.

The brokerage house currently handles 20% of operations through its DBMS. By the end of 1986, 80% of operations will be converted to DBMS, Murtha said.

At Morgan Stanley, data base administrator Scott Abbey said that his firm has taken the process a step further.

Using Software AG's Adabas and the Natural fourth-generation language, Morgan Stanley's MIS staff is able to access the central data bases from any of its 50 applications, allowing more integrated functions.

Four times as fast

Abbey said the 120-person programming staff can build applications four times as fast as those using Cobol, which leads to savings that can be invested in more hardware to maintain processing efficiency.

Conversion was not a problem because Morgan Stanley had few existing systems when it decided to use Adabas eight years ago, he said.

But the payoff comes in linking applications. When brokers make trades, they can enter them into the house accounting system, have them added to their account position "and have that immediately priced to the market in real time," Abbey said.

That form of updating and retrieval will enable Morgan Stanley to keep its customers more up to date as well, he said.

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IBM Information Services' Berland refutes critics charges

Strategic planning exec speaks out on pricing, size, quality, direction

By John Gallant

A senior IBM executive last week challenged critics' claims that IBM's applications software portfolio is too large and diverse and often does not match the quality and functionality of independent vendor offerings. In an interview with *Computerworld*, Robert Berland, who became director of strategic planning for IBM Information Services in January, also defended the pricing policies that in October led to the announcement of an average 10% increase on more than 1,100 applications and utility software packages.

Berland, IBM's field marshal

Berland is the field marshal who directs IBM's efforts on the applications software battlefield. Information Services encompasses Information Programming Services (IPS), which develops, acquires and supports applications for the entire range of IBM hardware; the IBM Information Network remote computing services unit; and Information Systems Services, which offers program customization and consulting services. Berland is responsible for coordinating the efforts of the three units and for developing and implementing IBM's worldwide applications software strategy.

IPS is responsible for roughly 2,000 program products. Critics say that is simply too large a portfolio for any organization to support or market adequately. Is there any validity to that criticism?

Yes, that's absolutely correct. Two thousand products is too difficult for the customers and field force to understand. What you want to drive toward is families of products that fit and work together. Examples of that are MAPICS, COPICS or the Personal Decision Series. We are moving in that direction as best and as fast as we can.

Your organization is responsible for applications products, while the hardware divisions retain control over systems software. Considering the increasing revenue importance of software, is IBM shifting its organizational structure to place all software under the control of one group, notably yours?

Today, systems software, the access methods, the data base and data communications software are under the individual product divisions. I don't see any change in that. Those products are very tightly coupled to the hardware; they have to exploit the hardware. Applications software can ride on well-defined interfaces that don't have to be quite as close to the hardware. That software can be developed by an organization like ours or by outside software vendors or customers themselves.

Periodically, IBM increases software prices as a result of what it calls "normal business review." Can you explain that phrase and give us some insights into IBM's software pricing strategy?

Software development is an incredibly expensive area. Marketing, support and distribution are also expensive, people-intensive functions. Since the cost of people tends to go up every year, the cost of all the ancillary elements of the software business tends to go up every year. Also, exploiting the characteristics of the hardware requires a huge investment in software enhancement, which many software companies don't bother to do.

The only counterbalance to that cost is to get huge volumes. Huge volumes require great marketing effort. That equation hasn't totally come together yet. It is still a very tough, challenging business. You can see examples in other companies and within IBM of individual products that are successful. But it's hard to find companies that have two, 10 or 50 successes. Prices go up because we not only have to put out one product but we also have to put out families of products that work together and can grow over time.

> ”
>
> *Prices go up because we not only have to put out one product but we also have to put out families of products that work together and can grow over time.*

After the last round of increases on applications products, many users said the price hikes were unwarranted because they had not been accompanied by any enhancement of the affected packages. Is that a valid criticism?

The packages are continually under enhancement,continually under upgrade. The key ones — the program products, the major strategic products — have ongoing development, support, marketing and education requirements. If more customers would buy those products, it would help us all relative to pricing.

Is IBM talking to it customers about site licensing of micro software?

Site licensing, where you grant a license for unlimited copying, is wrong because you have no asset protection. You have no way of keeping track of who has the software and how it gets distributed. One of the major problems in the industry — one that leads to price problems — is illegal copying. If you mean volume discounts, I am a fan of that. Volume discounting done right is of great benefit to the customer and to the vendor. But volume discounting implies a fixed number of licenses such that you can maintain some kind of asset protection. IBM does volume discounting now.

One of the most persistent prognostications is that IBM will strengthen its position in the applications market by acquiring one of the applications vendors. Is that really an option?

I hope we will strengthen our position in the applications market. I don't hope we will acquire a company. One of the prime responsibilities of IPS is the acquisition of applications software. There is no way IBM can write all that software. There are whole applications that we can't spell. For example, we have great lawyers in IBM but we don't pay them to come up with the specifications for a law office package. When we needed a package for System/36, we went outside to get it.

We have to do that in a large number of applications areas. You don't hire people right out of college, stick them in a blue suit, grow them in your own image and expect them to be industry experts in banking or insurance. As I've said, more than 50% of our revenue in the applications area has to come from stuff we get outside.

IBM is faulted for not offering applications of the same quality or functionality as those offered by independent vendors. Do you think that criticism is unfair?

Yes, it is very unfair. I'll match MAPICS with any product in the world. I'll match Business Management Series on the Personal Computer. It depends on the product. You cannot expect us to write the best package in the world in an area where we don't have expertise. I think many of our products are superior products, like ISPF, the dialog manager. That is an outstanding product used by many software companies.

We wouldn't write a spreadsheet product just to offer another spreadsheet. For us to write a stand-alone product is almost ridiculous. Outside people are writing them, and that is fine.

We focus on the areas we have strengths in and where there is the greatest need. That is the interconnection of intelligent workstations, departmental machines and hosts.

It's said that IBM is hampered in software innovation by its limited programming resources, the sheer size of its user base and by the perceived attempt to be all things to all people. How much of that is accurate?

There is no question there are not enough programmers to do everything we would like. We have multiple projects all fighting for dollars and skills and head count. We have to prioritize. You prioritize based on opportunity but just as much based on skill.

We are not building products for a few customers. We build for thousands of customers. That requires a commitment, a skill level and a support level far beyond what most people can do in a garage.

See BERLAND page 15

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Berland on IBM, critics

From page 14

Thank God for the size of the user base. I wish it was much larger. The bigger the base of customers, the better it is for your business, your opportunities, your leverage.

On the other hand, you have a commitment to customers to take them forward and to grow with them. Yes, there is a big base that you have to consider. But we also do some revolutionary things such as DB2 and SQL. We provide them to the customer in an evolutionary manner so that they can take advantage of those capabilities at their pace.

You have defended IBM's dual data base management system strategy [CW, Nov. 25]. One could assume you believe relational systems cannot be improved to handle high-performance applications. Are users likely to require different DBMS for different needs for the foreseeable future?

I didn't say that. Quite the contrary. I said relational systems can be improved over time. What I implied was that I don't believe that for a long time there will be any chance a relational system can compete with an IMS Fast-Path handling 160 transactions per second.

There is a place for continually improving relational into much higher performance. I don't see there is a limit to that. But you have to realize the pressure from large customers on IBM for IMS. We have to continually improve IMS Fast-Path and and IMS.

I guess the best answer is to talk to some of our customers. People are using our DBMS and others. But when it comes down to the highest performance, highest integrity, highest exploitation of the hardware, it is hard to come close to IMS and IMS Fast Path.

From your remarks, it seemed clear that IBM has focused on boosting performance. If productivity has become the primary concern for all but the most transaction-intensive shops, is IBM ignoring the bulk of users by not providing productivity tools?

We are trying to support the largest customers in the world. For example, we have a customer with more than 30,000 terminals interconnected on IMS systems worldwide. The performance requirements of systems like that are such that the hardware and software communities in IBM have to work closely together to provide what customers need.

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> *I think the stand-alone Personal Computer will always have a place, but it is very secondary to the future of it as an intelligent workstation.*

One of the dictates of IBM management is that software should never be the bottleneck that holds our customers back from running their business. That requires tremendously skilled people and products that can continually change and evolve.

Productivity is fundamental to our customers. All of them need tools. We would like to provide them with answers as quickly as possible. But we cannot do everything as fast as the customers or I would like.

We are dumping tremendous effort into the PC, which I believe — coupled properly as the intelligent front end — can give the most productivity boosts to our customers. Just producitivity boosts in the hosts are not enough. God bless the industry for coming out with innovative approaches. We're trying our best too. It is great that everybody is focused on that problem because it is one that needs to be addressed by all of us.

Do you think the picture painted by analysts and the press is an accurate reflection of IBM as a software company?

No. There is a tendency to equate IBM with bigness and bigness with badness. The beauty of IBM is the people and the management.

Recognizing the importance of software, we are given opportunity, freedom and areas to pursue in which great achievements can be made. I think there is this view of the monolith that moves so slowly. That is not true. An example is the Personal Computer. That wasn't even an industry. Between Apple Computer and us, a whole industry evolved. We were pretty light on our feet in that area. I think we have been pretty light on our feet in some of the software arenas.

Recently, we've seen a number of artificial intelligence product announcements from IBM. Has AI become a strategic research and development focus within IBM?

Certainly. IBM has focused on AI as an important additional capability that will be required in the future in many different areas. AI is not an end in itself; it is a vehicle. I see AI as an interface, a usability characteristic — a way to work with, for instance, data bases in the future.

What is IBM's AI strategy?

There are needs across a broad front of products on intelligent workstations, departmental systems and hosts. People want easier-to-use, better front ends. What you will see is the proliferation of AI approaches — what we call knowledge-based systems, as aids to help end users access information.

What new technologies do you see impacting the software market?

The No. 1 concern is intelligent workstations attached to departmental machines attached to host systems. The interrelationship between software will require some very sophisticated inner attachment capabilities.

But, even more important, it will require some significant progress in the synergism between applications in that cross-tiered environment. It will require improved end-user interfaces to mask all the stuff that sits behind an intelligent workstation.

I'll call the workstation the Personal Computer for short. I think the stand-alone Personal Computer will always have a place, but it is very secondary to the future of it as an intelligent workstation. The Personal Computer is going to be the fundamental end-user interface. We have to take advantage of the power, graphics capabilities and user friendliness that it can provide as a front end to, say, departmental or host applications.

AT&T to sell firm's data base packages

MENLO PARK, Calif. — Relational Database Systems, Inc. announced that it has signed an agreement with AT&T whereby AT&T will co-label and market four of Relational Database's data base packages for the AT&T PC 7300.

The four data base products include the following: Informix, Relational Database's flagship relational data base management system that runs in SQL; Informix Runtime, a version of Informix designed for value-added resellers; C-ISAM, the standard file access method for the AT&T Unix operating system containing a library of C language functions; and File-It, an interactive file management system.

Relational Database also said that it had reached an agreement to co-label and distribute for AT&T data base software for AT&T's PC 6300 and the entire 3B family of microcomputers and minicomputers.

— Bryan Wilkins

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VIEWPOINT

EDITORIAL

Japan Inc.?

For most American DP/MIS professionals, the phrase Japan Inc. is little more than some inventive headline writer's shorthand reference to the Japanese people's postwar industrial boom and continuing high-tech development. If anything, the phrase has more relevance to their private lives, as consumers of Toyotas and Sonys, than their professional lives.

Upon closer examination, however, Japan Inc. is something more than a catchphrase but considerably less than a concerted national industrial policy geared toward world trade domination.

In fact, Japan's computer manufacturers are as independent and fiercely competitive as their counterparts in the U.S. They cooperate with government policy when it serves their needs and kick and scream when it does not.

American DP/MIS professionals have been exposed to elements of this reality over the past few years as Japanese manufacturers have made a concerted effort to penetrate the U.S. computer market by forming partnerships with U.S. companies. This has not been some ominous, monolithic Japan Inc. infiltrating corporate America. This has been NEC Corp. becoming NEC/Honeywell and Fujitsu Ltd. becoming Fujitsu/Amdahl.

These partnerships, whatever their commercial success, provide U.S. vendors that are suddenly strapped for development funds with access to Japan's leading-edge technologies and offer Japanese manufacturers entry to U.S. DP/MIS departments. The ultimate benefit will be improved products, competitive prices and innovative technologies.

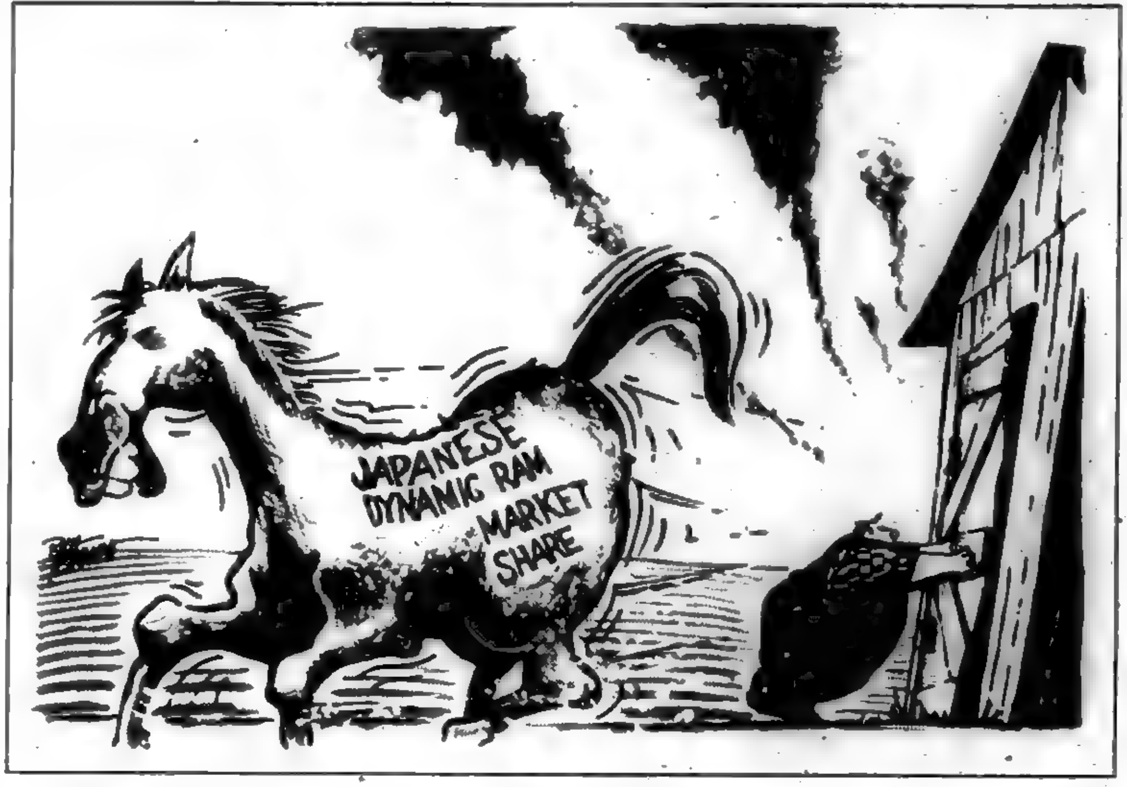
The one barrier to this progress is trade restriction born of xenophobia and misunderstanding. Yes, Japan itself needs to open its domestic markets to foreign products. But Americans must also realise that a great many U.S. companies have set up shop in Japan, buying or producing goods there and reexporting them back home. The U.S. trade deficit is a serious problem, but it should not be invoked to oppose technical progress.

Partnerships between manufacturers must be encouraged, and technology exchanges must be nurtured. Ties must be established between American DP/MIS managers and Japan's growing pool of talented young computer professionals who have proven their skill at managerial as well as technical innovation.

For the information age to be truly international, trade disagreements must give way to open cooperation. Then, the computer community around the world can profit and prosper.

Notes & observations

Not everyone in the market is getting rich, but at least the superminicomputer industry isn't dull. In September, Perkin-Elmer Corp. introduced its high-end supermini, the 3280MPS, with comparisons with the Digital Equipment Corp. VAX 8600. Then Data General Corp., whose Eclipse MV/10000 may have lost some technological and price/performance edge to the 8600, fought back in November with its own high-end supermini, the MV/20000. Now, it's December, and here comes DEC with an improved version of the 8600. The 8650 could be the new standard for superminis ... or it could signal, as DEC claims, its entry into the mainframe arena. As we said, it's never dull.


JAPANESE DYNAMIC RAM MARKET SHARE

LETTERS TO THE EDITOR

Expert systems software capable of 'reasoning' but not 'learning'

I take strong objection to your In Depth title, "Software that learns" [CW, Nov. 11]. AI software does some marvelous things. Expert systems software can do reasoning, computer configuration and problem diagnosis in phone lines or oil wells or sick human beings or soup cookers or chip etchers.

People study and learn *with* programs and machines, which is hard enough. Expert systems do not dynamically add rules or change their procedures or in any way adapt or learn.

I believe that it is possible to be both exciting and accurate. You can say, "Machines that reason," by reason meaning "infer" and draw conclusions.

But "learn" is not a description of the present programs nor of any programs about to appear.

Don Lamer
United Telecommunications, Inc.
Westwood, Kan.

Education will head off layoffs in previously protected DP ranks

The editorial "Don't cut here" [CW, Nov. 18] struck a nerve. The previously privileged status of DP employees is the primary reason that actions reducing their personnel and budgets are more than appropriate. Historically, DP management has been rewarded based more on direct responsibility — translation: how much they could spend on hardware, software, maintenance and personnel — than on results achieved.

It is very easy to consume people and funds when the typical DP management professional allows the whims of a single computer manufacturer to determine the company's direction and staff requirements. These are the same professionals that would commit to special wiring for buildings based on future promises by a computer manufacturer to use them someday in a grandiose scheme.

Reductions in budgets and personnel would probably force the old school to look for more efficient ways to survive, as other departments such as sales or manufacturing have done. These methods should include first-rate relational data base management system with fourth-generation languages and generic operating systems that put manufacturers into a true cost-performance environment and protect software investments and distributed or departmental processing.

My definition of distributed processing does not include systems fully dependent on the same incumbent empires for hand-holding, permission and so on. It would mean serving departments or clusters of users through cost-efficient and fully self-supporting multiuser and multitasking supermicros and superminis.

This approach keeps the detailed data closer to users and allows summarized data that is of interest to corporate executives to be uploaded. Future planning for larger corporations should include at least a cursory look at knowledge engineering and similar advances for computers besides just processing data.

Education should begin with DP staff members to find alternate ways to provide solutions other than through the hiring of bodies. This new knowledge could then be directed to the user community so that they might serve more of their own needs.

I would suggest, before expensive searches are undertaken for outside help, that a serious study of recent computer science graduates already in-house might reveal some excellent sources if they were asked what they could contribute to the organization.

Education should be the primary purpose of DP professionals. Those that attempt to keep a hold on the status quo are on borrowed time.

Randall K. Cullinan
Communications +, Inc.
Richmond, Va.

Data transmission by way of CATV could pose computer security threat

It's interesting that *Computerworld*'s Nov. 25 issue features a Special Report on computer security, "System security — Protecting corporate information assets" along with an article on using CATV for data transmission, "Legal hang-up: State blocks school CATV bypass."

With this use of CATV, what's to keep any home cable subscriber from tuning in to the data transmission channel on the television and browsing through everything that goes over the cable?

Jim Haynes
Associate Development Engineer
Santa Cruz, Calif.

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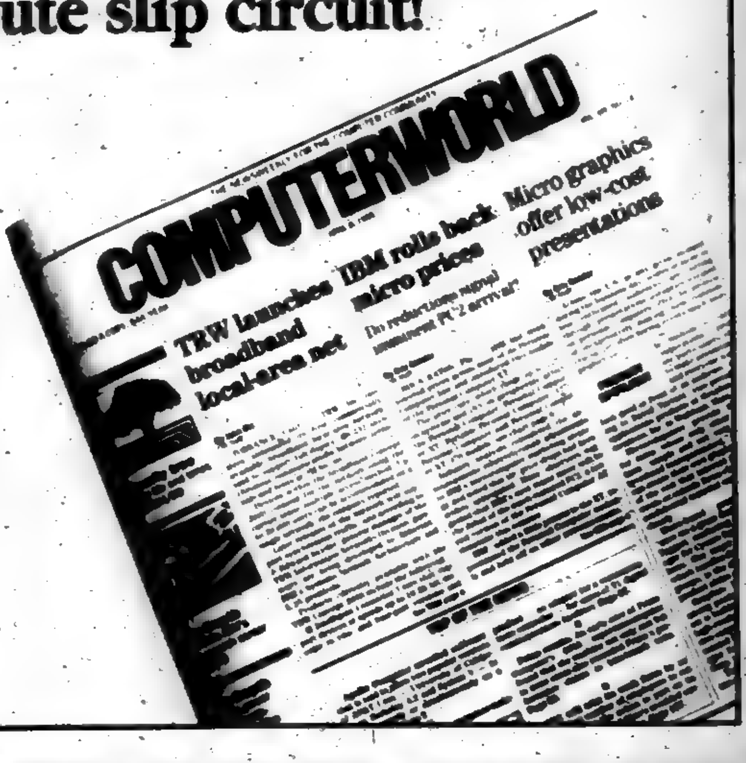
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VIEWPOINT

The myth of the East

By Charles P. Lecht

During the first half of the 1980s, Americans have painted a portrait of the Japanese computer industry that depicts a group of overzealous economic charlatans bent upon usurping U.S. world technological leadership by any means — moral or not.

Competing Japanese scientists, we are told, copy the results of our researchers unfairly and reproduce the products we intend to produce even before we start to do so. Adding insult to injury, we are told that those doing this graduated from U.S. universities where they gained the education needed to carry out their supremacy plans, which they could not have done had we barred their attendance.

According to the originators of this nonsense, who are faced with the need to explain why so many Americans prefer Japanese products over their own, Japanese companies producing these goods have an incilination to dump them at any time and at any cost into our marketplace for one nefarious business purpose or another. Aiding them is the Japanese government which, we are told, subsidizes the companies' losses.

First to paint this portrait of the Japanese computer community is the raft of U.S. companies that enter our own computer industry and are unable to cope with the competition they find when they arrive. Howling "foul" and launching suit to justify their foul howling, they blame Japanese competition for their financial woes.

For example, despite overwhelming evidence that a semiconductor company cannot expect to survive without a built-in marketplace for its product, such as a computer systems manufacturer or a defense contract, companies continue to enter the field to seek their fortunes without the faintest notion from where it's going to come.

Having spent their load without a score, their directions are now turned to litigation and the Japanese computer industry. Why not? It provides a ready-made defense from investors if bankruptcy is going to occur.

Next in line to buy the Japan-as-scapegoat portrait is the group of politicians representing districts unfortunate enough to have a faltering computer industry. Why blame anything local for the problem? It couldn't possibly be a homegrown snafu; it must be Japanese competition.

LECHT ON SCIENCE

”

It couldn't possibly be a homegrown snafu; it must be Japanese competition.

In the past five years, we've assigned to Japan just about all the reasons we could think of for our economic woes. Think about it. Whether these were electronics, steel, cars, radios, watches, textiles, toys, television sets — just about everything but oil and software — we have been inundated with unpleasant chatter about Japanese competition. So much so that were we to hear of the failure of just about any commercial enterprise this very day, we may well expect to hear that Japanese industry was the cause of it — especially if the stakes were high.

One after the other, politicians arrive in Tokyo, meet the local bigwigs, and then give a news conference on Japanese business and the U.S. Never have I heard one who said, "Before I came here I believed Japanese business was at fault, but now I've changed my mind."

Rather, all say exactly the same thing, "You've got to open your marketplace wider and stop dumping your stuff on our shores or else." "Stuff" is frequently a euphemism for high-quality products at cheap prices.

Even our government sees fit to assign fault for its real or imagined international trade problems on Japan. And even though Japan seems inclined at times to admit fault, one suspects that this is merely tossing a bone to visiting politicians. Japan's Prime Minister Yasuhiro Nakasone went on television, for example, to ask the Japanese people to buy U.S. goods, and he even provided them with a shopping list that included shaving cream and neckties.

A few years ago, I asked a U.S. government official what the U.S. computer industry would do if the Japanese suddenly declared that they would happily make all the computer systems we needed and give them to us no strings attached. He said, "We wouldn't take them; it would be a trap."

But studying the true state of the Japanese computer industry — how big it actually is in comparison with our own and how dependent it is upon ours — provides motivation enough for any honest person to put aside this attitude.

The precise reasons for Japan's meteoric rise in computer technology may never really be known, although I have some ideas on the topic. First and foremost is the level of U.S. investment in Japan — still most computers in the mid- to large-range produced in Japan are of U.S. origin, including those made by Japanese companies on U.S. licenses. Much of our semiconductor industry is located there.

But of increasing importance is the stability of manufacturing that Japanese companies offer. Only in the U.S. is that stability rivaled. Let's face it; when it comes to the mass production of high-quality electronics, skill alone won't do.

The up-front costs can be so high that the hope of ever seeing a return on investment may only be realized in a country that has a stable government and a peaceful labor force. Think of having made a plant investment in Lebanon in 1980.

"One thing the American computer community never considers is that we wish the peace that prevails in their use of our production facilities were matched by their peace of mind in buying our products too," one Japanese executive said to me. "On the one hand, we cannot turn down the business because we're strapped for cash.

"On the other, we'll never be able to develop our own product ideas if our plant production is substantially consumed making yours." His words portray the true state of affairs as seen by many Japanese computer executives, and we in the U.S. would do well to heed the message they bring.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies. He divides his time between Tokyo and New York.

Spies in the workplace

By Thomas Land

Several big trade unions are seeking global accord for the protection of their members from the electronic spies of modern industry.

"There is nothing wrong with those technogical wonders that boost productivity, tighten security or end boring work," concluded a study published by a United Nations organization in Geneva in response to the unions' demands. "The trouble starts when they are used to spy on workers, invade their privacy and divulge personal data to anybody who presses the right key."

Some enterprises have introduced card readers in place of door handles. To leave or enter their workplace, employees must insert their personal identity badges into an electronic slot. The stated purpose of the practice is the protection of sensitive industrial secrets. The process immeasurably increases the control exercised by the employer over the employees.

"The computer even knows when you go to the toilet," complained a trade union official at a recent conference.

READER'S PLATFORM

A similar specter looms in offices where word processors can produce daily statistics showing the number of operations performed, the time worked, the number of errors committed and even project the capability of the human operators.

"Electronics spying on workers is bad, but at least it can be identified, and remedies exist on the collective bargaining shelf," according to a paper published by the U.N.'s International Labor Organization (ILO). "Invasion of the privacy of workers is a more serious matter. It is difficult to prove, and effective antidotes are still in a laboratory stage.

"Details of a whole life can be squeezed on a few centimeters of tape. Hence the temptation, and the risk, to record personal information that is wholly irrelevant to the employer-employee relationship. Some data may be subjective, based on dubious sources or secretly recorded by an unauthorized person. However, once they find their way into computer memory, they are later treated as objective facts."

Several technologically advanced countries have recently adopted or tightened national legislation for the protection of privacy in the electronic age. An ILO survey noted that, although approaches vary, legal provisions usually cover such aspects as the purpose of personal data collection, access to computerized information and restrictions on its disclosure, the right of individuals to inspect their files and seek changes and penal sanctions for unauthorized use of data.

"Questions on the privacy of workers are increasingly being discussed at the bargaining table," according to the ILO study titled, "Technological change: a tripartite response, 1982-85."

It goes on: "A pace-setting collective agreement was recently signed at a General Motors Corp. subsidiary in Austria stipulating the conditions under which the firm can deal with personal information on workers. It contains severe restrictions on disseminating employee data, some of which cannot be released without prior agreement by the trade union.

"Transnational information flows via satellites have added a new dimension to the problem, increasing the risks of misuse, unauthorized disclosure and even theft."

Earlier, the ILO advisory committee on salaried employees and professional workers passed a resolution inviting the UN organization to initiate a series of studies with a view to establishing a compendium of principles and practices for safeguarding the privacy of individuals at the workplace. Such an initiative would broaden the substance of union-management negotiations everywhere.

Land is an author and foreign correspondent based in London.

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COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

Stop that PBX leak

Regardless of regulatory efforts to stanch the flow, private branch exchanges are leaking all over the place.

PBXs leak when they are capable of routing calls, which come in from remote office locations on dedicated lines, into the local telephone system.

A corporation in New York, for example, could run a dedicated line from its PBX to a PBX in a New Jersey facility across the border. Traffic destined for areas surrounding the New Jersey office could then be shuttled across that line and leaked into New Jersey Bell as a local call.

Dialing "81" establishes a connection to the New Jersey PBX, dialing "9" gets an outside line on that PBX and then the desired number can be dialed. But you don't have to do this manually. Most major PBX vendors provide software that does it automatically.

In practice, when a user dials a number local to the New Jersey complex, the system looks up the number and figures out if it is cheaper to route the call itself or send it across the border via the dedicated line.

The Federal Communications Commission frowns on this. To limit this practice, it developed a $25 surcharge for private lines connected to switching or other types of equipment capable of rerouting traffic into the local exchange.

This charge is meant to compensate local telephone companies for access charges that leaky PBXs avoid.

Recently the FCC decided in favor of users who claimed local exchange carriers have been overzealous in assessing this $25 surcharge. The commission issued a ruling clarification, saying local exchange carriers would have to repay

See STOP page 24

NEC rolls out Astra-TCMS

Cost management tool provides on-line accounting

By Paul Korzeniowski

BOXBORO, Mass. — NEC Information Systems, Inc. has announced Astra-TCMS, a communications cost management package that runs on NEC's Astra series of minicomputers and works with a variety of private branch exchanges (PBX).

Astra-TCMS, which can be used standalone or with NEC's Astra-Phacs telephone accounting system, enables users to maintain an on-line account of telecommunications equipment in use — such as telephones, cords, jacks, personal computers, modems and peripherals — and an inventory of equipment in stock.

The system can also be used to track what is known in the industry as equipment moves and changes, enabling users to keep tabs on relocated equipment. When a device is moved and the relocation entered into the system, the system automatically updates company directories of extensions.

Beyond equipment tracking, the software enables users to keep accurate records of internal cable runs, showing wire paths from a PBX through main and intermediate distribution frames down to individual extensions.

Key telephones — sets capable of answering multiple extensions — can also be tracked. Each extension followed under Astra-TCMS can have up to 32 keys or extensions. All lines and features are cross-referenced, enabling a user to print or display telephones sharing a common line appearance. Also, ring assignments, prime lines and usage can be entered.

The package can be used to generate reports showing the type and cost of telephones and other equipment used, class of service, station cable type, intermediate distribution frame setup, cable distribution data, spare-number assignment tables and operating parameters.

See NEC page 24

COMMUNICATIONS NOTES

Corning fibers win award

Corning Glass Works, Inc. has won a product engineering award from the National Society of Professional Engineers (NSPE) for its improvements in single-mode optical fibers. The NSPE said Corning had developed smaller, lighter and longer cables that improve the quality of transmission and reduce the need for repeaters and splices. Fiber optics for carrying voice, data and video signals are revolutionizing telecommunications, and the increasing demand for single-mode fibers has prompted Corning to double the size of its Wilmington, N.C., plant, the NSPE said.

■

Rolm Corp. announced recently that Rotelcom, Inc., its upstate New York distributor, will install a $14.3 million

See NOTES page 23

E-mail growth slow but strong

By Paul Korzeniowski

The number of new subscribers added to electronic mail services will drop this year compared with last, but strong industry revenue growth is projected through 1995, according to two market research firms.

A study called "Computer Based Message Systems: 1985 to 1990," by Venture Development Corp., a market research firm based in Natick, Mass., divided electronic mail into two categories: internal systems used by one company and general services such as those provided by MCI Communications Corp. and Western Union Corp.

According to the report, 50,000 new customers subscribed to electronic mail services in 1984. That number will drop to 25,000 in 1986 before the market settles into a period of moderate growth through 1990.

See E-MAIL page 24

INSIDE

Users can monitor data on leased communications lines using an IBM Personal Computer or compatible micro outfitted with an add-on package from Renex/23

NEW THIS WEEK

- Sun Microsystems introduces Sunlink X.25
- General Electric Information Services enhances its Genie consumer information service
- For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"Part of the job of network vendors is to hide all operations, provide user transparency. When your doing your job right, no one can see you."

— **William A. Lustig, director of marketing for Corvus Systems, a personal computer network vendor**

Gammalink's micro-to-facsimile transmission product debuts

Gammafax includes adapter cards, software

PALO ALTO, Calif. — IBM Personal Computers and compatibles can be used to send textual and graphics material to facsimile machines using a new product from Gammalink.

Gammafax is a bundled product that includes two adapter cards — one, a Gammacomm 9.6K bit/sec. modem, and the other, an IBM Synchronous Data Link Control card — and Gfax software. The product enables a micro to communicate with any CCITT Group III facsimile machine worldwide.

Memos composed on an IBM Personal Computer, which can include text and graphics, are stored to disk as a DOS file and then compressed into the Group III format for transmission with Gfax. The compression time depends on the speed of the user's computer but typically runs 30 seconds to 2 minutes, according to Michael Lutz, marketing vice-president.

Once compressed, the text is ready for transmission. It takes about 1 minute to transmit a single page of text to a Group III digital facsimile machine, Lutz said.

Conversely, a Personal Computer with Gammafax can receive a compressed image from a facsimile machine, display it on a monitor or output it to a graphics printer.

The micro must be outfitted with either an IBM color graphics card or an IBM enhanced graphics adapter. Graphics programs for the micro, which are capable of writing in all-points-addressable mode to screens supported by either of these cards, can be transmitted using Gammafax.

In addition to opening up facsimile communications directly to personal computer users, Gammafax enables users to take advantage of facsimile machines as a new in-house resource.

Because Group III facsimile machines provide high-quality output, micros with the Gammafax package can use in-house facsimile machines as if they were high-resolution printers. The only drawback is the facsimile paper used, which is shiny and probably not suitable for business correspondence.

Facsimile machines can also be used in the reverse direction as scanners. Documents or graphical material can be entered into the facsimile machine, read, compressed and stored as an image file. These files can then be displayed or printed using appropriate Gammafax software. Files cannot be manipulated.

Lutz anticipates that the system will be particularly appealing in foreign countries where imagery is an important part of communications, as in countries that use characters instead of letter alphabets.

Gammafax is available now for $2,490.

— John Dix

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Renex monitoring unit debuts

By Paul Korzeniowski

WOODBRIDGE, Va. — Users can monitor data on leased communications lines using an IBM Personal Computer or compatible micro outfitted with an add-on package from Renex Corp.

Datahawk includes a board that fits into an expansion slot of a micro — including the short slot of a Personal Computer XT or portable micro — a 48-in. test cable, software, a users guide and a function key template.

The menu-driven data scope is capable of monitoring asynchronous protocols, bit synchronous protocols like IBM's Binary Synchronous Communications and byte synchronous protocols such as IBM's Synchronous Data Link Control. It can also monitor X.25 links.

In use, Datahawk is inserted on a line between the data terminal equipment and a modem or digital serving unit. It can monitor a line, interactively test for problems, trap ASCII or EBCDIC data for further tests and print test results.

Tests include bit error-rate checking, block error-rate diagnostics, parity checking and character framing for asynchronous communications that use six, seven or eight data bits. Datahawk can also be used to test the performance of Cyclical Redundancy Checking-16 (CRC-16), as used by IBM, and CRC-CCITT, the international standard for this type of error checking.

While the tests are for data integrity, the general health of a communications line, such as noise level, can be deduced by analyzing the bit and block error rates.

All test results are downloaded to disk in standard ASCII format. The company does not offer any report generation capabilities.

Early next year, the company plans to offer a protocol analysis option for Datahawk that will enable users to examine the header fields of synchronous protocols, according to Shane Clawson, director of sales and marketing. The option, made possible by adding a programmable read-only memory to the Datahawk board, will allow users to break down headers to examine things like synchronizing bits and address information. Typically, data scopes analyze only data within the data fields.

Clawson said the product is targeted at three markets: network suppliers, vendors of communications products such as protocol converters and users with medium- to large-size networks.

System requirements for Datahawk include an IBM Personal Computer equipped with 256K bytes of random-access memory, a double-sided disk drive and IBM's Version 2 or higher of IBM's PC-DOS operating system.

Datahawk, which is available four weeks after receipt of order, costs $975.

S/38
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Notes: NASA's radio speech unit

From page 19

Rolm system at the University of Rochester. The system is the single largest Rolm CBX II sold to date. It will include 15 nodes connected by fiber optics and microwave links and support 13,000 voice lines and 5,400 data lines, Rolm reported. An unreported number of the voice lines will also support simultaneous data transmission. The configuration will use Rolmbus 295 technology and feature automatic call distribution and route optimization. Rolm's Phonemail will be available to 3,000 users initially. Installation was begun in October and is expected to be complete in early 1987.

■

A device that can reproduce intelligible speech over a radio channel with one-sixth the capacity of channels used with conventional radio telephones was recently demonstrated at a National Aeronautics and Space Administration briefing at the Jet Propulsion Laboratory in Pasadena, Calif. The so-called vocoder, presented by Allen Gersho, director of the Communications Research Laboratory at the University of California in Santa Barbara, reportedly "squeezes enough fat out of the spoken word to fit it into the extremely narrow radio channels that are still available in the crowded radio spectrum." The processed voice is said to sound slightly degraded but still intelligible.

The work is said to be part of a broader NASA effort to develop a mobile communications system available in all areas, not just urban areas. The system will be satellite based and require the development of small, lightweight antennae. But the largest technological hurdle is said to be the development of a vocoder that can reproduce near-toll-quality speech at 4.8K bit/sec. and be mass-produced for less than $100. Against these goals, Gersho rated the quality of the laboratory's vocoder as "not bad" at a "tolerable" price.

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E-mail growth slow but strong

From page 19

Competition from multifunction office automation vendors and user disappointment in services are two reasons for the decline in the number of new subscribers captured, the survey noted. Another reason is that Western Union and MCI added a number of subscribers to their respective services — Easylink and MCI Mail — in 1984, establishing artificially high growth rates for that period.

Also, several services supply capabilities for only one type of equipment, and this hinders widespread acceptance. The survey predicted that AT&T may soon enter the market and establish electronic mail standards.

While growth in new subscribers has abated, service vendors may increase their revenue by encouraging current users to send more messages, according to the study.

The Venture Development study costs $1,850.

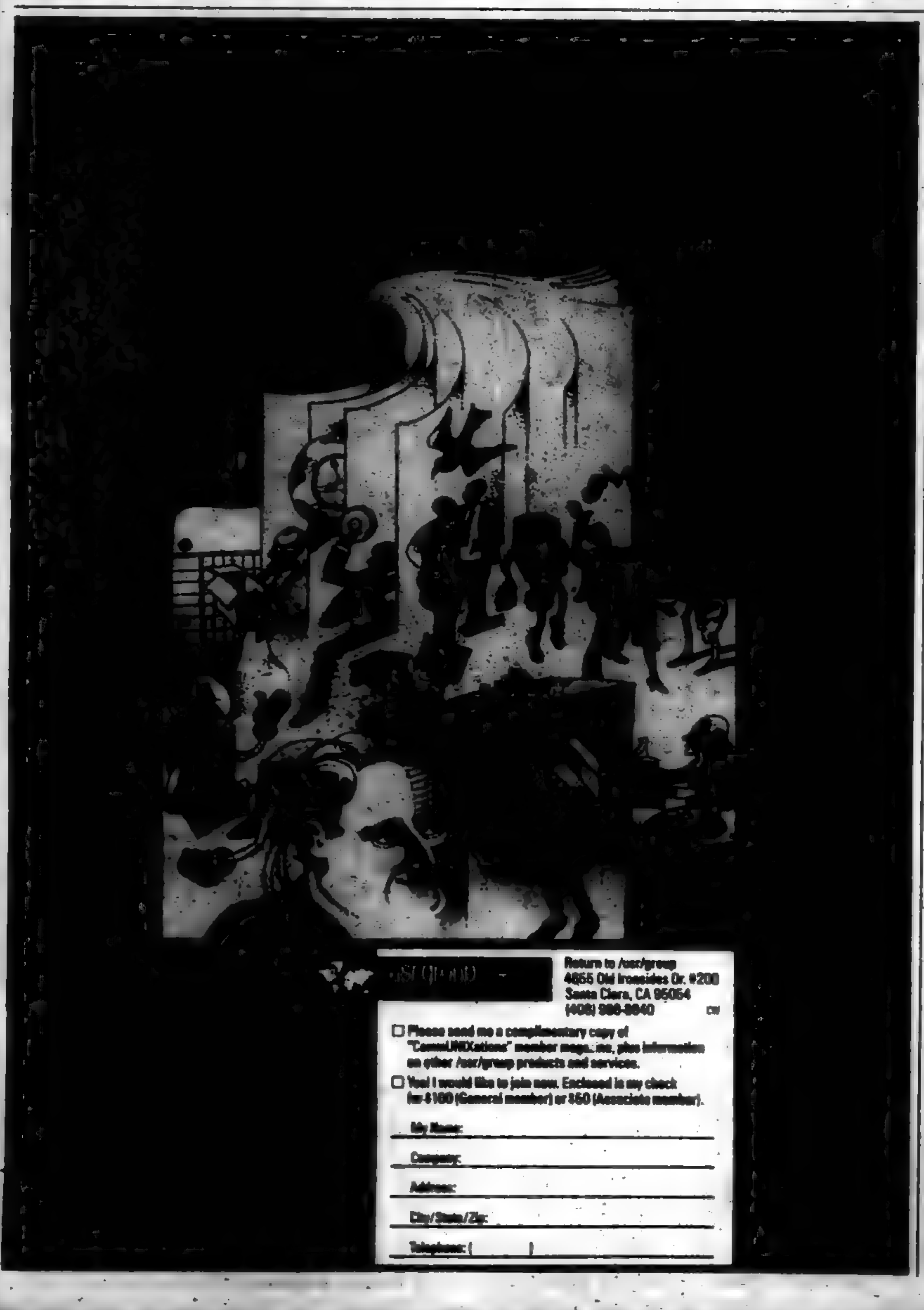
Business Communications Co. a research company located in Stamford, Conn., is bullish on revenue growth for electronic mail. The survey, "The Electronic Mail Revolution: Implications for Users and Suppliers," concluded that "several important factors will quickly converge to move this technology forward at a very explosive pace."

The number of electronic mail transactions carried by the commercial service providers such as MCI and Western Union is expected to grow at an anual rate of 62% between now and 1995, according to the survey. In 1985, 120 million mail transactions were supported, a figure that will grow to 6.1 billion in 1990 and 15.1 billion in 1995.

The total number of electronic mail transactions — taking into account mail handled by corporate in-house systems and missives transmitted from home computers — will grow from 360 million in 1984 to 24.9 billion in 1985 and 64.9 billion in 1995, according to Business Communications.

"Measurable revenue from electronic mail processed through the commercial service providers will increase from $250 million in 1985 to $11.5 billion in 1995, an average annual rate of 47%," the company said.

The report is available for $1,500.



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NEC rolls out Astra-TCMS

From page 19

Astra-TCMS was designed to complement Astra-Phacs, a NEC package that supplies station message detail reporting and traffic management reporting.

NEC Information Systems claimed that more than 1,000 Astra-Phacs have been sold.

When used together, information reportedly can be shared between the two packages, including data on tenants, divisions, departments, extension numbers, directories and cost allocation.

Data base diagnostic facilities enable tests to be conducted for inconsistent and missing data that ensures record accuracy, the company reported.

The $8,500 Astra-TCMS software is available immediately, the company said.

Astra-TCMS runs on an Astra system with 512K bytes of random-access memory.

Stop that PBX from leaking

From page 19

customers the surcharge if the customers filed an exemption request.

The actual existence of leaking PBXs is, after all, hard to detect and police. The capability exists in software. Local telephone companies have little way of telling if the calls they accept originated at the switch site or at a distant switch location.

As it turns out, however, it isn't so easy to tie PBXs together in the first place.

Typically the facilities used to interconnect PBXs are so-called tie lines or tie trunks. Tie trunks are one of the more complicated things in voice communications. This is because you run into terrific problems of matching signal levels on different switches, which may be of different brands.

Even before the AT&T divestiture, when the phone company was providing both ends and the middle of a circuit, there were frequently problems making tie trunks work properly. Echo and other problems result from signaling and transmission snafus between switches.

Foreign exchange (FX) lines, where one end connects to your switch and the other end connects to a local exchange company's central office switch, are easier to implement than tie lines. While they don't give you the same capabilities as a tie line, sometimes they can be used in a similar fashion. An office, for example, can use an FX line to leak traffic into a frequently called exchange, rather than pay for each individual call to that exchange.

It is clearly in the interest of telephone companies to stop PBXs from leaking and do whatever else needs to be done to keep local revenue. But it is equally clear that ambitious users will continue to search for loopholes in tariffs in an effort to keep a rein on escalating communications costs.

SOFTWARE & SERVICES

SOFTALK
John Gallant
CW Senior Editor

IBM spotlights restructuring

IBM has a knack for bringing issues to the forefront.

A case in point is the recent introduction of the Cobol Structuring Facility (Cobol/SF), a tool IBM claims will automatically transform users' old, tired Cobol programs into easily maintained, structured programs. (Readers may relax. The author has foresworn the use of the phrase spaghetti code to describe unstructured programs. It is a grating term that should be discarded before it gains wider acceptance.)

Cobol/SF's capabilities aside, IBM has brought the issue of code restructuring into the spotlight. Before IBM's entry into the fledgling market, a handful of considerably smaller players were working diligently to convince maintenance-besieged DP managers of the benefits of code restructuring. With IBM's blessing, it seems clear that the concept will get more attention now.

Gordon Gossage, director of marketing for Language Technology, Inc., a Salem, Mass.-based company that offers both a restructuring service and product, said DP managers are interested in the idea of code restructuring — that is, once they hear about it.

Gossage said his company recently hosted focus group sessions with DP professionals, and several underlying themes became clear. Above all, DP managers emphasized that maintenance has become an onerous task — one that consumes as much as 75% of some shops' resources. They said poorly written, unstructured programs developed in the past are the main source of their maintenance woes, and they agreed that structured programming techniques will reduce future maintenance requirements.

What the majority didn't know, Gossage said, was that tools and services exist that purport to unravel unstructured code and, therefore, reduce current maintenance work loads.

"Restructuring is a new idea," Gos-

See IBM page 30

IBM's CPF Release 7 receives praise from users

By John Desmond

The enhanced IBM System/38 operating system, CPF Release 7, now widely installed after deliveries began in September, has been well received by users.

Gene Gellman, director of information services at Cyro Industries of Sanford, Maine, said Cyro had Release 7 installed on its two System/38s in mid-October. The upgraded release of the operating system was announced last summer [CW, June 24] when IBM moved to make the System/38 a key component of its office systems network. Gellman said Cyro is happy with the new release's support for IBM's Systems Network Architecture Distribution Services, which enhances communications between the two processors.

In addition, Gellman said the Join function added to CPF in Release 7 has aided Cyro's programming efforts. The Join operator allows two physical files to be joined together in any field to create one file. "We find the Join function to be phenomenonally effective. It's saved us hundreds of lines of application code." A bill of materials application that pulled data from various physical files was done in half the time it would have taken without the Join operator, said Gellman.

"Another feature we think is nice is the ability to display a job log, so if you have a problem, you don't have to kill a job," he said. In the past, if a program encountered a problem during execution, the job had to be canceled. Now, the problem can be ascertained and remedied while the program is running.

Asked to make a comparison between the System/38 data base management system (DBMS) and those of indepedent software vendors, Gellman said, "The System/38 relational data base lacks two key things: one is a good data dictionary, the other is update capability with Join." Files created with the Join operator are read only; updates must be made on the physical files used to create the joined file, Gellman said. Days after Release 7 was installed at Cyro, the company suffered a head crash in one of its IBM 3370 disk drives. Cyro discovered that the process of restoring the system after a head crash is

See CPF page 29

Ingres DBMS Version 4 out

By John Gallant

ALAMEDA, Calif. — Relational Technology, Inc. is expected today to release Version 4 of its widely used Ingres system. The announcement comes just two months after the company introduced an IBM VM version of the relational data base management system [CW, Sept. 30].

According to a spokesman, Version 4 of Ingres supports distributed access to all Ingres data bases in a network of dissimilar computers running Ingres under AT&T's Unix and Digital Equipment Corp.'s VMS operating systems. Relational Technology earlier provided distributed processing support among similar operating environments with the release of its Ingres/Net product two years ago.

Ingres now supports both the Quel and IBM SQL-query languages within the VMS and Unix environments. The spokesman

See INGRES page 29

Sequent enhances Dynix operating system for Balance

By Donna Raimondi

BEAVERTON, Ore. — Sequent Computer Systems, Inc. has announced enhancements to its Dynix operating system and a series of parallel programming tools for its Balance computer systems.

The enhanced version of the Dynix operating system features both AT&T's Unix System V and University of California at Berkeley's Unix Version 4.2 capabilities. The vendor claims that Dynix 2 will run applications on the Sequent Balance 8000 parallel processing machine up to 45% faster than the previous version.

The programming tools support the development of parallel applications in C, Fortran and Pascal and include a parallel debugger, enhancements to the company's parallel programming library, a perfor-

See SEQUENT page 30

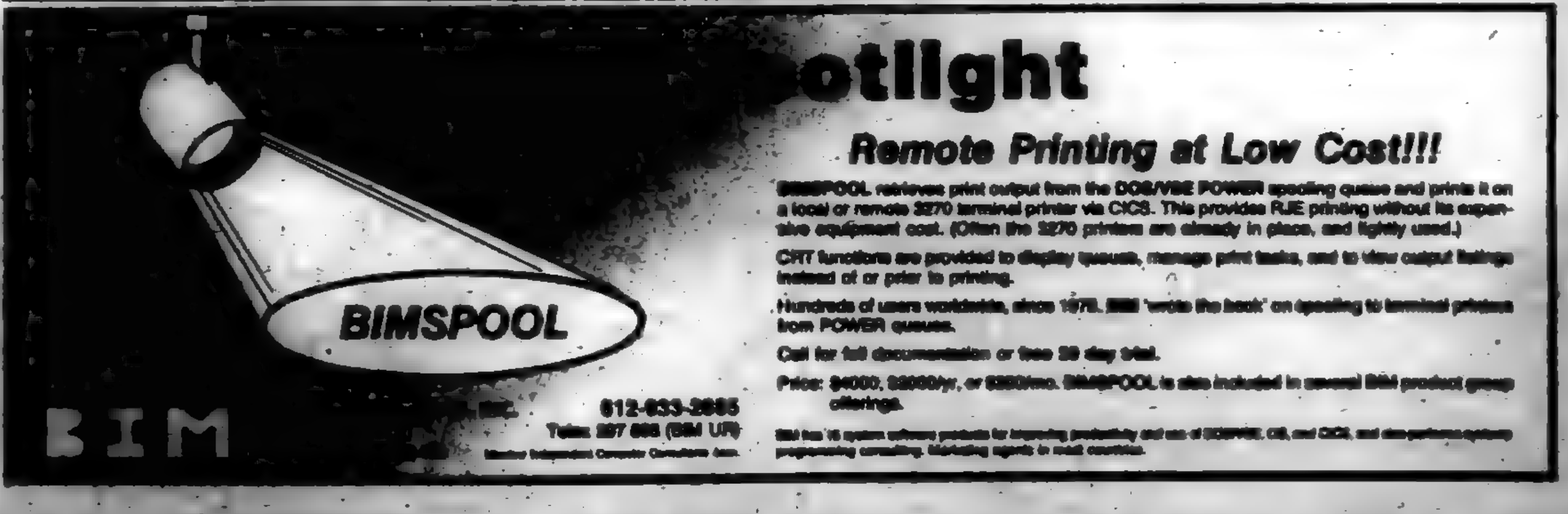
NEW THIS WEEK

- Britz Publishing announces five desk accessories for IBM System/34 and 36
- Charles River Data Systems upgrades its Unos operating system
- For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"An ancient, compelling myth is that the next language, the next generator, the next data base schema, the next methodology, will make everything easy. No language will dissolve the innate difficulty of computing. Fleeing from language to language consumes resources that might go into solving problems."

— **Nicholas Zvegintzov, publisher of "Software Maintenance News," on the future of software development**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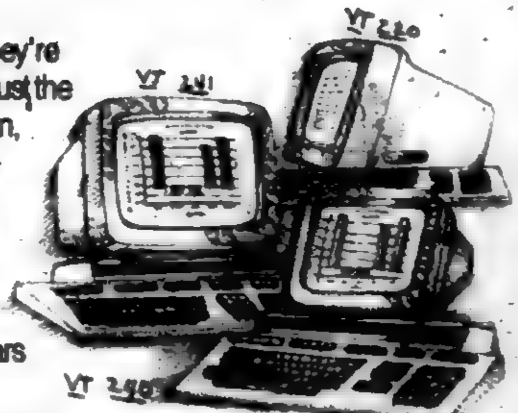

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CPF Release 7 receives praise

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more involved with CPF Release 7 than on previous releases. "We had some serious problems bringing back the logical and physical files because the access paths were not being restored properly," Gellman said. (The access path is a binary index to the records and fields of physical files.)

A restoration, essentially a recompiling of programs, that previously would have taken six hours took 18 hours. IBM did send out a program change fix that seems to have resolved the problem, Gellman said.

The 3370s are attached to System/38s in a single-level architecture, which means when one drive fails, "the whole system goes down because data is scattered throughout," Gellman said. Data must be restored from backup media. On a 4300-class mainframe, one failed drive will not bring down the system. Gellman noted that IBM is trying to find a solution to the problems surrounding 3370 failures.

'Pushing for the Join function'

Robert C. Nixon, a systems analyst with The Way International of New Knoxville, Ohio, a Biblical research fellowship and teaching organization, also had Release 7 installed in mid-October. "We've been pushing for the Join function for five years," Nixon said.

The Way has a data base of names and addresses that goes back to System/3 days, previous to System/38's release. A total of 500 programs now access the data base, though only 14 can perform updates.

Functions and users were continually added until the data became a "hodgepodge that was very difficult to merge and expand," Nixon said. "We wanted to get it into better relational structure, but we wanted to keep the existing programs the way they are."

Using the Join operator, The Way is breaking up the data into name, location and participation records. In a major undertaking, all new development at The Way will be based on a new version of the old data base.

The Way plans to buy Personal Services/38 and Personal Computer Support/38, also announced in June. Personal Services/38 enhances System/38 communication with other IBM products including the System/36 and the Distributed Office Support System. Personal Computer Support/38 supports the exchange of data between IBM Personal Computers and System/38.

Nixon is anticipating using Personal Computer Support/38's dynamic Join feature that allows personal computer users interactively to set fields and records needed to create a joined file. "We're excited about it as a development tool," said Nixon of Personal Computer Support/38. The company has six Personal Computers among a total of 50 devices attached to its System/38.

The communications enhancements in Release 7 make the option of bringing in a System/36 to handle The Way's word processing tasks an attractive one, Nixon said.

The department now performs word processing on IBM 5520 terminals with limited communications abilities.

Man-years required cut in half

Nixon projects that Release 7 will cut in half the previously estimated four to eight man-years required to modernize its data base. "And we're adding a level of sophistication and function we never had before," he said. "Routine requests [that] we'll handle with Join we would have refused to handle before because it would take too much work."

Like Gellman at Cyro, Nixon hopes a data dictionary with editing capabilities will be added to System/38's relational DBMS. And he hopes IBM SQL-like commands for accessing the data base and a good report writer will also be offered. IBM is receptive to adding the enhancements, Nixon said.

"The whole idea of implementing Join opens up all kinds of other areas to go into," Nixon said. If IBM takes System/38 in the direction Nixon advocates, the System/38 relational DBMS and tools will eventually closely resemble those offered in the fourth-generation language products offered by independent vendors.

"We'd like to see IBM continue to build the functions into the system, instead of each user having to build it into the system," Nixon said.

While he expected System/38 to be a strategic machine for IBM in the 1980s, his impression from attending a recent IBM users meeting is that, "IBM is looking for System/38 to go into the 1990s."

Ingres DBMS Version 4 out

From page 25

said Relational Technology's implementation of SQL is compatible with IBM's DB2 relational data base management system and offers extensions such as international date and money data types.

Also, the spokesman said, Ingres' performance for most applications has improved, on average, by 40%.

Version 4 features enhanced applications development tools such as function keys that allow users to enter commands with one keystroke.

Volume shipments of Version 4 are scheduled for February. Ingres is priced between $7,500 for the DEC Microvax II to $90,000 for IBM mainframes under VM/CMS.

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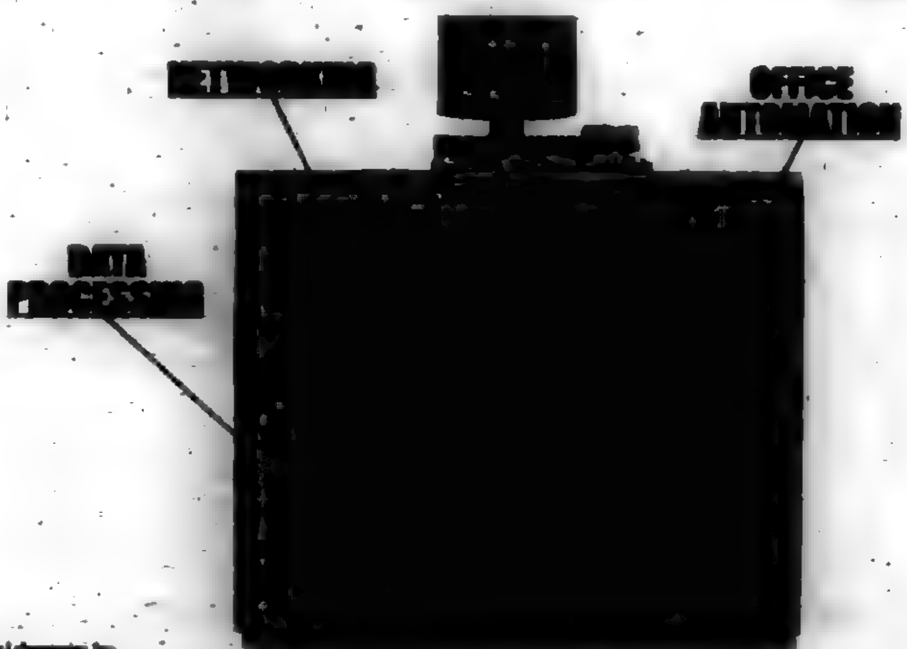

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IBM spotlights restructuring

From page 25

sage said, "and people are skeptical. Users don't believe an automatic restructuring solution is feasible. We spend about three-quarters of our time convincing prospective customers that the technology works. The IBM announcement has brought the issue to a higher plane. IBM is saying, 'This solution is feasible.' "

According to Gossage, success for the new products rests on how much user intervention is required to complete the restructuring process. He said Language Technology's Recoder system can automatically restructure any IBM Cobol program — no matter what shape it's in. That is not the case with other products, Gossage claimed, notably IBM's.

"Cobol/SF's analysis mode identifies the program sections the product cannot automatically restructure," he said. "Manual restructuring is a very difficult process. At a recent Guide [IBM users group] meeting, IBM recommended that users put their best programmers into the restructuring effort with Cobol/SF."

Pander to users' fears

But the most important question may be whether restructuring is really the answer to the current maintenance overload or whether, as some critics have claimed, the products simply pander to users' fears of maintenance.

Gossage and the other restructuring pioneers said they sincerely believe that restructuring is the answer. He said a number of studies have shown clearly that unstructured code is two to three times more expensive to maintain than structured code.

"Restructuring does not replace the need to write new programs using structured techniques," Gossage said. "But when it comes to existing programs, users don't have a lot of alternatives.

"Stay with the current approach, and the maintenance task will get worse and more expensive. Or you can totally rewrite all your systems in structured code. That costs anywhere from $10 to $30 per line of code.

"The third alternative is to restructure. We charge, for example, between 10 cents and 50 cents per line of code. That is the most cost-effective approach. You can see a payback in the first year," Gossage said.

With IBM's help, Gossage said, 1986 will be the year in which the concept of restructuring takes wing — in a market sense, that is. "We estimate that there are 77 billion lines of Cobol code out there, and two-thirds of them are unstructured. Between us and IBM," he said, "1986 will be the takeoff year for restructuring."

Certainly, the maintenance issue is a hot one and if any company can focus attention on an issue, it's IBM. But the restructuring vendors will have to educate a lot of users on the capabilities of restructuring technology, and that takes time. Whether the concept will win over a large camp of users next year remains to be seen.

Sequent enhances Dynix, Balance

From page 25

mance monitor and a software generation system.

All of the tools will be available as part of the Balance 8000 system software, with all but the debugger being shipped with Release 2 of the company's Dynix operating system later this month. The debugger is scheduled to ship in the first quarter of 1986.

The debugger, dubbed PDBX, allows a programmer to debug multiple processes as if they were one. When an individual process or combination of processes reaches a predefined condition, any or all processes can be stopped and examined. Its command interface is an extension of the DBX debugger, which operates with Unix 4.2.

An added barrier function in the parallel programming library provides for synchronization of multiple processes. A barrier provides the programmer with a common stopping point for groups of processes that all must satisfy some condition before any can proceed.

Also, a shared memory facility in the library, based on a mapped file model, supports paging of shared memory. It lets the programmer declare multiple independent shared memory regions that can be larger than physical memory.

Optimum load balancing

The performance monitor tracks processor utilization on each Balance CPU. The data facilitates applications tuning for optimum load balancing across processors.

It can be used to show time spent in system code vs. user code for each process; to show I/O, network and paging traffic; to highlight load balancing problems or find looping modules; and as a system administration tool.

The software generation system is said to exploit Sequent's parallel processing facilities to build software systems more quickly. It is an extension of the Unix Make utility, the vendor said.

Shipments of Dynix 2 will begin this month. As an upgrade to customers, the package will cost $2,000. It is free to customers of Sequent's software support program.

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VSAM structure and requirements for its effective implementation are presented in this course, including its use on-line (with CICS/VS), batch (with COBOL, Assembler or PL/1) and through Access Method Services.

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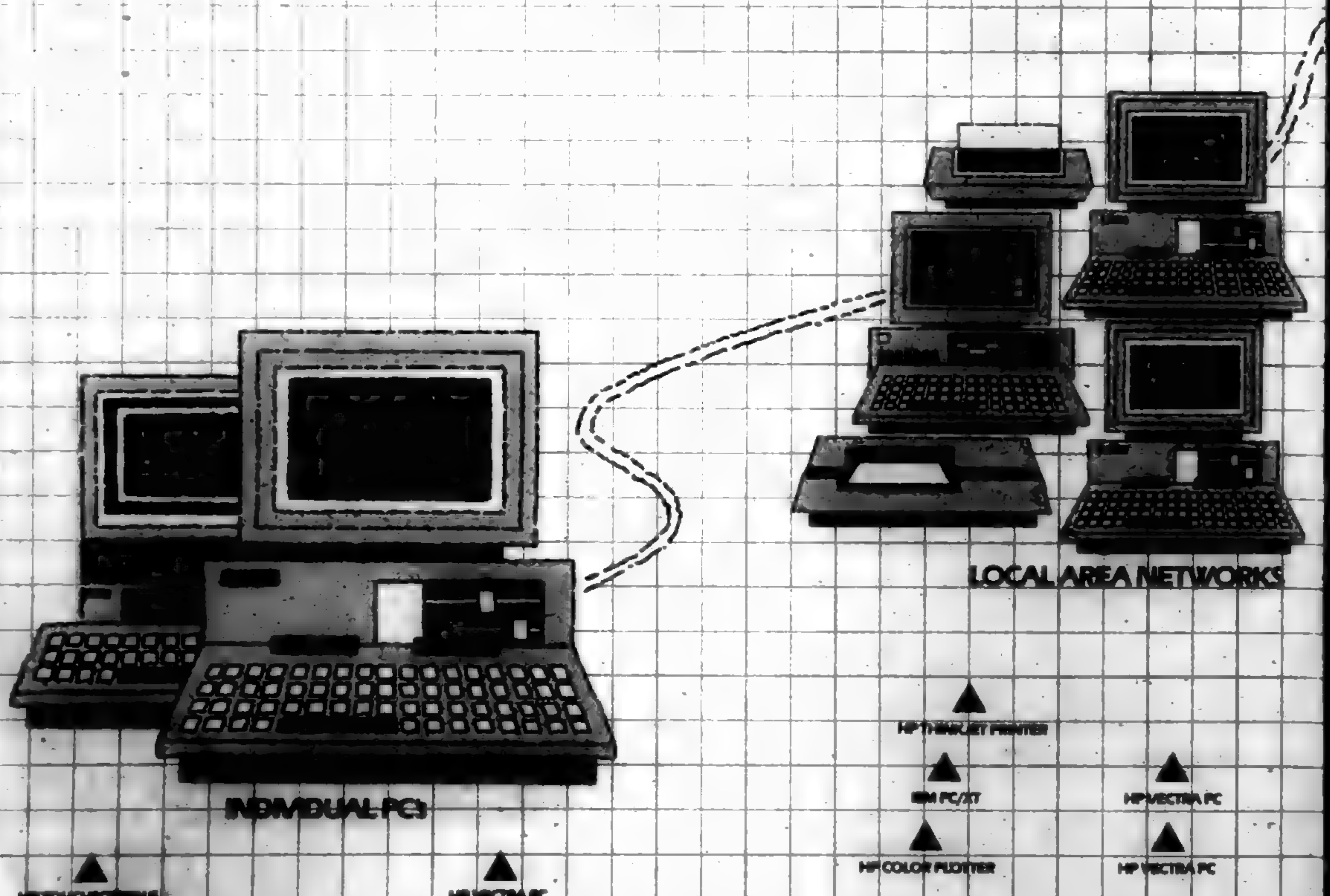

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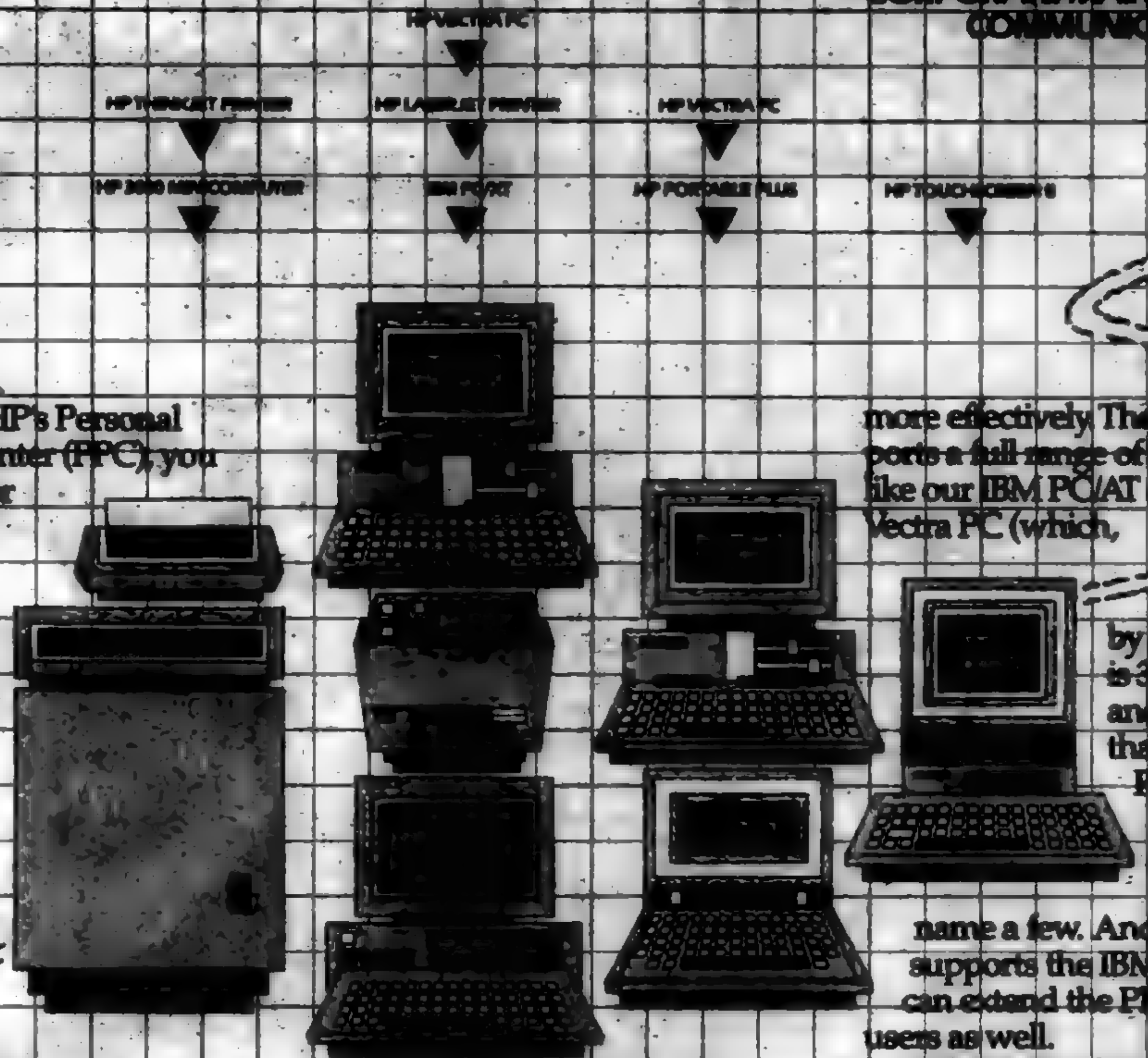

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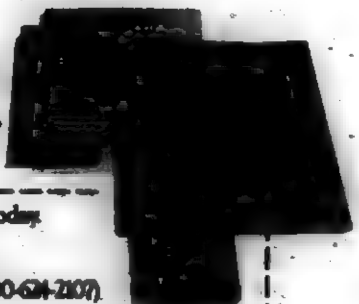

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

PDP-11 marks 15th year

In an age when computer companies disappear before their products reach the market and products are obsolete before they are delivered, the fact that a product passes an anniversary can be notable, if not newsworthy.

Therefore, it may be more than noteworthy that a group of products in the dynamic processor market has made it to its 15th anniversary, which is the crystal anniversary for those who adhere to traditional gift-giving practices.

Richard Nixon was president, and the IBM 360/195 was a star in the mainframe world when Digital Equipment Corp. introduced the PDP-11 family of minicomputers. Most 360s long ago went to the junkyard, and Nixon is arbitrating baseball disputes, but the PDP-11 is hanging in — even thriving in some markets.

"It is a fabulously successful machine, perhaps the most successful machine of all time," said Boston-based consultant and DEC-watcher Sonny Monosson. "There are over 500,000 [PDP-11s] out there, so many that even if DEC wanted to replace them all, they couldn't produce replacements fast enough."

The PDP-11 has been written off as doomed several times, usually by boosters of DEC's own VAX-11 series or by users who may be wary of 15-year-old technologies. It not only has survived but continues to be enhanced, most recently with DEC's addition of the Micro/PDP-11/83.

The original family member, PDP-11/20, bore little resemblance to today's PDP-11s and Micro/PDP-11s. The boxes and the boards have been replaced by smaller boxes and microprocessors. Some systems still need computer-room-type power supplies, but most PDP-11s are available in deskside office versions. Some versions still use DEC's Unibus, while others have moved to the Q-bus.

However, the basic instruction set

See DEC page 39

Options for 3090 users

Power supply alternatives to IBM recommendation

By James Connolly

The IBM specification for supplying power to its 3090 mainframes is being short-circuited by some customers who have found ways to save up to $60,000.

While IBM officials have reported no signs of fall-off in sales of its 3089 Power Unit in conjunction with 3090 Model 200 sales, some 3090 customers have turned to other vendors who supply products needed to retrofit existing power supplies to support the 3090.

At issue for some customers interviewed since 3090 installations began is IBM's recommendation that customers install two 3089s, priced at about $38,000 each, for each 3090 Model 200 and four 3089s for each Model 400 scheduled for delivery in late 1986.

The owner of a Newport, R.I., electrical service and consulting firm said that his firm is one of several throughout the U.S. offering products and services that allow 3090 users to utilize the existing 3089 or whatever power supply was used with the IBM 3080 series or 3030 series processor that is being replaced.

"IBM has a nice [3089] box. It runs well, is designed well and holds up as well as anybody's. There is no problem with it except it costs too much," said James H. Clausen of A. P. Systems, Inc. in Newport.

Clausen said IBM officials have told him they require the two feeds because a single 44-kVA feed from a 3089 comes close to exceeding the 125A rating of the connector to the 3090's power and coolant distribution unit, the 3097. He speculated that it is only a matter of time before IBM replaces the 3089 with a power supply designed specifically for the 3090. Meanwhile, he and several other vendors are offering attachments such as a splitter — in Clausen's case a product known as the Multiple Distribution System (MDS) — which breaks the single feed from an existing power supply into two feeds. Some of those alternatives fit under the computer room floor, while others were designed to fit in cabinets.

One customer that installed the A. P. Systems MDS is Sebouth Asadourian, man-

See USERS page 39

Gruner discusses Alliant, FX/8

By Donna Raimondi

The word "alliant" — an early French version of the word alliance — means a mutually beneficial relationship. It aptly describes the type of company that Ronald H. Gruner and his two associates founded in 1982.

Ronald H. Gruner, president, Alliant

Alliant Computer Systems Corp. builds parallel processors for the scientific and engineering marketplace. "The appetite for computation [in that market] is almost insatiable," he said. "If you can sell faster machines — if they are available — they will take them. They require them."

The company, which provides low-end supercomputing power to that market segment, will have installed about 10 of its FX/8 parallel minisupercomputers by the end of 1985. It recently signed a $35 million deal with Apollo Computer, Inc. for its processors to act as servers in Apollo Domain networks.

During a recent interview in his office Gruner talked about the growing company and how it began.

The technology for the Alliant FX series machines — said by parallel computer technology analysts to be the only commercial machines actually doing parallel computing — was not a flash of brilliance from a mad scientist dedicated to the search for truth and beauty in machinery. It was the result of a calculated search by the Alliant founders: Gruner, the president; Rich McAndrew, vice-president of engineering; and Craig Mundie, vice-president of software. They sought a technology that was different from what was on the market and that would be salable, Gruner said.

"We quickly came up with the idea that if we could commercialize parallel processing — in other words, develop a system that would truly run existing software — and increase the performance of the sys-

See GRUNER page 37

INSIDE

Point 4 Data enters the supermini marketplace with its Mark 12 system/36

Wang Laboratories offers a midrange system for its Office Information System product line/36

Inner Access unveils its Noel eight-user supermicro/38

NEW THIS WEEK

- The Automation Group announces the MDL-22 data acquisition device
- Hewlett-Packard introduces two hard disk drives

■ For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

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— Consultant Sonny Monosson on the DEC PDP-11

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Wang pumps up mid-range OIS family

By James Connolly

LOWELL, Mass. — The Wang Laboratories, Inc. Office Information System (OIS) product family, which has been rumored to be doomed despite the company's promises of future enhancements, recently received a mid-range addition.

Wang introduced the OIS 70, a 12-user system that is intended to provide an upgrade path for users of the four-user OIS 60 and the eight-user OIS 50.

The OIS 70 was designed to handle text editing and office automation in small and medium-size departments and businesses. It is compatible with all other OIS systems, the vendor said.

Fits into virtually any office

Wang said the system fits into virtually any office. It features a 5¼-in., 67M-byte Winchester disk drive with a 28-msec access time and a 5¼-in., 320K-byte diskette drive.

It supports combinations of up to 17 peripherals, 12 of which can be terminals, including Wang 4200 series workstations and Wang Professional Computers.

Wang said four of the terminals can be low-cost OIS Internal Workstations.

The company also said a field upgrade from an OIS 50 or OIS 60 requires no document conversion or operator retraining.

Standard software reportedly includes Wang word processing with functions such as Wang Glossary for retrieving standard words and paragraphs, Wang Decision Processing for automating word processing commands and Wang Math Support Package for common mathematical functions.

Optional application packages

Optional Wang application packages include WP Plus text editor, List Processing, Spelling Verifier and Readability Analysis.

Available data processing functions include Wang Office Basic or Digital Research, Inc. CP/M operating system.

Communications resources include Wang's Wangnet local-area network and Fastlan, a user-installed version of Wangnet.

As an option, OIS 70 supports Wang Inter System Exchange, which permits links between new and current OIS systems for sharing peripherals, software and documents, according to the vendor.

The OIS 70 was announced less than two months after Wang executives told a Wang users group meeting that the company would continue to support and enhance the OIS line, in contrast to industry speculation that OIS would be phased out. However, one analyst still termed the OIS 70 as an "end of life kicker" for the product line.

The OIS 70 is scheduled to be available in January. Prices for the product will start at $12,000 for a system with the 67M-byte hard disk drive.

Point 4 Data launches Mark 12 supermini

System targeted to vertical industry marts

By James Connolly

IRVINE, Calif. — Point 4 Data Corp., a 7-year-old minicomputer maker, has introduced its first superminicomputer, a system that the company said provides five times the performance of its previous high-end computer.

The Mark 12 has a 16-bit CPU but is based on a four-stage pipeline architecture and a 32-bit bus that operates at 33.3M byte/sec. in support of up to 16M bytes of extended memory, according to a company spokesman.

The Mark 12 reportedly features a 64-nsec instruction executive cycle time and performs between 7.5 million instructions per second (MIPS) and 15 MIPS, the vendor claimed.

Like other Point 4 products, the Mark 12 will be distributed only through value-added resellers that target vertical industry markets such as the medical field and the construction industry.

Available now, the Mark 12 reportedly supports a physical maximum of 100 ports, although the company said a realistic number of users would be 50 or 60 in typical accounting or office automation applications.

The Mark 12 uses a single 15-in. board with 128K bytes of main memory. A basic configuration, including an 84M-byte disk drive, a ¼-in. streaming tape and an eight-port multiplexer, costs $42,430, the vendor said.

The Mark 12 is being added to the high end of Point 4's product line, above the 2-year-old Mark 9.

The company said it continues to offer the previous products.

One current Point 4 user, Robert Eller, computer operations manager for Louis Patnos Iron & Metal Co. in Holland, Mich., said of the product, "We're very anxious to see it. We have been running a Mark 9, which is now the top of the line. But as we keep growing, we keep looking for something to handle that growth."

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[illegible] Old Ironsides Drive, M/S [illegible], Santa Clara, CA [illegible]

Gruner discusses Alliant, FX/8

From page 36

tem by simply adding additional processors, that would potentially be a major new idea in computing," Gruner said.

Gruner was no beginner in the world of processors. He spent 13 years developing processors for Data General Corp. In Tracy Kidder's book *The Soul of a New Machine*, which told the development story of DG's FHP computer, Gruner was an antagonist, called the "North Carolina leader." Although the product developed at that time never went to market, he helped design processors for DG's Nova series and the Eclipse MV/8000, MV/4000 and MV/10000.

When he and his associates founded Alliant, "We spent a lot of time at the MIT library," Gruner said. They went through 4-ft-thick stacks of books and papers at a time to determine who understood how to perform parallel processing with existing software rather than throwing away the software and starting over.

In most of its study, the group reached the conclusion that parallel processing could not be done with existing computer structures, existing languages or existing applications. "We felt that [starting over] was not commercially viable," said Gruner.

But researchers at the University of Illinois had written papers as far back as 1973 applying parallel processing to ordinary programs. One of those papers, coauthored by David Kuck, developer of the university's Cedar supercomputer project, sparked Mundie and Gruner to learn parallel processing directly from Kuck in Illinois. "We came away saying, 'We think we can commercialize this,' and that's what we began doing," Gruner said.

[illegible]

"We have been very aggressive in trying to identify the ideas that were developed in Illinois that we thought were commercially exploitable," Gruner said. "We have worked hard to develop a symbiotic relationship between that academic perspective and our commercial perspective."

True parallel processing includes the application of multiple computers to the execution of a single computationally intensive program, Gruner stated. "If you have a program on one computer that runs in eight hours, and if you add three additional computers for a total of four, the thing would run in two hours," he said.

Alliant's FX/8 parallel processor looks at a Fortran program, identifies what parts of the program can run parallel, what can be vectorized and what must remain scalar. DO loops in Fortran, which are generally a large part of a Fortran program, are the only parts of the program that can run in parallel at this time.

What makes it possible for Alliant to claim parallel capabilities, Gruner said, is a combination of the FX/8's compiler, its hardware architecture and the design of the operating system. The compiler identifies opportunities for parallel execution and generates efficient code for execution, Gruner said. It was developed jointly by a team at Alliant, the Massachusetts Computer Associates in Wakefield, Mass., and the Pacific Sierra Research Corp. in Placerville, Calif., a company whose usual business is to apply existing programs to supercomputers. Kuck acted as technical consultant.

Alliant's hardware architecture, if viewed as a circle, starts with memory at the core, cache memory around the core and processors surrounding the memories, Gruner explained. The up to eight processors on the top half of the imaginary circle are called computational elements. These are the processors that operate on computationally intense programs. The up to 12 smaller interactive processors on the bottom half of the circle execute the operating system, manage the file system and run nonparallel programs such as text editors. Alliant's Concentrix operating system coordinates all of the processors.

Alliant's founders went after the engineering and scientific markets partly because members of those communities are likely to adapt early to new technology, Gruner explained. "If you look at the last 30 years, all of the major computer companies with few exceptions initially focused on the scientific and engineering marketplace," he said. Parallel processing is applicable to that market also, because scientific users are most apt to do computationally intensive tasks like modeling or simulating physical phenomena.

Expects competition from IBM, DEC

Gruner expects strong competition from companies like Digital Equipment Corp. and IBM. Alliant's product plan and strategy assumes that fact, and the company is working to leave its role as a niche player to become a long-term, viable, general computer manufacturer. "For the foreseeable future, we will always be focused on engineering and scientific applications," he stated.

The company identified, in its first business plan, what Gruner calls a major opportunity in the OEM sector — to provide a high-performance computational server to firms selling workstations in the $5,000 to $70,000 range. The plan has resulted so far in the multimillion-dollar deal with Apollo.

Gruner will not talk specifically about where the company plans to go from here. It is working on more OEM deals and on an Alliant sales and service organization that will directly market to end users. The market for machines like the FX/8 should reach $1 billion by 1990, Gruner said, and he wants to cash in on that market.

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Inner Access unwraps Noel

By Donna Raimondi

BELMONT, Calif. — Inner Access Corp. has unwrapped Noel, a $4,999 expandable eight-user supermicrocomputer.

Noel is the company's second computer and its first small-scale system, spokesman Gary Feierbach said. "We are going head-on with the [IBM Personal Computer AT] and that size computer," he said. Inner Access sees its market for Noel as a file and print server in corporations that have terminals and personal computers with terminal emulation capabilities.

The Motorola, Inc. 68000-based machine contains 512K bytes of random-access memory that is expandable to 2M bytes in the chassis and up to 16M bytes in an expansion chassis. If the memory is increased to 1M byte in the factory, Feierbach said, the price jumps by $700. If increased to 2M bytes in the factory, it costs an additional $1,199. Memory can be upgraded after the customer owns the machine, but the cost will be higher.

The system includes a 20M-byte hard disk, expandable to 120M bytes in the chassis to several gigabtyes in an expansion chassis.

A 1.2M-byte floppy disk is expandable to 2.4M bytes in the chassis, and the eight RS-232C I/O ports can be increased to 64 channels in an expansion chassis.

DEC PDP-11 marks 15th year

From page 35

remains 15 years later, providing the compatibility and migration paths that DEC has emphasized in its marketing efforts. The PDP-11 family is one that is sold with the promise that software designed for one PDP-11 system will run on other PDP-11s. DEC's product manager for the PDP-11 line, Abbot Gilman, noted recently that that promise has been a key to the PDP-11's success.

The original PDP-11 was targeted toward real-time markets such as communications, process control and laboratory data acquisition — markets that DEC still seeks to address with the 16-bit systems.

But early success for the PDP-11 fueled later success. "In terms of success, I think one of the reasons is the installed base, which has developed a fairly complex set of applications over the years," Gilman noted.

He also argued that the VAX-11 series is no threat to the PDP-11 and that they complement each other in serving different markets.

Without discussing future product directions, Gilman promised that further enhancements are still to come.

The PDP-11 remains a survivor. It is a competitor in a battle where microcomputers are driving up at minicomputers and superminicomputers are driving down. It is surviving despite being told it was dead, and it will survive as long as it addresses the particular needs of its specific markets and as long as its users and DEC remain loyal.

Users of 3090s exercise options

From page 35

ager of facilities engineering at Cigna Corp. in Windsor Locks, Conn. He said the MDS is more economical and more dependable than IBM's solution. He also said the MDS offers the advantage of being mounted under the floor adjacent to the computer, where he can shut down power for maintenance on the 3090 without affecting the power supply for other mainframes.

"IBM wanted us to have two separate feeders, which would have meant a lot of man-hours in terms of cabling. If I did what IBM requested, it would have been at least double the price of the MDS," Asadourian said.

Asadourian reported that IBM field engineers were concerned about the power feeds that A. P. Systems proposed to provide until IBM, Cigna and A. P. Systems representatives held a meeting and agreed that the power supply was adequate.

Another 3090 user, Union Mutual Life Insurance Co. of Portland, Maine, was using a non-IBM motor generator power supply for the IBM 3081 mainframe that was replaced by a 3090 Model 200. Union Mutual electrical maintenance supervisor Arthur Osgood said the insurer already had a service contract with Clausen when Osgood realized from discussions with IBM engineers that he could split a single feed from the existing parallel bus, which allows any generator to feed any computer in the shop.

Osgood noted that there was no resistance from IBM when he proposed bringing in non-IBM products.

Clausen said he was not surprised by that, as many IBM field engineers are oriented toward the electronics of the computer itself more than the mechanical process of bringing power to the processor. He said that in his experience IBM field engineers have preferred that a third-party vendor take responsibility for providing power, as long as that power is adequate.

However, an IBM spokesman noted, "There are risks to using non-IBM solutions. One risk is that improper voltage and current levels could damage the technology and could present safety hazards. Another risk is that we couldn't guarantee that another power supply could meet IBM power specifications."

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370 computer companies have discovered the secret to building some of the world's most advanced printers.

MICROCOMPUTERS

SMALL TALK
Eric Bender
Chief Senior Editor

Ups and downs of pricing issue

Despite all the changes in personal computing, there still are many issues that intelligent men and women can argue indefinitely — even in pricing, which should offer plenty of hard evidence.

Depending on who's talking, the cost of microcomputer business software seems to be either rising or falling or maybe staying about the same.

"There is no reason for software to be priced as high as most of it has been until now," columnist Erik Sandberg-Diment argued in *The New York Times* two weeks ago.

He made an intuitive argument: It just doesn't cost all that much to write, manufacture and distribute software.

IBM bolstered the opposing case in early November by raising prices on 139 Personal Computer packages as much as 10%. The move startled many — at least one trade publication ran the story under an "IBM cuts prices" headline — although it mostly bypassed mainstream applications.

Noting the tangled group of events that influence pricing, Software Access International, Inc. President William Coggshall presented figures last month showing wholesale costs of productivity software dipping in fourth-quarter 1984, rising through second-quarter 1985 and then dropping again.

Software Access projections show the average customer price for IBM Personal Computer productivity software declining slightly from $292 this year to $281 in 1986.

So what's the view from the most successful vendor of inexpensive business software, Software Publishing

See UPS page 50

Volkswriter 3 gets upgrade

Design incorporates calculator, spelling checker

By Eric Bender

Lifetree Software's Camilo Wilson

MONTEREY, Calif. — As Lifetree Software, Inc. founder Camilo Wilson described it, his design goal for the new Volkswriter 3 word processing program was to add appropriate related features — including mathematical functions and a spelling checker with a 170,000-word dictionary — without cluttering up the user interface.

The Volkswriter 3's four-function calculator will help users deal with expense accounts or budgets while staying within a document, he said. "We're not claiming it's a spreadsheet. It's for 'what is' math rather than the 'what-if' math of a spreadsheet," he said.

The spelling checker can suggest phonetically similar alternate spellings, correct transpositions and verify punctuation. Additionally, automatic hyphenation, sorting, global and automatic reformatting, print queuing and mail-merging capabilities are provided.

Volkswriter 3 shipped in November with a $295 price tag. Current Volkswriter users, who number about 150,000, can upgrade for $95.

Responding to user requests, Lifetree also built in the ability to convert files to and from IBM's Revisable-Form-Text Document Content Architecture format, aiding the transmission of documents throughout Distributed Office Support System (Disoss) environments.

Disoss "seems to be a dominant trend" in linking systems within large corporate networks, Wilson commented. From a software supplier's point of view, "all you have to do today to join the bandwagon is add revisable-text files," he said.

However, one limitation on the revisable-text format is the requirement for users to convert documents for local print-

See UPGRADE page 50

Products flourish, prices slide in nonimpact printer market

By Peggy Watt

LAS VEGAS — The parade of nonimpact printers was lengthened and its variety heightened late last month, with an array of systems introduced at Comdex/Fall '85.

The flurry included new entries in the driver engine design, with C. Itoh Electronics, Inc. and Delphax Systems, Inc. teaming up on a Delphax engine-based series and Dataproducts Corp. promoting a Toshiba Corp.-based system. Early laser printers were largely based on Canon U.S.A., Inc. systems.

As the nonimpact printer population increases, the prices decrease. Hewlett-Packard Co.'s Laserjet, introduced a year and a half ago, is priced at $2,995, and most of the newcomers view that as the price to beat.

Lower prices also make the quiet, high-volume nonimpact printers more attractive to medium-size and small offices, where they are usually hooked into a local-area network.

The crisp quality, capability of mixing text and graphics on a page and increased variety of type fonts represent other advantages for users interested in desktop publishing, from the internal company newsletter to typesetting and production companies.

More details on Comdex debuts are

See PRINTER page 46

INSIDE

Corona Data Systems renames itself Cordata and expands its IBM-compatible line/42

Convus Systems' Omninet supports Apple's Macintosh and Novell's Netware/O software/48

NEW THIS WEEK

- Microsoft enhances its Macro Assembler
- Conetic Systems upgrades its Higgins software
- For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"The smart people have already bought micros. Today's first-time users are not only inexperienced but they're dumb."
— William Coggshall,
Software Access International

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ORACLE is currently installed on over 1000 supermini and mainframe systems around the world, as well as on thousands of PCs and compatibles. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and many government agencies.

For further information, contact Oracle Corp., Dept. C, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350.

Corona Data Systems to change name, redirect market focus

Unveils desktop, graphics card

By Clinton Wilder

LAS VEGAS — Corona Data Systems, Inc. announced at Comdex/Fall '85 that it will change its name to Cordata, Inc. as of Jan. 1. The Thousand Oaks, Calif.-based firm said it hopes to change its image as an IBM Personal Computer clone manufacturer, but the name change reportedly stems from a proprietary dispute with SCM Corp.'s Smith Corona typewriter business.

Entering the add-on board market while also reinforcing its IBM-compatible systems product line, Corona unveiled a color graphics adapter card and a desktop micro compatible with the IBM Personal Computer AT.

The Corona ATD, shipping in the first quarter of 1986, reportedly runs the Intel Corp. 80286 chip at 8 MHz with zero-wait states and retails at $3,995 in its base version, dubbed the ATD-8-Q.

Complementing Corona's ATP series of portable micros, the ATD features 640K bytes of main memory, 1.2M bytes of floppy-disk storage, a floppy disk drive controller, parallel and serial ports, a socket for the Intel 80287 math coprocessor, four AT-compatible slots and two Personal Computer-compatible slots.

Two other expanded memory versions of the ATD are available. The ATD-8-Q20, featuring a 20M-byte hard disk drive and controller, is priced at $5,495. The ATD-8-QT40, containing a 40M-byte hard disk drive, controller and 60M-byte streaming tape drive, sells for $8,995.

Corona's Fastdraft 480 color graphics card is said to expand graphics capabilities of the IBM Personal Computer, Personal Computer XT, AT and compatibles. The card produces 640- by 480-pixel resolution in 16 colors.

The board will ship in January for $1,295.

Corona also introduced a 14-in. color monitor, compatible with the Fastdraft 480. It adjusts to frequencies ranging from 15 to 35 KHz and costs $895.

Corvus opens its net to Mac

SAN JOSE, Calif. — Corvus Systems, Inc. has opened up its Omninet local-area network to support Apple Computer, Inc.'s Macintosh and Novell, Inc.'s Advanced Netware/O, an extensive library of file locking schemes.

Macintoshes now can coexist with IBM Personal Computers on Omninet, according to the company.

Corvus' Macintosh Omninet Network Interface works with Corvus' disk network management system and enables Macintosh users to share Omnibus disk drives. The interface attaches to a Macintosh modem port through a short, flat ribbon cable.

The disk drives, available with 11M bytes to 126M bytes of storage, can be partitioned for public, private or shared files, according to Corvus. Packages with suitable import/export capabilities can be shared by IBM Personal Computer and Macintosh users, Corvus said.

Also, an Apple Laserwriter connected to the network can spool and print Macintosh files.

The network interface and net management software cost $396 each.

Advanced Netware/O works with Corvus Trimline Combo, a 20M-byte hard disk and 60M-byte streaming tape add-on subsystem. Any device on the network can use the subsystem as a server unit, and the subsystem can also serve as a workstation on the network.

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— Paul Korzeniowski

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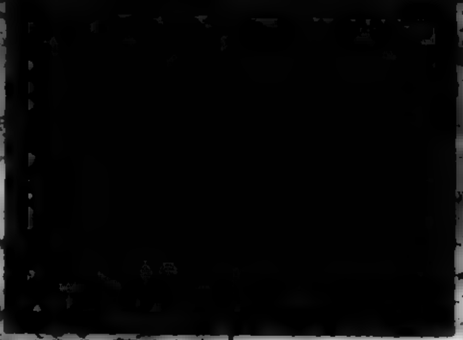

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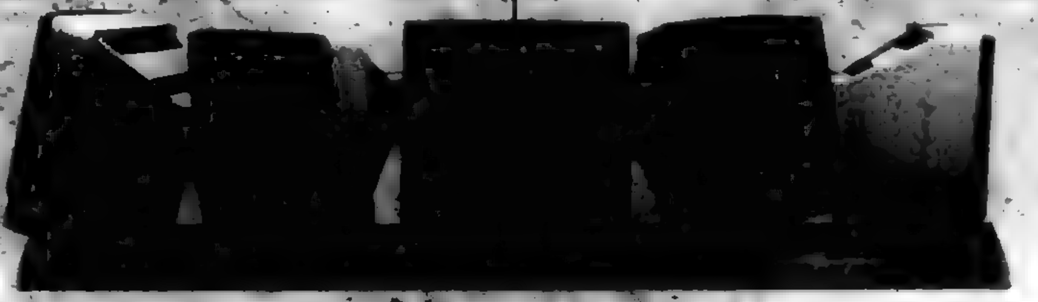

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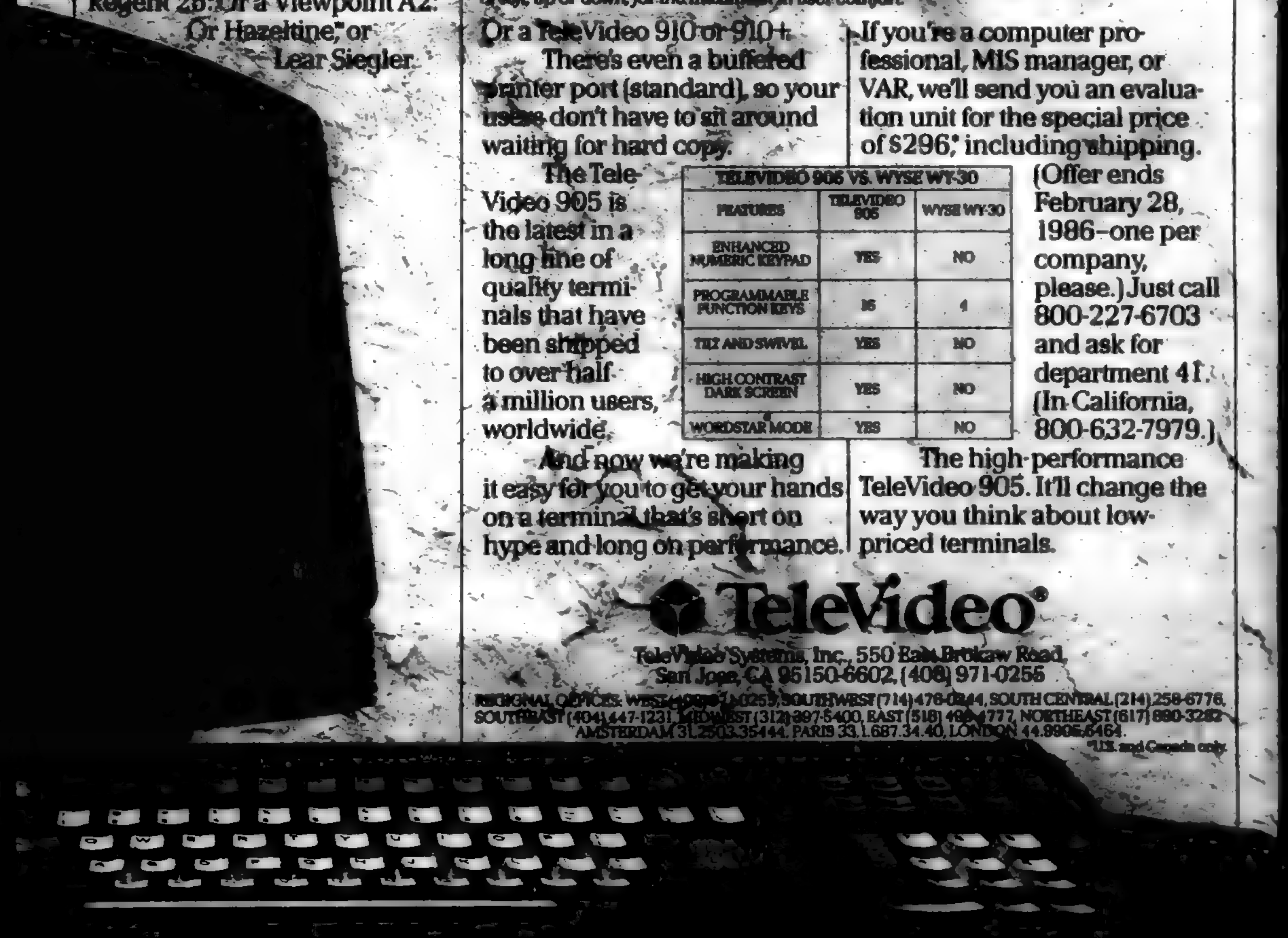

Printer mart flourishes

From page 41

given below:

■ QMS, Inc. of Mobile, Ala., introduced the QMS KISS (or Keep It Smart and Solid), a $1,995 laser printer that the company said will be available in limited quantities this month.

The Motorola, Inc. 68000-based system runs on a Canon engine, prints 6 page/min, mixes text and graphics at 300 by 300 dot/sq in. and has a choice of nine fonts available through the 2-character control panel. The system also supports downloading of fonts.

The QMS KISS features 128K bytes of user-accessible memory and 256K bytes of internal memory. An IBM Personal Computer-compatible Centronics Data Computer Corp. parallel interface is standard, and an RS-232C interface is optional.

■ C. Itoh Electronics of Los Angeles and Delphax Systems of Westwood, Mass., jointly introduced the CIE 3000 Ion Deposition Printer series, scheduled to be available in early 1986. Systems will be available in 30 and 45 page/min models and also with a choice of 240 by 240 or 300 by 300 dot/in. resolution, according to Ken Yanagisawa, C. Itoh marketing representative.

C. Itoh is touting the printer's reliability and said its drum life is one million copies.

Estimated price for the 30 page/min, 240 by 240 dot/in. model is $12,000. The 30 page/min, 300 by 300 dot/in. system costs $13,000, Yanagisawa said. Other prices have not been set.

■ Ricoh Corp. of West Caldwell, N.J., introduced its LP4080R tabletop laser printer, based on a Ricoh engine that has also been provided to Digital Equipment Corp. under an OEM agreement. It is scheduled to be released in the first months of 1986. No pricing was available.

The 8 page/min printer is rated at 5,000 prints per month, according to a Ricoh spokeswoman. Resolution is up to 300 by 300 dot/in., with four on-board fonts. The Ricoh printer emulates the Diablo Systems, Inc. 630 impact printer to accommodate numerous popular programs. It has both an RS-232 serial port and parallel port. Its paper feed cassette holds up to 250 sheets, and output is facedown.

■ New in the area of LED array imaging technology, an alternative nonimpact printing method, was a system from NEC Information Systems, Inc. in Boxboro, Mass. NEC entered the OEM page printer market with the LC-900, a $2,995, 8 page/min desktop page printer with four resident type fonts, a 128K-byte memory buffer and optional 1.3M-byte memory board.

The printer is based on an NEC LED engine, compatible with the Canon laser engines introduced earlier, according to Ned Bunnell, NEC spokesman. It has an LCD operator panel and dual serial/parallel interface for systems integration. It handles 250 sheets in a cassette and offers facedown or faceup output. Another eight typefaces are available with additional font cartridges, as well as additional paper trays. The system prints bit-mapped graphics at 300 by 300 dot/in. with the optional memory board.

■ Another LED system came from Kentek Information Systems, Inc. of Allendale, N.J., which showed the K-2 Intelligent Page Printer. The LED array system prints 240 by 240 dot/in., is aimed at high-volume merged text and graphics printing and sells for $7,995.

The Motorola 68000 microprocessor-based printer has a 5¼-in. floppy disk drive, enabling it to perform program control functions and containing up to 30 fonts. Available now, the device prints 12 page/min, with facedown output.

■ Dataproducts of Woodland Hills, Calif., introduced a low-end laser printer, the LZR-1230, running with a Toshiba engine that the company says is half again as fast as its Canon engine-powered competitors. The $3,495 printer produces up to 12 page/min at a resolution of 300 by 300 dot/in. and emulates the Diablo 630, Epson America, Inc. FX80 and Hewlett-Packard Laserjet Plus.

"We have features you don't find on other [comparable] machines," said Ronald Iversen, Dataproducts vice-president for the Non-Impact Printer Division, pointing to

See PRINTER page 50

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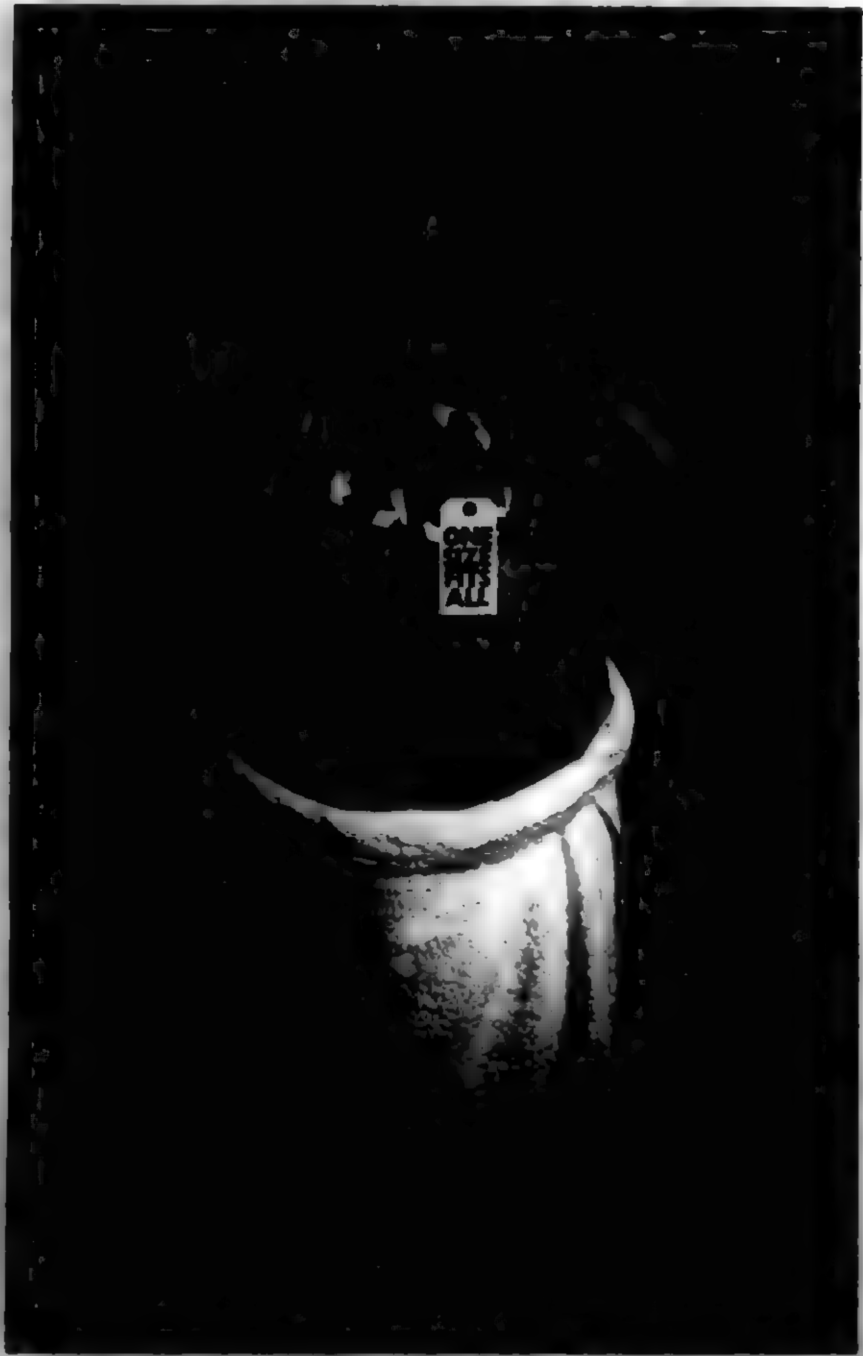

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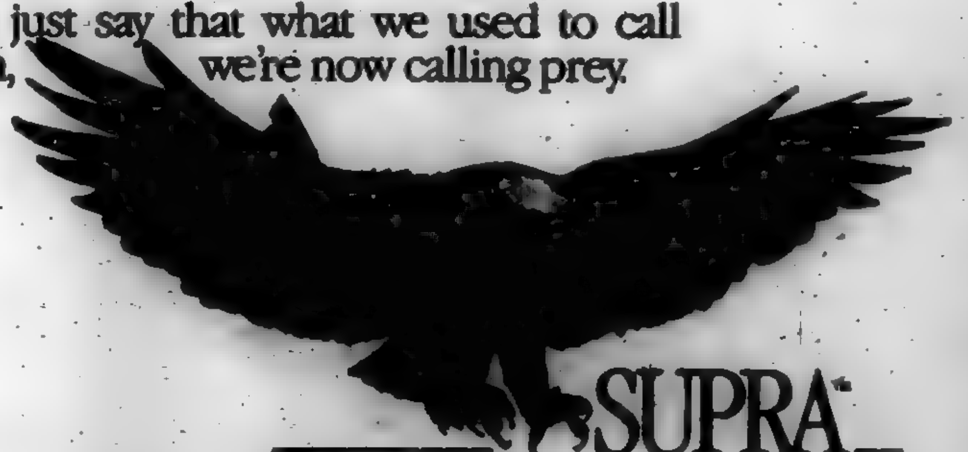

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Printer mart flourishes

From page 46

the intelligent key pad that allows programming at the printer as well as the personal computer, and the seven resident fonts. The laser printer also accepts the IBM Personal Computer character graphics set.

Iversen said the LZR-1230 can handle stacks of 200 sheets of paper, instead of the usual 100, and release printed sheets either facedown for security or faceup. Volume shipment is scheduled for April.

■ Corona Data Systems, Inc. in Thousand Oaks, Calif. — which is renaming itself Cordata, Inc. — upgraded the software to its LP-300 printer. The system can now take font and resolution information directly from the disk, without manual input at the printer. Sixteen fonts come with the unit, with another 24 available separately and more promised.

The laser Xerographic page printer produces 300 by 300 dot/in. at up to 8 page/min. Its graphics capability is approximately one-third page full resolution with 640K bytes of memory, and full-page graphics with reduced resolution for graphics from an IBM Personal Computer or compatible system. It costs $4,495.

Upgrade for Volkswriter 3

From page 41

ing, "a tedious process," he said. The next step will be toward final-form-text format, which will avoid that requirement, once the proper support software is in place throughout the network.

Lifetree's largest and most sophisticated customers are turning toward Disoss, with plans for first implementations in the next year or so, but Wilson called Disoss only an interim solution.

"Disoss requires a mainframe — a big mainframe — and this is a temporary state of affairs," he said. Wilson predicted that emerging IBM communications standards, including LU6.2 and Netbios, will provide a foundation to build much more flexible arrangements.

Another important trend in word processing software is toward mixed text and graphics. Wilson listed three main markets that will appreciate that feature: engineers and scientists — the target for Lifetree's Volkswriter Scientific package; a "fun" market for users playing with the technology; and desktop publishing.

While desktop publishing is "an obvious market, it's not nearly big enough for all the people chasing it," Wilson said. He suggested that vendors are concentrating on low-end offerings rather than high-quality output.

Overall, personal computer word processing software represents "a very strange segment of the market," he said. "It's remarkable to me that, to this day, word processing is still so fragmented."

Chances are slim that any single vendor will dominate sales, because users show so much loyalty to the packages they know, he said. "There are coexisting religions."

Ups, downs of pricing

From page 41

Corp., which markets to its resellers for an average of $60 a box?

According to Software Publishing President Fred Gibbons, Borland International, Inc.'s spectacular growth has led many to overestimate the role of pricing, but for the most part, Borland's success was built on product rather than pricing.

He predicted that Borland's repositioning of the Reflex data base analysis package at $99 will not boost sales dramatically and pointed to other areas, such as project management, where prices are on the rise.

But he also gave a counter-example of a promising low-end attack. "I thought Paperback Software was on to something with a cheap 1-2-3 clone," he said.

At last month's Businessland conference in Dallas, he asked an audience of MIS-types whether they would buy a $100 clone from a credible company, and "the whole audience raised its hands," he reported.

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Detroit, MI.	January 16, 1986 February 19, 1986
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Indianapolis, IN.	January 7, 1986
Irvine, CA.	January 28, 1986
Kansas City, KS.	January 21, 1986
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Madison, WI.	January 23, 1986
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CALENDAR

WEEK OF JANUARY 5

JANUARY 6-8, IRVINE, CALIF. — **Automated Business Technologies '86.** Contact: James Ramsey, Automated Business Technologies '86, Suite 396, 8532 Commonwealth Ave., Buena Park, Calif. 90621.

JANUARY 6-9, ANAHEIM, CALIF. — **ATE West '86.** Contact: Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

JANUARY 6-10, SAN FRANCISCO — **Writing Procedures, Policies and Documentation.** Contact: Mary Ann Cluggish, Information Mapping, Inc., 275 Wyman St., Waltham, Mass. 02154. Also being held Jan. 27-31 in Orlando, Fla.; Feb. 3-7 in Dallas; and Feb. 10-14 in Washington, D.C.

JANUARY 7-8, BOSTON — **Writing Management Reports.** Contact: Mary Ann Cluggish, Information Mapping, Inc., 275 Wyman St., Waltham, Mass. 02154.

JANUARY 8-11, MILWAUKEE — **Mini and Microcomputer Concepts.** Contact: John T. Snedeker, University of Wisconsin at Milwaukee Extension, 929 N. Sixth St., Milwaukee, Wis. 53203.

JANUARY 9, DEDHAM, MASS. — **Elements and Applications of Microcomputers in the Graphic Arts Industry.** Contact: Frank R. Trocki, Director, Graphic Arts Program, Northeastern University Center for Continuing Education, 370 Common St., Dedham, Mass. 02026. Also being held Jan. 16 and 30 and Feb. 6 in Dedham.

JANUARY 9, IRVINE, CALIF. — **Invitational Computer Conference.** Contact: Suzanne Hubner, U.S. Conference Director, Invitational Computer Conference, No. C-2, 3151 Airway Ave., Costa Mesa, Calif. 92626. Also being held Jan. 28 in Austin, Texas, and Jan. 30 in Dallas.

WEEK OF JANUARY 13

JANUARY 12-14, KEY BISCAYNE, FLA. — **The Outlook for Computer Printers.** Contact: Gail Montgomery, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

JANUARY 13-15, ATLANTA — **Telecommunications Management.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JANUARY 13-15, WESTBORO, MASS. — **A Structured Approach to Software Testing.** Contact: Central New England College, 3 Westboro Business Park, Research Drive, Westboro, Mass. 01581.

JANUARY 13-17, MILWAUKEE — **Microprocessor Hardware and Software — An Introduction.** Contact: John T. Snedeker, University of Wisconsin at Milwaukee Extension, 929 N. Sixth St., Milwaukee, Wis. 53203.

JANUARY 14-16, KEY BISCAYNE, FLA. — **Thermal Printing.** Contact: Gail Montgomery, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

JANUARY 14-16, LONG BEACH, CALIF. — **Annual Battery Conference '86.** Contact: Rita Johnson or Jane Doherty, Annual Battery Conference, Department of Electrical Engineering, California State University, 1250 Bellflower Blvd., Long Beach, Calif. 90840.

JANUARY 15-16, SAN JOSE, CALIF. — **BUSCON '86.** Contact: Anne Weber, Bus Users Show and Conference 1986, Suite 116, 17100 Norwalk Blvd., Cerritos, Calif. 90701.

JANUARY 15-17, DENVER — **Usenix Technical Conference.** Contact: Usenix Conference Office, P.O. Box 385, Sunset Beach, Calif. 90742.

JANUARY 16, NEW YORK — **CDLA Regional Reception.** Contact: Dianne L. Sims, Manager of Convention Planning, Computer Dealers and Lessors Association, Inc., 1212 Potomac St. N.W., Washington, D.C. 20007. Also being held Jan. 23 in Minneapolis.

JANUARY 16-18, SAN FRANCISCO — **Macworld Exposition.** Contact: World Expositions, Mitch Hall Associates, P.O. Box 860, Westwood, Mass. 02090.

WEEK OF JANUARY 19

JANUARY 19-22, DALLAS — **Forum '86.** Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

JANUARY 20-21, ARLINGTON, VA. — **Ada.** Contact: Specialized Training Services, Inc., P.O. Box 1618, Dahlgren, Va. 22448.

JANUARY 21-22, NEW YORK — **Introduction to Telecommunications Systems: Technologies and Applications.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JANUARY 21-23, SAN JOSE, CALIF. — **ASEE '86 — Advanced Semiconductor Equipment Exposition Technical Conference.** Contact: Joyce Estill, Exposition Manager, Cartlidge & Associates, Inc., M259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

JANUARY 23-25, SAN DIEGO — **1986 SCS Multiconference.** Contact: Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

JANUARY 24-25, DEDHAM, MASS. — **Copyfitting.** Contact: Frank R. Trocki, Director, Graphic Arts Program, Northeastern University Center for Continuing Education, 370 Common St., Dedham, Mass. 02026.

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Update

The U.S. data center: Can Japan have an impact?

By Glenn Rifkin
Update Editor

Sometimes I think if Japan didn't exist, it would have to be invented. Then it occurs to me that Japan already has been invented.

— Jon Woronoff
Inside Japan Inc.

Hiroshi Kashiwagi is happy to clear up the misconceptions. As the director of the computer systems division of Japan's Electrotechnical Laboratory (ETL) in Tsukuba's Science City, Kashiwagi is a prime mover in the development of Japan's advanced computer systems. He is well aware of the variety of interpretations of Japan's Fifth Generation Computer Systems and Superspeed Computer projects theorized by journalists, academicians and others since the projects were launched several years ago. Can Japan, through its Institute for New Generation Computer Technology (ICOT) Project, leapfrog current technologies and dominate future computer markets?

Kashiwagi laughs heartily. "There are three ways of understanding this," he says. "The first is to look at what would happen if we got all the funding and personnel that the researchers have requested, which is what the journalists like to write about.

"The second is the idea put across by Edward Feigenbaum [in his controversial book *The Fifth Generation*]. But what he writes about is a completely different project. What he says we are doing is actually what he's doing — making expert systems. What we're doing has nothing to do with expert systems.

"And third is what we are really doing."

What ETL is "really doing," according to Kashiwagi, is providing support to ICOT in four key areas: high-speed hardware, architectures, software development and enhanced algorithms. He says that despite the hype and hysteria set off by these futuristic plans, the truth is that Japanese researchers, like their American counterparts, are trying to push out the frontiers of computing by demonstrating possible directions. Timetables, in many instances, are meaningless, and the Japanese are certainly not expecting breakthrough technology to lead them into the 21st century of computing.

The Electrotechnical Laboratory's Kashiwagi, director of computer systems

> **'Japanese vendors have found the computer systems market largely unapproachable, requiring links to U.S. companies for the necessary service and distribution capabilities. The competitive history to date has seen at least as many failures as successes.'**
>
> — *IDC report*

The beliefs and mysteries surrounding Japan in general and its computer industry specifically are varied and are often distortions of the truth. Kashiwagi's experience in trying to separate fact from fiction for Western businessmen and journalists is common in these times when the Japanese are both admired and despised and more often misunderstood.

Japan Inc., the vaunted collaboration between government, bureaucracy and industry, earns high praise, and the "learn from Japan" syndrome has spawned an army of Japan watchers in the U.S. At the same time, huge trade imbalances between the two countries create increased friction. The anti-Japanese backlash results in nationalistic posturing, legal action and Toyota burnings in Detroit.

Aside from semiconductors and peripherals, the Japanese have found the going tough in the U.S. computer market. Their production and manufacturing expertise that serves them so well in cars and videocassette recorders has not yet resulted in computer system sales.

According to a report from International Data Corp. (IDC), a Framingham, Mass.-based consulting firm, "Japanese vendors have found the computer systems market largely unapproachable, requiring links to U.S. companies for the necessary service and distribution capabilities. The competitive history to date has seen at least as many failures as successes. Despite inroads in printers and disk technology, Japanese vendors have found it difficult to penetrate end-user markets, and the overall dominance of U.S. vendors remains largely intact."

IDC estimates that Japanese vendors accounted for 13.8% ($5.1 billion) of the value of U.S. computer and peripheral hardware sales in 1984 (see chart page 58).

Though the Japanese acknowledge that selling computer systems in the U.S. is a difficult task, they also realize that their own domestic markets are becoming saturated, and new horizons must be found. They point to Asian markets, particularly China, and developing nations as natural targets. But no major Japanese computer firm has given up on the U.S.

The DP/MIS manager in this country has shown only passing interest in Japanese activities in the data processing arena (see survey page 60). Generally disinterested in where the memory chips and laser printers are made, DP pros have not had much opportunity to interact with Japanese mainframe or mini vendors. Many are unaware of or unconcerned that machines they are buying from such vendors as Amdahl Corp., National Advanced Systems Corp. and Honeywell, Inc. may well be manufactured by these firms' Japanese partners.

The Japanese, howev-

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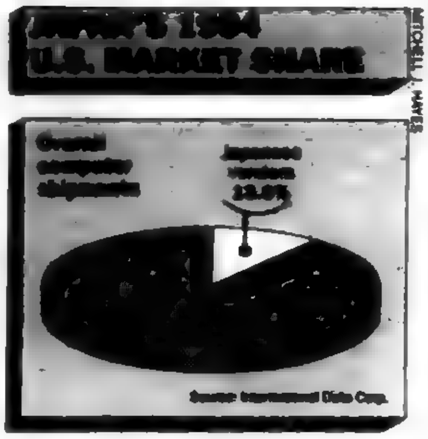
Update

er, are as committed to the information processing business as U.S. companies are. Though not currently a major factor in the systems business, the potential and talent are there. The Japanese are hard at work developing future technology through government-backed programs, such as ICOT's Fifth Generation project. Regardless of which country is truly closer to next-generation systems, nobody has made money selling the Japanese short. This section of *Computerworld* Update will focus on Japan's influence on the U.S. computer market, what has been accomplished thus far and what the future holds.


JAPAN'S 1984 U.S. MARKET SHARE

Source: International Data Corp.

Large systems

In Japan, several key players share major parts of the market. Prior to 1979, IBM dominated the Japanese market and still would, many feel, if Japan's Ministry of International Trade and Industry (MITI) had not intervened.

After orchestrating cooperative agreements between the major Japanese firms, MITI pushed hard for the domestic companies to create plug-compatible machines that would win back market shares from IBM. That plan, along with some innovative technical, marketing and support maneuvers, helped Fujitsu Ltd. grab the lead.

Today, Fujitsu, NEC Corp., IBM Japan and Hitachi Ltd. share roughly equal portions of the large-systems market. This fact alone creates major differences between the Japanese and U.S. industries.

It means, for example, that the three major Japanese vendors must fight each other to retain domestic market shares, leaving diminished resources and inclination to make a significant thrust into U.S. territory.

"Setting up their own marketing and support networks in the U.S. requires enormous amounts of money, manpower and time," says Yuji Ogino, director of IDC Japan Ltd. "At this stage, that would be very impractical for Japanese data processing product vendors. They are still facing intense competition in the domestic market, and that market is at the point of saturation, especially in the large mainframe area."

In addition, IBM is clearly unhappy about losing its market share in Japan and is putting enormous pressure on the Japanese vendors, particularly in the area of software infringement. IBM currently is suing Fujitsu over copyright infringement, a case that is in arbitration. This pressure makes it more difficult for Japanese vendors to continue their IBM-compatible strategies. There is, however, little choice for them.

IBM President John F. Akers, speaking last month to security analysts in Greenock, Scotland, stressed the problems in following an IBM-compatible course. "First of all, the Japanese have a history of attention to detail, to manufacturing products at high quality and low cost, and no one can argue with that track record. And I would expect they are going to continue to be extraordinarily competitive in that regard," Akers said. "But they have no corner on innovation, and they have no corner on technological leadership.

"We believe, although we're not the technology leader in every single thing we try to do, we are the leader technologically in our industry, including the Japanese. They will continue to try to emulate IBM. Many of them, of course, are on a compatible strategy with IBM systems. And in that regard, they will continue to have a problem because they have not had the success in software that they've had in their manufacturing."

Late last year, IBM sent 250 of its U.S. staff members to its Asia/Pacific Group headquarters in Tokyo to beef up an operation that plainly wasn't pleasing the main office. Though the added manpower will devote its attention to other Asian markets, such as China, IBM clearly is aiming to regain its No. 1 spot in Japan.

For Fujitsu, Hitachi and NEC, the choices are growing smaller. As Ogino puts it, the companies are now "playing the game within IBM's ballpark, and the main issue for them is how to get out of that ballpark and play their own games."

While the major competitors grapple in Japan, the U.S. systems market has a much bluer cast to it, leaving little room for foreign colors. According to IDC, sales of Japanese manufactured CPUs make up just 2.8% ($1.1 billion) of the overall U.S. computer systems market. U.S. strengths in software and computer architecture make the CPU business difficult for the Japanese.

In addition, a DP/MIS manager opting for a Japanese mainframe is taking a risk, according to Jack Hart of IDC. In order to take that risk, there must be something in return. "For the MIS manager to stick his neck out, he'll need to get a big price/performance benefit from Hitachi or Fujitsu," Hart says. "A 5% difference is not enough."

Nonetheless, the Japanese recognize the potential of this market and find the best way in the door is through joint agreements with U.S. partners (see chart page 66).

Three such successful ventures include the following:

Fujitsu and Amdahl — Fujitsu owns 49% of Amdahl and has maintained a relationship with the company since the early 1970s. Amdahl sells IBM-compatible large-scale systems that are based on Fujitsu subassemblies. Though Amdahl customers realize Fujitsu's role in the company, most DP/MIS professionals pay little attention to it. Fujitsu itself is strongly committed to the partnership.

"We will continue to see a close relationship with Amdahl in the future," says Toshio Hiraguri, board director and general manager of Fujitsu's Computer Systems Group. According to Hiraguri, before the end of the year, Fujitsu will be announcing a machine comparable to or faster than IBM's 3090 that will be available through Amdahl in the U.S. Amdahl also markets Fujitsu's supercomputers.

Hiraguri points out that while Fujitsu makes use of Amdahl's capabilities in creating high-quality IBM-compatible systems, the Japanese company offers Amdahl more than just strong manufacturing and production expertise. He says that Fujitsu, which is strong in an IBM weak spot — communications — plans to offer communications control processors in the U.S. through Amdahl.

Though the Fujitsu-Amdahl connection makes large mainframes, the biggest Japanese influence in the U.S. market (more than 60% of Japanese sales are in large systems), Ogino points out that the value of Fujitsu's shipments to Amdahl has declined in the past few years.

Hiraguri says Fujitsu is strong where IBM is not — communications.

Hitachi and National Advanced Systems — This marriage was made in 1979 when National Semiconductor Corp. acquired Itel Corp., a plug-compatible manufacturer (PCM) and renamed it National Advanced Systems (NAS). Itel had developed an import arrangement with Hitachi, so as a result of the acquisition, National Semiconductor inherited that connection.

Through NAS, Hitachi markets large and medium-size systems in the U.S. Amdahl and NAS remain the only PCMs in the U.S. market, and industry watchers say they feel that both Fujitsu and Hitachi will concentrate more effort on establishing OEM agreements to sell storage devices than on pushing PCMs. Together, Amdahl and NAS hold approximately 10% of the large-systems market.

The Hitachi/National Semiconductor relationship is an ironic one in that National Semi has joined other semiconductor manufacturers in legal action against Japanese firms like Hitachi for allegedly dumping memory chips on the depressed U.S. market.

Nonetheless, Kazutaka Tsukamoto, computer group engineering division manager at Hitachi, says he feels that the relationship with NAS is secure. He acknowledges that sales of mainframe equipment are likely to decline in the next few years, and though Hitachi will continue to try to penetrate the mainframe market, "Our efforts will be greater in the area of smaller equipment rather than mainframes."

Tsukamoto says that despite the many hurdles, Japanese computer makers are doing "pretty well in the U.S. market. In distributing mainframe hardware, it's very important to take into consideration

Continued on page 66

TOP 10 COMPUTER MANUFACTURERS' FINANCIAL RESULTS IN JAPAN

Manufacturer	Fiscal Year '84 Total Company Sales	Fiscal Year '84 Information Systems Total Sales	1983-84 Growth[2]	Fiscal Year '84 Information Systems Domestic Sales	Fiscal Year '84 Information Systems Export Sales	Projected Fiscal Year '85 Information Systems Total Sales
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[1] In millions of yen. One yen is approximately equal to 0.0045 cents.
[2] In percent.
[3] Not applicable.

Source: International Data Corp.

The world according to Kobayashi

NEC's chairman talks about computers, communications and competition

> **It's nonsense to develop computers only. It's nonsense to develop communications only. Ultimately, computers and communications will be integrated. I announced that in 1977. Now that day is coming.**

Koji Kobayashi, the 78-year-old chairman and chief executive officer of Japan's NEC Corp., has earned acclaim as a dynamic international businessman and leader. The diminutive and jovial Kobayashi joined NEC in 1929 and has had a strong hand in steering the company's course since 1949, when he was elected company director. He was named president in 1964 and chairman in 1976.

Kobayashi built NEC into one of the world's largest communications companies and Japan's second largest computer company with $9 billion in revenue, 90,000 employees in 11 countries and a product portfolio of more than 15,000 items.

Since 1977, Kobayashi has doggedly pushed NEC toward his "C&C" plan. He is convinced that the future holds the inevitable link-up between computers and communications and has directed NEC's strengths in both fields toward this integration.

On a recent visit to Boston to celebrate the publication of his sixth book, Computer and Communications: A Vision of C&C, *(The MIT Press, 1985), Kobayashi met with* Computerworld *Update Editor Glenn Rifkin to discuss Japan's role in the U.S. computer market.*

Is there such a thing as Japan Inc.?

Where is Japan Inc.? In every country, the bureaucracy is trying to catch the industry. The industry wishes to be released from the bureaucracy. It's impossible to work with the bureaucracy. I believe there is no such thing as Japan Inc.

Why do many people have the perception that Japan Inc. exists? Is it a creation of Western journalists?

When we are talking with your country, we are talking not with Washington, D.C., but with industry. We have a long relationship with U.S. industry in every respect. This is not Japan Inc., it's NEC, Inc.

So I don't know the real meaning of Japan Inc. When you say Japan Inc., there should be some rigid framework for the connection of the Japanese government and industry, and there isn't. Japan Inc. is fiction. For instance, if U.S. industry has some concern with the government, it goes to Washington, D.C. But we don't call it U.S. Inc.

Can you compete with IBM in the U.S.?

Impossible — depending upon the meaning of "competition." When we say "competition," we mean capitalwise, technologywise, everything. Capitalwise, IBM is g[illegible]antic. Japa[illegible]panies are v[illegible]ry small. It's silly to [illegible] with th[illegible]r huge amo[illegible] of mone[illegible] [illegible]establishe[illegible]plete monopoly [illegible] over [illegible]. We are only tr[illegible]ing t[illegible] [illegible] gigantic [illegible]onopoly company.

In this market, we have no such ambition to fight with IBM. But there are many areas that IBM is not in, and we are coming into these markets.

For example, what markets?

Fingerprint detection systems. [Kobayashi laughs]. They don't have that. So NEC might be the leader in this field.

A small computer like the NEC 9800 personal computer; we have a good market here for that. But in general in this computer market, we have no intention of competing with IBM. It's like throwing our heads against a concrete wall.

But you sell your $1000 mainframe through Honeywell, Inc. in the U.S.

We were asked by Honeywell to supply that computer to them because they had no such big computer. We wondered whether we should supply this computer to the U.S. customer directly or not, and it was a very difficult decision. But we continue to have a very good relationship with Honeywell. We ultimately decided it would be better to supply it through Honeywell.

So there is no plan to sell it under the NEC name in this country?

[illegible]er the contract with Honeywell, if we are [illegible] from the customer, [illegible]pply it.

[illegible] rather have an [illegible] large systems [illegible] the [illegible]?

[illegible] don't [illegible]k so [illegible] cu[illegible] this country requires a very big investment. From the business standpoint, if you have such a relationship as we have with Honeywell — almost 25 years — then it's better for us. We have NEC Information Systems, Inc. here for small and medium-size computers. We are selling those by ourselves. I don't hurry that. The results are very good, and we are creating a customer base for ourselves.

Is it a matter of pride that with large systems you can't sell under your own name here?

Ultimately, that will come. But it's nonsense to develop computers only. It's nonsense to develop communications only. Ultimately, computers and communications will be integrated. I announced that in 1977. Now that day is coming. With AT&T divested and IBM released from the antitrust suit, they are both facing that question.

I've been thinking about this for 20 years. We are the first C&C [computers and communications] company. We will really establish our C&C business in this country ultimately.

It takes time. I'm not hurrying.

Is that how the Japanese companies will have the most effect — through this integration?

[illegible] don't know about the other [illegible]an[illegible]e co[illegible]ies.

I'm asking you to be a spokesman for [illegible]

[illegible]hat's [illegible]cult. I can't [illegible]peak [illegible] poli[illegible] [illegible]ch compa[illegible]. There fo[illegible] possibl[illegible] companies could be against the idea of C&C. I don't know. They are not expressing their ideas to me. I can say that the other Japanese companies followed IBM compatibility. I'm not for such ideas.

Why did you decide not to go IBM compatible?

Because I was thinking from the beginning of C&C. It's the only way to survive for the next world. I'm thinking of the 21st century.

What do you mean by C&C?

C&C is very simple. Communications cannot be done without the computer, and computing must have communications. They work together. The computer is heading toward distributed processing.

Communications is not limited to nations but is becoming worldwide. Communications will have several levels. One is public communications. Second is business communications. And third comes a new market, the home market.

It's multilayered. I'm talking about the start of the next century. It's already started.

What about IBM coming together with Nippon Telegraph and Telephone Corp. (NTT)? What does it mean for NEC?

That will be quite an event. But why did Japan release NTT from being a government operation? It was to protect from a monopoly. Monopoly is not good. If IBM or NTT wishes to have a monopoly over the market by this combination, it's against the law, and ultimately there will be a political reaction. The most important thing is that if one gets arrogant — "I can control the world" — that's not good. This is why we have antitrust laws.

So you think IBM is being arrogant?

I don't know. You said that. But when NTT and IBM get together, what happens? If that combination gets to be arrogant, it's a monopoly. The people will be completely against that idea.

My philosophy is that a business is not only for making money. A company needs to make money, but that company is allowed to exist because it is good for the people. We need to think of that. If the big companies become too selfish, then the company will ultimately decline.

You always need the competitive power, otherwise you cannot control it. Therefore, I believe privately that if a share is over 50%, it's against the morality of business. That's my feeling. For instance, in satellite communications, we had over 70% of the world market. So I told my people that it was too much. We should be satisfied with up to 50%. So now we have 35%.

If you were head of a U.S. computer company, what would your view be of the Japane[illegible]omputer ind[illegible]y?

If you a[illegible]cerned with [illegible]nly computer[illegible], Jap[illegible] is not [illegible]. C&C [illegible]eld. The [illegible]ket [illegible] technology are still [illegible]come. Tha[illegible]min[illegible]. That's where there is a possibility. We are tr[illegible] strong enough in C&C. [illegible] the president [illegible] U.S. computer company, it would be hopeless because of the existence of IBM. If I were the president of a computer company in this country, a long time ago I would have headed toward C&C. Otherwise, it is hopeless. ■

日本電気株式会社

Update

CW survey: Japanese not a force in U.S. data centers

By Joanne Kelleher
Special to CW

"Fifteen years ago, the owner of a Japanese car was probably quite a pioneer," says Nick Vittore, director of corporate data processing at De Sotot, Inc. in Des Plaines, Ill., as he mulls over the prospects for Japanese computer products in the U.S. market. "Back then, buying a Japanese car meant driving many miles for service and putting up with the inconvenience of trying to find appropriate parts."

Looking at what the Japanese have since accomplished in the U.S. automotive market and observing similarly impressive performance records in consumer electronics, Vittore and other DP/MIS executives cannot discount the possibility that Japanese computer products might also become factors with which they will have to reckon. Still, from where these people sit, that day seems a long way off.

In a recent random *Computerworld* survey, 15 DP/MIS executives from around the country were asked about the potential of Japanese computer vendors in the U.S. market. By no means conclusive, the sampling did indicate that there was minimal Japanese presence in the systems arena and that it will be a long, hard climb for those vendors to become a force in the U.S. data center.

There is a general awareness that Japanese components are proliferating under the hoods of U.S. processing units. "I'm sure that if we looked inside our boxes we'd find a lot of Japanese components," says Michael Carberry, director of information and management services at Orion Pictures, Inc. in New York. Acquaintance with products of totally Japanese origin, however, is minimal, limited to a few scattered printers, microcomputers and some telecommunications equipment.

Knowledge about joint venture activity between Japanese and U.S. vendors is sparse, even among customers of the U.S. companies participating in the ventures. Vittore, for instance, although a Honeywell, Inc. user, knows no more about that company's association with NEC Corp. than what he has read in the press. "I've yet to hear about it from anyone who calls on us," he says. "Maybe that's because the system we are using, a DPS 7 Model 65, is much smaller than the one involved in the joint venture." Presumably the same rationale would apply at Sigman Meat Co., in Arvada, Colo., and Zeigler, Inc. in Minneapolis, two other Honeywell installations where the DP/MIS executives have heard nothing about a joint venture with a Japanese vendor.

A few DP/MIS executives report queries from National Advanced Systems Corp. (NAS) regarding a mainframe system offered in collaboration with Hitachi Ltd. These approaches, however, struck their recipients as curiously unaggressive.

"We were approached by NAS about a large-scale computer they are marketing for the Japanese," says Joseph Freudenberger, director of information resources for Sea-Land Corp. in Elizabeth, N.J., a worldwide freight shipping company. "My impression, however, was that it wasn't a very serious effort." Freudenberger also points to several business acquaintances, executives from companies with far weaker vendor commitments, who have told him that they also regarded the sales approaches they received from NAS as halfhearted.

Meanwhile, Richard Giordano Sr., director of MIS at the Titleflex Division of Bundy Corp. in Springfield, Mass., who considers himself a "pretty open-minded" prospect, expresses some surprise at the absence of information about Japanese products. "I haven't been approached," he says. "Most of the literature I read has little or no advertising for Japanese products." And, in the computer-assisted design and manufacturing area, where his company is on the brink of a purchase and where Giordano says he would expect that the Japanese might be quite advanced, Japanese products are notably absent at both trade show booths and in conversation. "I haven't even heard anyone talking about the Japanese yet," he says.

It will take much more effort and presence than DP/MIS managers are now sensing for Japanese computer vendors to make inroads at almost any level, the survey indicated. Pioneering is not an activity that most businesses are interested in, they say, and dependable access to parts and service is a nonnegotiable precondition of any computer purchase.

"If I have to make a decision on hardware, it isn't going to be based on where the equipment is manufactured," says Vittore. "But serviceability takes precedence even over price and performance, and I just don't think I'd have the confidence yet that the necessary service organization would be there for Japanese products."

Similar concerns recently led the Kellogg Co. of Battle Creek, Mich., to eliminate NEC from consideration as a supplier of telephone switching equipment. "They would probably have been among the top three or four contenders," says Gordon Brazas, director of information systems technology, "except that one of our criteria was that there be a half-dozen installations we could visit, and at the time NEC didn't have one switch up and operating in the U.S.

"We don't care to be out there experimenting," Brazas explains. "We want something proven, and we want to know that the vendor is going to be around when the equipment breaks down three years from now."

This insistence on well-established service capabilities is only one of several characteristics of the business systems market that are likely to make establishing a foothold in the U.S. an arduous task for the Japanese.

For one thing, Japanese computer vendors won't be able to capitalize on quality deficiencies in existing products as their fellow countrymen did in the automotive industry, says Derek Mumford, director of worldwide systems development for Eaton Corp. of Cleveland. "The computer marketplace here has always demanded quality — and received it," he says. "The reliability of American hardware and software is much better than it has been for other products, like autos. So, a reputation for quality won't carry the Japanese very far in the computer area. In order to sell, they'll have to produce better features and functions for the dollar."

By most accounts, the differential would also have to be significant in order to lure U.S. buyers away from established U.S. brands. "A 10% difference in speed and price isn't worth switching from IBM for," Brazas says. "If they came in with a computer that was 100 times as fast as our current equipment and cost only half as much, then I might look at it."

It has by now become a truism that the Japanese can produce good quality at lower prices. While that is certainly not a bad reputation to have, it also means that what was once a market advantage may have turned into an entry requirement.

If Japanese vendors can meet such price expectations and still deliver equipment of equivalent or greater functionality than U.S. products, they may find some ready purchasers for microcomputers, terminals and peripherals.

Freudenberger believes that the microcomputer offers the easiest entry for Japanese vendors. "If they came up with something fast enough and cheap enough, they could probably get in there," he says.

It might be somewhat difficult for Japanese vendors to adjust to the necessity of interfacing with the wide variety of products found in a typical U.S. organization, observes Don Madden, manager of computer systems/planning at General Electric Co. in Bridgeport, Conn. "It would be difficult for any vendor," he says, "but probably more so for the Japanese, who are used to a different kind of relationship with their customers. In that country a vendor can be much more influential in the planning process and doesn't, typically, have to worry about a large number of already-installed systems."

Mumford's opinion is that the Japanese are making a strategic error by concentrating their initial market efforts on large-scale systems. "The problem is that they started in the wrong place," he says. "They should have come in aggressively with small or mid-size systems in 1980 or 1981, when IBM's System/38 was going through its problems and a lot of traditional IBM users were approachable." The Japanese missed a great opportunity by not taking advantage of that situation, according to Mumford, but the market remains viable.

It's also not beyond the realm of possibility, according to Freudenberger, that the Japanese could leapfrog over even IBM if they were able to bring about the convergence of voice and data technologies. "The future belongs to whoever can solve the problem of integrating all systems facets," he says. "Whoever does it will run away with the ball game." ■

WHERE WAS IT REALLY MADE?

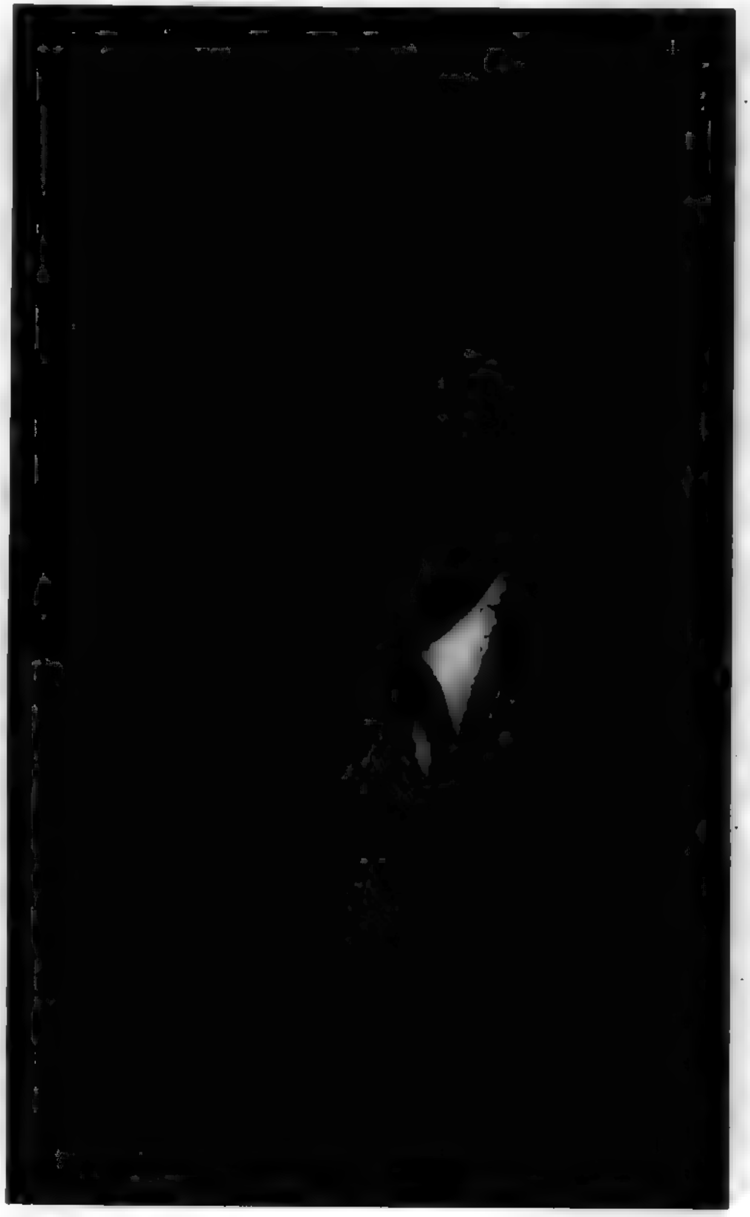
Japanese Supplier	U.S. Reseller	Products
ALPS Electric Co.	Apple Computer, Inc. Commodore Business Machines, Inc.	*Floppy diskettes, personal computer* *Floppy diskettes*
Canon, Inc.	Hewlett-Packard Co. Apple IBM Tandy Corp.	*Printer* *Printer* *Printer* *Printer*
Casio Computer Co.	Tandy	*Pocket computer*
Epson Corp.	IBM HP	*Printer* *Printer*
Fujitsu Ltd.	TRW Corp. Amdahl Corp.	*Mainframe, small computer* *Mainframe*
General Corp.	Texas Instruments, Inc.	*Portable computer*
Hitachi Ltd.	National Advanced Systems Corp.	*Mainframe*
Kyocera Corp.	NEC Information Systems, Inc. Tandy	*Hand-held computer* *Hand-held computer*
Matsushita Electric Industrial Co.	IBM	*Multiterminal system*
Mitsubishi Corp.	Sperry Corp.	*Personal computer*
NEC Corp.	Honeywell, Inc.	*Mainframe*
Nissei Sangyo	IBM	*Cellular data terminal*
Sharp Corp.	Tandy	*Pocket computer*
Sony Corp.	Apple HP	*Floppy disk drive* *Floppy disk drive*

Source: Dataquest Japan

Kelleher is a Boston-based free-lance writer specializing in high-technology issues.

The time has come for straight talk about database management systems.

"The only reason to buy a database management system is to build better applications."



Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEO's of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

J J Cullinane

John J. Cullinane
Chairman of the Board

© [illegible] Cullinet Software, Inc., Westwood, MA [illegible]

The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of online and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/1, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS

Cullinet

[illegible] Drive, Westwood, MA [illegible]

'Made in Japan' tag penetrating components market

U.S.-Japan pacts create added equipment sales

By Teresa A. Mortola
Special to CW

The Japanese participate in the U.S. computer market in a manner not reflected by the name on the box. A look inside almost any machine reveals a list of components "Made in Japan." This parts market is where the Japanese have most effectively penetrated the U.S. computer industry. The Japanese impact has also surely been felt in the large mainframe and supercomputer areas where the Japanese are selling equipment via agreements with U.S. vendors.

The printer market is undoubtedly the area in which the Japanese have been most successful in the U.S. In 1984, of the four million printers shipped in the U.S., well over half were sold by Japanese firms. And of all printers installed, 34% were Japanese products, with 1.8 million sporting the Epson Corp. brand name.

Certain areas, most notably nonimpact page printers, have been very fruitful for the Japanese vendors. With laser technology, Japanese vendors have accumulated more than a 70% share of the U.S. market shipments in 1984, with Canon, Inc. and its LBP-CX engine almost solely responsible for this success. Its laser engine has been sold through OEMs including Hewlett-Packard Co. for its Laserjet and Apple Computer, Inc. for its Laserwriter.

Japanese vendors sold nearly 2.2 million serial impact printers in the U.S. last year and were responsible for more than half of the 3.7 million total shipments.

The serial nonimpact area has also been a strength for the Japanese, who hold more than half of the U.S. market. Thermal, thermal transfer, and ink jet are the primary technologies in this group, with the largest growth segments being thermal transfer and ink jet. The Japanese vendors will continue to fare well since these two segments are strengths for them.

In the storage market, Japan has achieved enviable success. In 1984, nearly one-third of all disk drives shipped in the U.S. were products of the Japanese. These vendors are particularly strong in the flexible drive area where they sold close to 40% of last year's U.S. shipments. The lower end of the flexible market — the 3½- and 5¼-in. drives — is where inroads have really been made. More than 95% of all 3½-in. flexible drives were shipped by Japanese vendors, while 38% of the 5¼-in. market belongs to them.

The Japanese control nearly one quarter of 8-in. and 9-in. fixed-drive markets with Fujitsu Ltd. far and away the leader, being responsible for nearly two-thirds of the Japanese shipments. Fujitsu also leads other Japanese vendors in the 10½- and 14-in. 200M-byte to 499M-byte areas with its 10½-in. product.

Fujitsu. Fujitsu is Japan's No. 1 computer manufacturer, producing everything from one-chip microcomputers to extremely large systems. In the U.S., Fujitsu America, Inc. has begun to make inroads with sales in 1984 approaching $600 million.

In the computer markets, Fujitsu has enjoyed some success with its Micro 16 products, although the sales have not been phenomenally high. Its incompatibility with the IBM Personal Computer ensures it of limited potential. Fujitsu has gained a share of the high end of the computer market through its dealings with Amdahl Corp., of which it owns 49%.

The storage market has been a successful, growing area for Fujitsu. With products in virtually every segment of this market, Fujitsu leads Japanese competition in nearly every category.

Several products have been announced this year, including a streaming start/stop tape drive, a ¼- in. cartridge tape and an intelligent disk controller. Just announced in November was Fujitsu's entry into the flexible disk drive area with both 3½- and 5¼-in. offerings.

Fujitsu is focused on the U.S. market and has built manufacturing facilities in Florida, Texas and Oregon. It hopes someday to manufacture nearly all of its disk drives domestically.

Hitachi Ltd. Hitachi has a low profile in the nonsemiconductor markets in the U.S. This is changing as Hitachi has moved from the position of supplying only one company, National Advanced Systems Corp. (NAS), to becoming an OEM for many. It is reportedly opening another U.S. division to act as an OEM supplier and service and support center.

Hitachi has done very well in the U.S. market, reporting sales of $1.1 billion for the latest year. Much of this, however, is semiconductor related.

The products offered in the storage area include Winchester drives in the 3½- (newly introduced), 5¼-, 8- and 8.8-in. areas. Additionally, flexible drive products of 5¼- and 8-in. are offered.

Through NAS, Hitachi offers large IBM plug-compatible machines as well as large disk drives.

Hitachi, considered by many as a national company in Japan, retains a Japanese business style in the U.S. that is reflected in a very slow, methodical mindset. Many members of the U.S. management team are Japanese nationals, different from the majority of Japanese vendors who employ a high percentage of U.S. managers. This may be a detrimental factor for Hitachi as it becomes more involved in the open market and realizes that a quick, reactive type of style prevails.

NEC Corp. NEC started in Japan as a manufacturer of telephone sets and switchboards, and it continues to be strong in the telecommunications area.

NEC Information Systems, Inc. was established in 1977 as a subsidiary of NEC and is headquartered in Boxboro, Mass. Sales for last year were approximately $300 million.

The product line of NEC Information Systems includes personal computers, small business minicomputers, printers and disk drives. NEC has experienced moderate success with the personal computer line but has done better with its

Continued on page 70

Mortola is a senior research analyst with International Data Corp. West.

Honeywell, NEC team up

NEC & Honeywell

Within the past few years, it became increasingly clear to Honeywell, Inc. that its best strategy for survival in an IBM-colored world was to concentrate on medium-size to large systems, such as minicomputers and superminicomputers. Since it was losing market share, the firm simply did not have the resources to develop very large mainframes. The decision was made not to spend research and development revenue on top-of-the-line systems.

But Honeywell didn't want to risk losing even more existing customers to IBM. Honeywell decided it had to compete across the board, and two years ago, it turned to its Japanese partner of more than 20 years, NEC Corp.

NEC, Japan's second largest computer maker, agreed to develop and supply Honeywell with a large-scale mainframe compatible with Honeywell's other machines. The product, called the DPS 90, began to ship this year.

On the receiving end

And Honeywell, which had traditionally provided technology for NEC to use in its Japanese products, was now, for the first time, on the receiving end. Earlier this year, Honeywell sold its Japanese operation outright to NEC.

Despite that, according to Jim Vervant, vice-president and group executive of Honeywell's U.S. Marketing and Service Group, the relationship between Honeywell and NEC is more than just a typical OEM agreement between a Japanese and a U.S. company. "Over the past 23 years, our president Edson Spencer has built many close relationships with people at NEC," Vervant says.

"He is close to [NEC Chairman Koji] Kobayashi, and it is those relationships that carry us through. It is more characteristic of a Japanese business agreement where the relationship is key. It strengthens what we do together."

It is also helpful that in their long relationship, the two companies have built architectures and operating systems that are greatly similar. NEC's proprietary architecture for its large systems is called ACOS and is "extremely compatible" with Honeywell's GCOS operating environment, Vervant says.

Under the agreement, NEC ships its S1000 CPU to Honeywell's Phoenix plant where it is fitted with Honeywell's communications front end and peripherals. Honeywell retains all distribution and manufacturing rights to the product in the U.S.

Vervant says the DPS 90 has "sold according to plan," and the two companies are currently working on a follow-up product in Japan. Though NEC controls the research and development, Honeywell engineers closely monitor progress and provide input along the way.

Japanese origin made clear

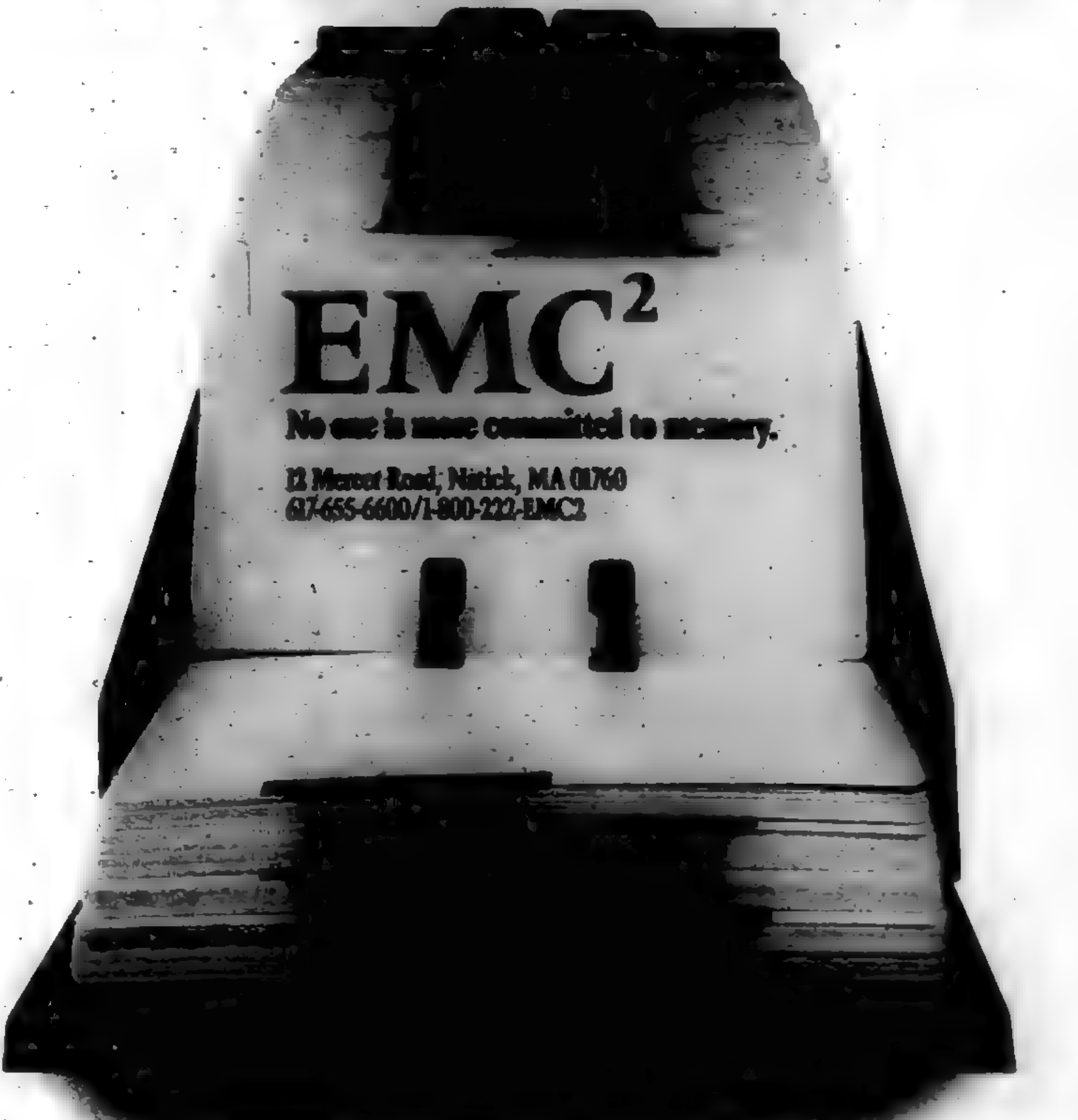
Vervant notes that Honeywell sales representatives make it clear from the outset that customers are buying a Japan-built product. "We've never heard a negative comment," Vervant says. "Customers are pleased that Honeywell can support a product at the high end of the line."

Those who closely monitor the Japanese computer industry point out that it is irksome to the Japanese vendors to have to sell their products under the name of a U.S. company.

"There is a lot of pride involved," according to Vervant, "but they are realizing more and more how difficult it is to penetrate the U.S. market on their own. Those who are successful will have a partner, and there aren't that many partners available."

— Glenn Rifkin

Why the three letters you think of first for System/38 add-in memory shouldn't be IBM.



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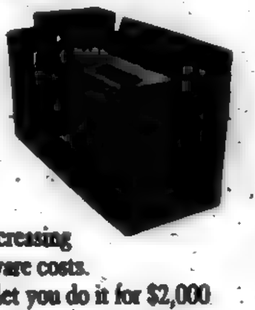

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Update

Continued from page 59

the culture gap. This is particularly true in different business fields. We have to make up complete menus, build up sales engineers and support staffs, and those people should be completely acclimatized to fit in the local market in the U.S. We will have to solve many problems before marketing large systems ourselves in foreign markets."

Though no one from Hitachi would comment, there is speculation that the company is seeking more OEM agreements for many different products in the U.S. computer market. It recently announced an agreement with Sperry Corp. on a large system connection.

Hitachi announced that it plans to open a manufacturing facility in Oklahoma to produce large-scale 3380-type storage devices in 1987.

NEC and Honeywell — These two companies are in the 23rd year of a cooperative agreement for the exchange of technology (see story page 64). Two years after signing an agreement calling for NEC to supply Honeywell with its largest mainframe, Honeywell began shipping the DPS 90 this year. Based on NEC's S1000, the DPS 90 is selling "on plan" according to Honeywell's Jim Verrant, vice-president and group executive for the U.S. Marketing and Service Group. IDC predicts that this connection will add only a percentage point or two to Japan's share of the large-systems market here.

NEC is clearly more interested in selling small systems and personal computers into the U.S. market.

In terms of large systems, the power of Japan Inc. clearly will provide little advantage for Japanese firms breaking into U.S. markets. MITI official Koichiro Urabe admits that the Japanese government is making no formal effort to help its firms gain a foothold in the U.S. "The administrative policies of MITI toward the domestic computer industry have never intended to boost Japanese computer makers' presence in the world computer market," Urabe states.

Medium-size, small systems

The Japanese made their nation a dominant industrial power by taking existing products — cameras, automobiles, television sets — improving them to the highest quality and using superior manufacturing capabilities to produce them for less money. This strategy has worked phenomenally well for products with long life cycles and technologies that are relatively stable.

In the data processing arena, however, technology changes too rapidly; product life cycles are much shorter; and in medium-size and small systems, as well as personal computers, the target is moving too fast for the Japanese style to have an impact.

Japanese firms hoping to penetrate the U.S. market are beginning to realize that it will be difficult to sell office systems and workstations without the add-ons that customers want most. Ironically, U.S. buyers either do not know or do not care that the contents of most personal computers, including the IBM Personal Computer, are manufactured in Japan. Selling the total package is obviously another story.

"To be successful here you have to have a product that is responsive to the marketplace. To do that you have to have a partner in that marketplace helping you with product development and distribution channels," says John Rehfield, vice-president and general manager of information systems for Toshiba America, Inc.

In the small systems and workstation arena, the cultural differences between Japan and the U.S. come into play once again. The Japanese have spent an inordinate amount of time incorporating Japanese language capabilities into their machines. This difficult endeavor has kept them from concentrating on foreign markets, and industry analysts are skeptical of their chances at this late date.

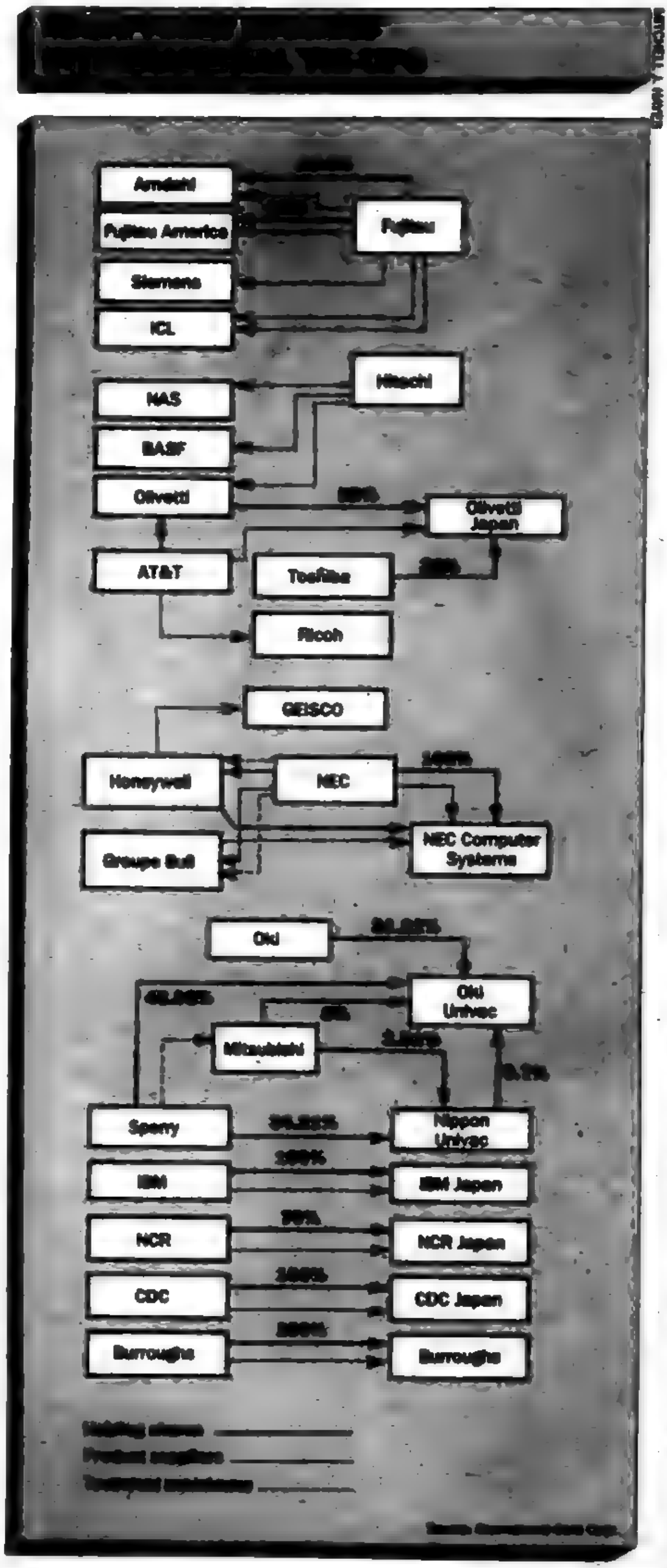
In the mid-range U.S. market, the Japanese hold a negligible (0.3%) share. According to IDC, only Hitachi — through NAS — is selling an IBM 4381-size machine in this country, and the outlook for increased competition on that level seems dim.

In the minicomputer market, the Japanese have established virtually no presence on U.S. shores. Digital Equipment Corp., the leader at home, is also the top seller in Japan. Unlike in the U.S., where vendors have chosen certain markets in which to specialize, the large Japanese vendors tend to supply everything — computers, communications, semiconductors — at all levels for their customers.

For a Japanese supplier to break into the U.S. market, it would have to take on DEC, IBM, Wang Laboratories, Inc., Hewlett-Packard Co., Data General Corp. and others. Businesses, analysts say, are unlikely to want to bring yet one more proprietary operating system into their environments. Japanese vendors are turning to AT&T's Unix in hopes that this portable operating system will help them extend into new markets.

Nonetheless, the Japanese have begun to create some eye-catching products, and vendors like Toshiba Corp. are clearly looking to the U.S. as a potential feeding ground.

According to Toshiba's Shigenori Matsushita, chief engineer of the information systems business group, his company focuses on a distributed office system environment based on departmental processors. Using its shiny new headquarters in Tokyo as a working example, Toshiba has pushed Japanese office automation to new limits.



The building, Matsushita explains, houses 7,000 Toshiba employees. A network of 51 departmental processors are connected by two types of local-area networks: a 100M-bit optical backbone network connects with a 10M-bit Ethernet system on each floor of the building. More than 1,000 workstations hook up to this network.

To back up its philosophy, Toshiba recently unveiled a 32-bit superminicomputer called the TOSBAC G8050, reportedly faster than the DEC VAX 8600. Utilizing Japan's own CMOS technology — a low-cost, high-density, low-power-consumption processor attempting to replace the standard bipolar emitter-coupled logic chip — the G8050 reportedly runs at 5.6 million instructions per second (MIPS) compared with 4.8 MIPS for the VAX 8600.

Matsushita points out that the new machine is the first in the world to use a CMOS gate array device utilizing silicon-on-sapphire technology. The sapphire, which acts as an insulator, is covered with a thin layer of silicon. Because the substrate of the chip is insulated, the circuit can operate faster than competitive chips. The sapphire, of course, is expensive and raises the cost of the machine. Up to four processors can be linked to the main memory unit and in that configuration can run at 18 MIPS.

The system will sell for approximately $400,000 in Japan. Matsushita acknowledges that Toshiba plans to market the G8050 in the U.S. through an OEM agreement with a yet-to-be-named vendor. That agreement is expected within the next five months.

Though other major Japanese vendors, such as Hitachi and Fujitsu, also offer "total-solution" systems, it appears unlikely that any will become major players in the U.S. market any time soon.

It would be a surprise to corporate America if they did. According to a recent survey of 243 U.S. firms by the Omni Group Ltd., a New York research and consulting firm, only 10% reported purchasing Japanese-brand office computers compared with 98% who reported installing American-made systems (see chart page 68). David Cushing, associate director of the Omni Group, says that the No. 1 reason for resistance to purchasing Japanese office systems is compatibility. Cushing points to emerging standards, such as IBM PC-DOS on the personal computer level and says, "The Japanese have been slow on the uptake to adopt these standards. They are missing the boat."

The survey revealed that only 13% of Fortune 1,000 respondents thought that Japanese products would have the highest compatibility with existing office systems. Given the importance U.S. companies place on systems compatibility, the survey states, these unfavorable perceptions pose a strong entry barrier to Japanese vendors.

"They may think that what sells in Tokyo will sell in Toledo, but they haven't convinced the MIS director that they can offer fully compatible systems," Cushing says.

In addition, the survey points out that service and support is a major stumbling block to acceptance. At least 85% of respondents believe U.S. vendors offer the best service for office computers. "Our past studies have shown that U.S. customers place an extremely high value on vendor-supplied service. Unless Japanese vendors build their image as service providers, it could put a damper on their success," Cushing states.

Despite the survey results, Cushing believes that the Japanese could well be a medium- to long-term force to be reckoned with in office systems. As the office automation world conforms to a set of standards, it will give the Japanese a target for their price/performance advantages. The large Japanese vendors have so many divisions and varied product lines that one division can carry another through bad times, and this gives them a longer window of opportunity, he says.

Dale Kutnick, an independent consultant based in Wayland, Mass., says that the only real opportunity for Japanese office systems vendors is if the Unix operating system becomes a standard. Fujitsu's Hiraguri agrees and says that Unix has already been announced on its minicomputers. "We are now making an effort to make Unix a standard for our machines; the export potential is secondary," he says. "But of course, if we make Unix a standard, it can have an effect that maybe an American user can appreciate."

In that regard, Toshiba is incorporating Unix on its office automation workstation as well as its engineering workstations. Toshiba recently announced an agreement with Sun Microsystems, Inc., a leading supplier of Unix-based engineering workstations, to add Japanese language capabilities to its workstations. That connection may have significance in the future in the U.S. if Sun decides to bring in technology from Toshiba.

In the long run, the Japanese vendors may change their outlook. But for now, most echo the sentiments of Toshiba's Matsushita. "In my opinion," he says, "I don't want Toshiba to be a predominant participant in the U.S. That is not our objective. Our objective is to survive in the domestic market as a systems provider. To survive, we have to have some areas of the U.S. market, but not as a primary objective.

"In the U.S., the most difficult thing for us is having systems engineer support for the customer. Nowadays, computers are more and more application oriented, and more nonexperts are using them. So today, computers are very influenced by a country's culture, and the most difficult part in selling abroad is the adaptation to the culture. That is why American computer manufacturers are not successful in Japan and Japanese are not successful in America. We would need a large population of systems engineers, and that is very difficult as a business investment. As long as this continues, the dominance of Japanese manufacturers in the U.S. will not happen."

Personal computers

The personal computer marketplace has been perplexing for the Japanese at home and even more confusing in the U.S. On the surface, it seems that personal computers were a perfect stepping stone to success in the U.S. The Japanese could take the standard model, produce it better and cheaper and flood the market through retail dealers who would provide service and support. Thus far, that scenario has not materialized.

Slow to adapt to IBM's PC-DOS standard, the Japanese have concentrated on getting Kanji character handling capabilities on their domestic machines and have put little effort into the U.S. market.

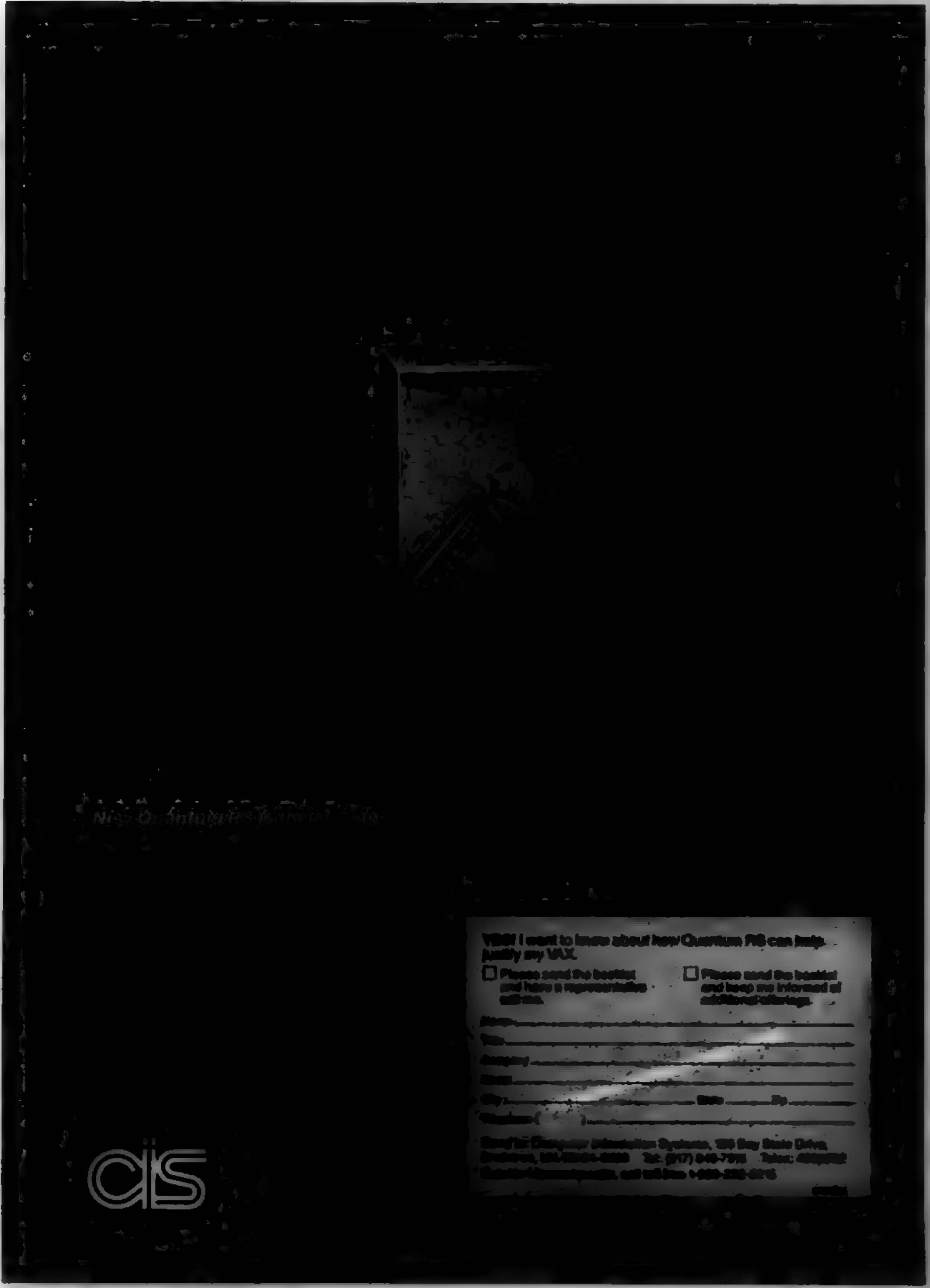
Companies like Toshiba, Fujitsu and Panasonic Industrial Co. tried to get into the market in 1982 and failed. In 1984, IDC reported that Japanese vendors held just 2.6% of the personal computer market and predicted even lower numbers this year.

"With the personal computer market virtually standardized around PC-DOS, it might seem that there would be an opportunity for the Japanese vendors to come in with a low-priced version of the IBM [Personal Computer]," the IDC report states. "But since personal computer technology continues to move very rapidly, it is still hard for the Japanese to gear up to produce high volumes of the right product at the right time."

"It's too much of a moving target," Kutnick adds. "They can't come in, pick a spot and go after it."

Never known for innovation, the Japanese lag behind in the swiftly changing world of the personal computer. While IBM and other domestic makers switched to 16-bit technology, the Japanese were still pushing

Toshiba's Matsushita: 'Our objective is to survive in the domestic market.'



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Update

8-bit machines in 1984. The DP/MIS director, already inundated with IBM Personal Computers, is unlikely to start bringing in incompatible Japanese machines, and the consumer market has its own set of barriers. There is, for example, a subtle but key difference between selling autos or electronics and personal computers.

In his new book *IBM vs. Japan: The Struggle for the Future* (to be published by Stein & Day Publishers in January), Robert Sobel points out that comparison shopping in computer stores has not been a plus for the Japanese as it has been in autos and electronics. "The comparisons weren't favorable, in part because IBM and Apple Computer, Inc. had excellent reputations by then, but more important was the matter of selling both a technology and a product," Sobel writes.

"The person who test-drove a Toyota in the 1970s probably had owned a Chevy or Ford; the shopper for a Sony color set a decade earlier had an RCA or Zenith at home. Not so for the first-time purchaser of a micro, and as it turned out, he preferred the familiarity of a domestic model."

Interestingly, the Japanese are now faced with tough competition in their own backyard as the effort to create low-priced, quality machines for export intensifies. The "Four Dragons" — Seoul, South Korea; Hong Kong; Taiwan; and Singapore — are vigorously pursuing the IBM Personal Computer-compatible market, and it will be all the Japanese can do to fight them off in the domestic market.

All that said, several Japanese vendors such as Toshiba, Panasonic, NEC and Mitsubishi Corp., have not given up on the U.S. market. Toshiba's Matsushita admits that mere IBM compatibility is not enough for the Japanese to grab significant market share.

"We believe something must be added, but if something is added which impacts the compatibility, that is no good. The compromise between compatibility and something new is the key to success in this field," Matsushita says.

Toshiba has combined very large-scale integration technology and a compact body to produce its 16-bit, IBM Personal Computer XT-compatible T1100. Already selling in Europe, it will soon be introduced in the U.S.

NEC is also aggressively marketing personal computers, and it has its own production plant in Massachusetts to manufacture its machines. The products, however, are not selling well due to incompatibility with IBM.

Whether the Japanese can overcome the initial obstacles and make a dent in the marketplace remains to be seen. It is difficult to write them off in a market area still evolving and growing. (The IBM Personal Computer is, after all, not yet 5 years old.)

But as the IDC report states, "No major assault on the personal computer market is perceived as imminent."

Future systems

Japan's future in the U.S. computer market may rest not with current technology but in the next generation of information processing. The Japanese are making a well-publicized attempt to create advanced, intelligent, superfast systems with cooperative efforts that strain the ties that bind Japan Inc. Depending on which sources one chooses to believe, the Japanese will either leap into the No. 1 spot in the world's information systems market or simply plod along like everyone else toward tomorrow.

Among recent commentators, author Feigenbaum set off the most furor with his 1983 book *The Fifth Generation*, in which he wrote, "The Japanese have seen gold on distant hills and have begun to move out. . . . The consequences of complacency, of our spirited attention to the present at the expense of the long view, will be devastating to the economic health of our most important industry. The Japanese could thereby become the dominant industrial power in the world."

Others, such as Theodore H. White, believe the Fifth Generation project represents just part of a calculated attack on U.S. commerce. Writing in *The New York Times*, White says, "Today, 40 years after the end of World War II, the Japanese are on the move again in one of history's most brilliant commercial offensives, as they go about dismantling American industry. Whether they are still only smart, or have finally learned to be wiser than we, will be tested in the next 10 years. Only then will we know who finally won the war."

The U.S., in fact, is not sitting idle while Japan works [CW, May 6]. Major research continues at American universities and corporations on artificial intelligence, parallel processing and advanced systems fueled by vast funding from the Department of Defense.

The Japanese acknowledge openly that they are working on future technologies through private, corporate and cooperative government-sponsored projects. But they also point out clearly that their efforts are evolutionary, not revolutionary. Those involved in the projects as well as industry analysts downplay the "us vs. them" aura that the work has taken on.

"Is there a race between the U.S. and Japan?" ETL's Kashiwagi asks. "Races have rules. You obey rules to run it. But tell me, who will make the rules in this race? Japan and the U.S. must cooperate as well as compete."

James Abegglen, management consultant and professor at Sophia University in Tokyo, adds, "The melodramatic view of all this is simply not useful. Why should we be concerned about technological advances of the Japanese? They are our allies. They're not making weapons."

MITI, in fact, encourages cooperative agreements with foreign researchers, though no official pacts have been announced. Said one MITI official, "When the ICOT Project was inaugurated four years ago, close exchange with international organizations was promoted because all these projects relate to untapped technologies. International cooperation will be required all the more because it is very important to establish international standards for new languages and parallelization."

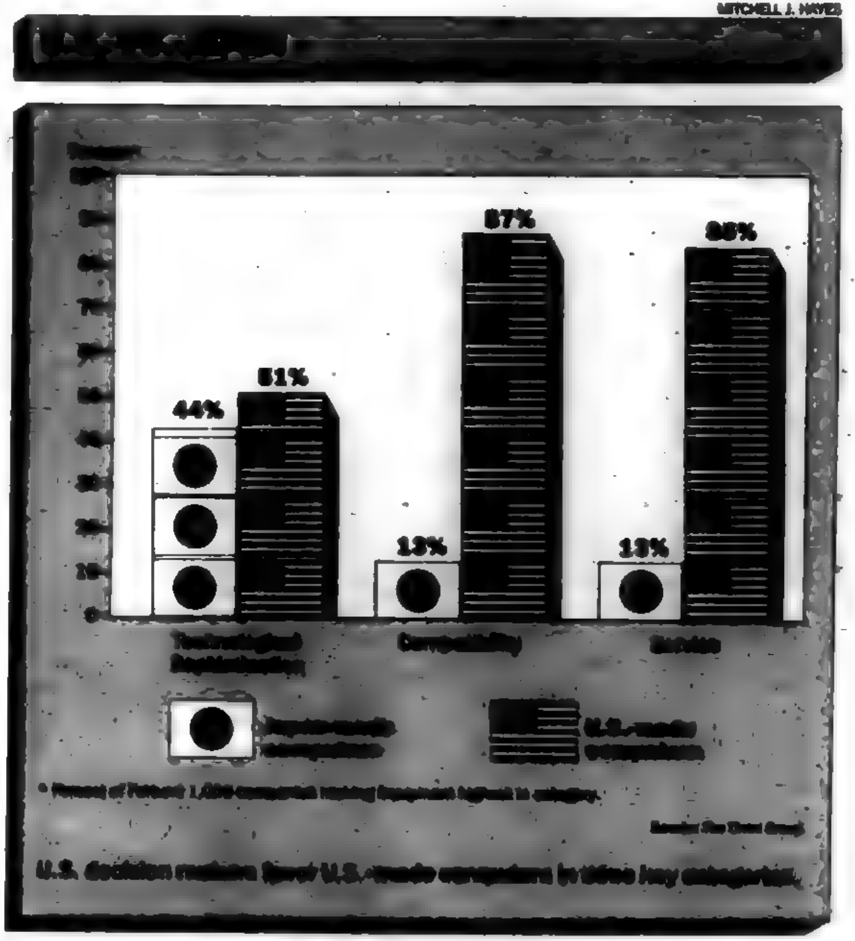
MITI — through its Agency of Industrial Science and Technology — is funding four major computing projects for the purpose of leading Japan to the "age of informationization."

■ The ICOT Project. Known generally as the Fifth Generation project, this research is devoted to the study of artificial intelligence, parallel processing, translation systems, vision systems and more. Begun in October 1981 and funded for $850 million over 10 years, it is a cooperative arrangement in which the leading Japanese vendors send top researchers to ICOT for three years of joint development work. The project is divided into three segments. Phase I — a catch-up period — ended this year. Phase II — the intermediate stage designed to create actual demonstration systems of initial research — is scheduled to run until 1988. The final phase for implementation has no detailed schedule but should reach completion in 1991.

■ The Superspeed Computer Project. Getting less attention than the Fifth Generation project, this national project got under way in January 1982 to develop high-speed computing systems for scientific and technological use. The project, scheduled for completion in 1989, aims to produce a 10 billion floating-point operations per second (FLOPS) machine. The $100 million project has already entered its commercial phase. Its three major activities include R&D on parallel architectures and software; development of new high-speed devices, such as Josephson junctions, gallium arsenide and high electron mobility transistors; and construction and evaluation of the final system.

■ The Sigma Project. This major project focuses on elevating the productivity of software development. Japan is predicting a shortage of 600,000 software programmers by the year 1990 if the nation does not take significant action. The lack of

MITCHELL J. HAYES



U.S. decision makers favor U.S.-made computers in three key categories.

[illegible]

Vendor	1983 Shipments	1984 Shipments
[illegible]	280	678
[illegible]	425	870
[illegible]	41,000	51,000
[illegible]	3,985	[illegible]
[illegible]	—	[illegible]
[illegible]	13,500	[illegible]
[illegible]	—	[illegible]
[illegible]	200	[illegible]
[illegible]	7,000	[illegible]
[illegible]	1,000	[illegible]
[illegible]	700	[illegible]
[illegible]	300	[illegible]
[illegible]	200	[illegible]
[illegible]	4,100	[illegible]
Total	72,521	[illegible]

software development expertise has long been a Japanese impedance, and several of the major companies are participating in the Sigma Project.

- The Interoperability Project. In this cooperative effort, manufacturers are working to increase interfaces between incompatible systems. The focus is on constructing multimedia data bases and furthering distributed data processing in Japan.

Urabe says that MITI is seeking funding for another project that will promote cooperation between Japan and less developed countries in the computer industry. Among the challenges of the project will be to build computer-aided translation systems between the Japanese language and the languages of the less developed countries.

Since it was originally announced, sending the U.S. computer industry into a panic, the Fifth Generation Project has not had a smooth ride. Though MITI officials claim that the project progresses right on schedule, the bloom is apparently off the rose. Major computer companies such as Fujitsu hesitate to send their best people off to ICOT and sacrifice short-term potentially profitable research for yet unknown group gains.

"Under the Japanese employment system, most companies have trouble sending these people out for a long period of time," Kashiwagi admits. "If it doesn't bring profits to their own company in the short run, they are not likely to do it. It's the same in Japan as it is in the U.S."

Reports also indicate that MITI funding for ICOT has declined, and the government realizes that it set unreasonable goals for the project.

Kashiwagi says that the transition of personnel for ICOT between the first and second phases of the project went smoothly despite the reported problems. He acknowledges, however, that the researchers in the second phase will have less freedom than those in the first because the project migrated from basic research to product development. "Freedom will naturally decrease in the new period," he says, "and then ICOT may not be good enough for those researchers who seek the same freedom they had in the first stage."

According to IDC's Ogino, these creative individuals are turning more and more to independent, third-party development companies, a heretofore unthinkable route for the Japanese. With the country's renowned lifetime employment, it remains extremely difficult for independent ventures to survive without government support or a lifeline to a major firm. If a new venture does find a *sukima* or niche, a bigger firm often snatches it up. "The number of new ventures is still very small," Ogino says, "but we are starting to see some small software developers, for example, have success."

For the Japanese to attain success in the fast-moving U.S. computer market, many believe they must encourage more of this individualistic thinking. The large vendors feel they are encouraging that attitude in-house with work on state-of-the-art systems.

In the supercomputer arena, for example, Fujitsu, Hitachi and NEC engage in head-to-head battles in Japan for dominance of that specialized market. Fujitsu recently announced its VP 50 and VP 400 models, and Hiraguri indicates that the company looks to Amdahl as a channel of U.S. know-how in this area. No sooner did Fujitsu unveil its top-of-the-line VP 400 (with a reported speed of 1.14G FLOPS), then NEC announced it was shipping its first supercomputer, the SX-2 with a rating of 1.3G FLOPS.

Whether companies like Fujitsu can find success marketing supercomputers through U.S. manufacturers remains to be seen. In such a small market, it is doubtful that a vendor without a service presence will do well, but the Japanese makers indicate that they are looking for a global audience for their machines.

Fujitsu is also pioneering the artificial intelligence field in Japan. Though ICOT chose Prolog as its language of choice in the fifth-generation push, Fujitsu recognizes a strong market potential for LISP, the U.S.-favored AI language. Fujitsu markets the Facom Alpha, a LISP processor that already has stirred widespread interest for companies looking into expert systems in Japan, according to Hiraguri. He says that Amdahl expressed interest in selling the machine in the U.S.

In addition, Fujitsu is demonstrating the Atlas, an artificial translation machine that automatically translates Japanese to English and vice versa.

Companies like Toshiba are also involved in advanced research and

MITI's Urabe: Hoping for cooperation with less developed countries

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Update

It is clear that the Japanese manufacturers are no more fixated on world domination than anyone else.

development but with more practical, short-term goals in sight. As part of the ICOT group, Toshiba engineers designed a relational data base machine. But for its own business, the company is heavily involved in promoting its advanced office systems approach. It developed a unique image processing expert system to address a major need in Japanese document handling and optical-disk technology for the records-handling crunch that has long plagued Japan.

The recent liberalization of Nippon Telegraph & Telephone Corp. (NTT) opened up the telecommunications market in Japan, and computer vendors are scrambling for a piece of the value-added network market. Deals between NTT and U.S. vendors such as IBM [CW, Nov. 18] put even more pressure on Japanese manufacturers.

Concentration on domestic markets leaves little time for Japanese vendors to devote R&D cash to U.S. computer needs. Where those needs cross over to machines created for home use, vendors will undoubtedly make attempts at marketing abroad. But it is clear that the Japanese manufacturers are no more fixated on world domination than anyone else. In fact, they tend to debunk the Japan Inc. label as inaccurate and misleading.

According to Toshiba's Matsushita, the government does take the initiative on occasion in deciding direction for industry, but the reverse is more often true. "Actually, individual companies give their opinions first, and this directs the policy of the government," Matsushita states. With so many companies expressing individual concerns, conflicts and contradictions arise on many occasions. The veil of harmony exists, more often than not, in the pages of books written by overzealous or uninformed writers.

Upon investigation, it becomes clear that the Japanese have yet to repeat in the U.S. computer arena what they've accomplished in automobiles and electronics. Both they and their U.S. counterparts remain skeptical of any such domination in the future. Despite trade imbalances and increased anti-Japanese feelings in the U.S., both countries expect increased rather than decreased cooperation between computer makers in the future with both sides reaping the benefits. For now, the competition remains keen.

As Kashiwagi puts it, "Even in competition, there is cooperation." ■

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Continued from page 64

small business computer line.

NEC has a long-term relationship with Honeywell and sells its large mainframe to Honeywell, which resells it as its large system.

Toshiba Corp. Toshiba's U.S. subsidiary, founded in 1965, is a $1 billion company that sells and services industrial and consumer electronics. The business microcomputer segment is Toshiba's target market.

This year, Toshiba took the first step in acquiring Sord Computer Corp., a small but innovative personal computer maker in Japan. Sord's expertise in personal computers will benefit Toshiba.

This acquisition should be instrumental in successfully developing and marketing personal computers, an area where Toshiba has been anything but successful.

Mitsubishi Corp. In 1973, Mitsubishi Electric America was established. The U.S. sales for 1984 were about $800 million.

Mitsubishi Electric America sells products manufactured in Japan by Mitsubishi Corp. Products are all currently sold through the OEM channel.

Its personal computers, for example, are sold in the U.S. market through Sperry Corp. and Leading Edge Products, Inc.

Other products include disk drives, printers and monitors.

Japanese vendors are slowly learning how to succeed in the U.S. market, but it has been a long and flawed education. The cultural differences have proven difficult to overcome; U.S. computer makers trying to sell in Japan face a similar obstacle.

The U.S. marketing style is very different from that of the Japanese. U.S. businessmen tend to be more aggressive and move quickly, whereas the Japanese like to take the time to develop a relationship with their customers. Translation: a longer sales cycle that may result in a lost sale.

The primary reason for the success of the Japanese is their ability to come to market with a high-performance, low-price product. Perhaps better than any other nation, Japan has the ability to manufacture technically sound products priced at the lower end of the spectrum.

How Japan will fare with that capability in the U.S. computer market of the future remains to be seen. It would be unwise, however, to discount the potential of the Japanese. ■

IN DEPTH

Planning amid change

Managers find they can't proceed from theory to an actual plan in an environment where fundamental assumptions become obsolete monthly. One company's response — focusing on the planning process and the ability to manage change, rather than writing a static long-range plan — allowed MIS to reap the benefits of ever-changing information technology.

By Vita Cassese, William Gruber and Max Hughes

Senior executives and information managers today are confronted with an extraordinary array of forces that make the construction of a strategic plan for information systems particularly difficult. The forces include the following:

The proliferation of technology.

A lack of integration among technologies, both across manufacturers and from the same vendor.

Major technology gaps, such as in micro-mainframe links and word-processing and data-processing links.

Pressure from users who expect effective access to technology that in reality is not user friendly.

Pressure from top management to cost-justify where the benefits are not fully known or not quantifiable.

Systems managers and business managers who have attempted long-range information systems planning often have difficulty in proceeding from theory to an actual plan. They have difficulty deciding what the plan should address and sorting out policy from strategy, technical decision and management and control in an environment in which nothing is stationary and fundamental decisions and assumptions are made obsolete with the next issue of their favorite computer journal.

In short, these managers cannot focus: They cannot get to the point of making a coherent statement about where they are going, why they are going there and how they are going to get there.

Systems management at one firm, Pfizer, Inc., responded to this challenge. Following is an account of this large company's effort to effect a significant reordering in management practice to bring about the orderly management of change.

The planning process

The speed of change at Pfizer has been so rapid that systems management decided to focus on the planning process and the ability to manage change rather than write a static long-range plan. To begin with, the senior systems managers went off-site for three days in order to initiate a program for systems planning. They established certain guidelines for the planning process:

- Identify audiences or users for the systems long-range plan.
- Define the purposes or objectives of systems planning.
- Identify the issues to be managed by systems planning.
- Group issues into the strategies required to manage those issues.

Vita Cassese is director of systems for the Pharmaceutical Division of Pfizer, Inc., New York. William Gruber is president of Research & Planning, Inc., a Cambridge, Mass., consulting firm. Max Hughes is vice-president of systems and communications at Pfizer.

- Implement a program of managed change.

Senior systems managers arrived for the three days of off-site planning with a strong intuitive understanding of the "vision" behind managing change. They were well aware of the issues to be managed by the planning process.

The commitment of senior systems managers to the planning process came in response to their need to articulate an almost-formed vision. They initiated the process to complete the vision of new roles for information systems and to achieve an action plan for translating the vision into practice.

The managers' focus on this vision played a pivotal role, for it transformed the whole process from reaction to proaction. Their proactive approach transformed the role of systems management from satisfying the aggregate need of all end users to one of leading the organization in the adaptation of technology to its greatest advantage.

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> *Users, like senior management, need confirmation that their real goals are understood, that the role of information technology is appreciated and that a road map for getting from today to tomorrow is created and revised as conditions change.*

Increasingly, systems management recognized that they had no clear road map for carrying out all the required changes. Some decisions were made to satisfy only immediate needs; other decisions were delayed until some larger, prerequisite decision had been made. In short, the managers felt intellectually gridlocked.

In this state, they could obviously not communicate their vision. The planning process was initiated to correct this inability to communicate the proactive vision of senior systems management.

The first day of the planning process involved the brainstorming of issues, in no particular order. Not all issues were of equal importance. Some of the more important issues include the following:

- Was the system going to consist of a three-tier architecture, with an intermediate computer between the corporate mainframes and the micros; or only two tiers, mainframe and micros?
- How could documents be transferred between Wang Laboratories, Inc. word processors and IBM Personal Computers?
- Was a three-vendor strategy employing Digital Equipment Corp.'s All-in-One for electronic mail, Wang for word processing and IBM for data processing a viable option, or should management attempt to reduce the number of vendors to one or two?
- What was the stated and actual strategic direction of the major vendors?
- Was electronic mail here to stay and if so, whose software would be used?
- Who was going to call the shots on what cables to install in the office buildings, since a master communications plan had not yet been developed?
- If all the end users had substantial computer power on their desks, what were the future roles of the systems staff?
- Who was the guardian of the data — who "owned" the data?

Constituencies for planning

While all these issues were being raised, the flow of the talk was frequently interspersed with "So-and-so must understand that . . ."; "We'll never get him to agree to . . ."; "That will really satisfy his wanting to have . . ."; "What is corporate policy on . . .?"; "We've got to think our way through . . ."

Ultimately, conversation halted with "Look, we've got to define who the audience is, or we'll never be able to write anything down." And so, the group systematically identified the various audiences that the plan would serve.

Senior company management. Senior management has to be assured that systems management had a plan that provided cost-effective information technology while balancing vendor hype — to which senior management is subjected at every turn — with the realities of running a business.

Senior management deserves the comfort of knowing that the influx of personal computers and office automation is part of some overall plan. Furthermore, their active support is needed not only for visible expenditures but also for acquiring from their subordinates the required time and energy commitments to learn and take advantage of modern computer technology to achieve a business advantage.

Users. Users expect to behave as individuals with regard to information processing. They are led to believe that data will be instantaneously available, that all software packages are "user-friendly" and apparently require neither a definable problem nor definable solution to be installed.

Users, like senior management, need confirmation that their real goals are understood, that the role of

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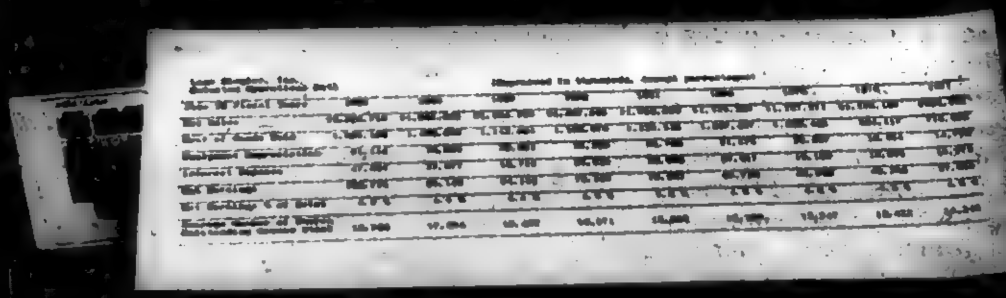

information technology is appreciated and that a road map for getting from today to tomorrow is created and revised as conditions change. Their support is needed in at least two ways: participation in the more detailed planning that would follow and tolerance for compromise solutions that would satisfy a much larger group.

Corporate information processing staffs. At Pfizer, significant expenditures for computers are subject to review by the relevant corporate staffs, and telecommunications is a corporate function. Therefore, these groups need to understand and support the plan, particularly if any action under consideration either departs from the relatively few absolute policies that existed or requires active cooperation between these corporate groups.

For example, the plan calling for intermediate computing required that an appropriate machine be bought, which it was, with the corporate groups participating in the selection of a particular machine.

The systems staff. The advent of the current wave of information technology, the influx of personal computers, the acceptance of fourth-generation languages, the reordering of data to data base format and so on provided new opportunities for systems personnel. But for some, these changes also posed a challenge to their roles.

Furthermore, without the wholehearted support of those who were to translate plans into reality, the whole exercise would be a blueprint of nothing. The plan also afforded an opportunity for the staff to see the assumptions under which their own managers were operating and either back the assumptions or stand up and debate them.

Systems management. As with any document of this nature, the writers, not the readers, derived the most benefit from the planning proposal. Here lay the instrument to examine and debate all of their assumptions and to reach a consensus. With these agreed upon, making change happen smoothly was not trivial, but at least systems management collectively knew what they were trying to achieve and why. Indeed, even if no one else read the plan, the immense value that accrued to the writers more than justified the whole exercise.

Why plan?

Just as the discussion of issues was interspersed with asides concerning the audience, the writing of the plan was distrupted with "Why are we doing this?"; "What is our real purpose?"; "Is this really going to help?"; "Do you think anyone is actually going to wade through this plan?"; and so on. Again, participants recognized that formally answering these and allied questions would provide essential guidance to the format and content of the plan. The group decided that the plan would provide the following:

- A framework for making day-to-day decisions.
- A vehicle for securing the cooperation and commitment of others.

Software strategy outline

SCOPE

Intermediate computer software.

OBJECTIVE

To establish a corporate software policy for information systems.

BACKGROUND

Software costs are significant. [illegible] can be in excess of [illegible] and must be carefully managed.

In the past, systems professionals needed to be familiar with one or two DP languages and one computer. The advent of personal computers and word processors and a plethora of software for each has enormously expanded the knowledge now required.

Software and hardware continue to proliferate, placing additional demands on those responsible for developing applications.

Selection of appropriate software is critically important yet increasingly complex because of the following factors:

- Many products perform essentially the same functions.
- Efficiency and functionality have to be traded off; software can be written to do a few things exceedingly well or many things somewhat less efficiently.
- A package that is optimal for one application may be inappropriate for another.
- Some evaluation methodologies used by systems managers contain over 100 evaluation criteria.
- Establishing the relative importance of functions is difficult.
- Many of the criteria are subjective.

Avoid using marginally different software packages performing the same function, since it is unnecessarily expensive in terms of initial cost, training and consumption of hardware resources. The standardization of software must be balanced against the benefits of selecting optimal software for each application.

Good software should facilitate access to data; facilitate end-user computing; maximize responsiveness to changed requirements; and maximize the productivity of systems professionals.

The growing demand for centralized data requires appropriate data management software.

The growing demand for ad hoc, unstructured inquiry is increasing rapidly and in turn raises the demand for appropriate, easy-to-use, query software packages.

The demand for direct access to data by managers and professionals is increasing rapidly, particularly for further analysis on personal computers.

Because of the importance and complexity of selecting software, selection standards and criteria are needed.

The company must select software that will fit in with prior expensive software purchases, such as a data base management system.

STRATEGIES

Where possible, avoid using procedural languages (such as Fortran, Cobol and Basic) in favor of contemporary nonprocedural packages focused on data base management, decision support, graphics and spreadsheets.

Use, whenever possible, application packages that are available in the marketplace, rather than building systems from scratch.

Gear software selection to facilitate end-user computing.

The installed DBMS package will be the first choice of data base management packages for other applications for the intermediate (second-tier) computer.

To capitalize on the benefits of contemporary software packages, the aging minicomputer will be deemphasized in favor of hardware for which software is more available.

Decisions will be aimed at software standardization in order to make effective use of limited systems resources, including hardware capacity and systems staff.

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> *Instituting a planning process is the single most important factor in managing the changes required in organizations as they seek to reap the benefits of ever-changing information technology.*

- A way of communicating systems management's vision.
- A statement of systems management commitment to manage change within information resources.
- A means of eliciting viewpoints from others.

The issue identification process produced 75 issues affecting the performance of Pfizer systems. The process of grouping and analyzing issues found eight domains to be addressed.

The next stage in the process was to develop an action plan for each domain. Planners developed these plans over several weeks, using a draft document to record their decisions. The format adopted for each domain was as follows:

- Scope. Overall mission and focus used to introduce the strategy.
- Objectives. The benefits to be achieved from the strategy.
- Background. Listing of issues identified in the first day grouped under the strategy and annotated with facts on trends, problems and opportunities.
- Strategy action plan. List of actions required to implement a given strategy.

Garnering support

Drafting the plan not only identified myriad issues but also explicitly identified just whose cooperation and support was needed, which in turn led to a plan to secure that cooperation.

The first phase was to give early drafts to those end users whose management, over the years, had been identified as knowledgeable and influential in information technology issues. As anticipated, these users provided insights toward wider acceptance of the plan and contributed added input to the substance.

At the same time, certain key corporate staff managers were exposed to the plan. They reacted favorably and became committed to making the plan work.

Initially, the systems staff, the next group of users to be involved, were not uniformly persuaded of the plan's benefits. Indeed, it was not until management presented the first formal annual update, coupled with a review of progress to date, that the plan gain the systems staff's enthusiastic support. Their skepticism may be attributed to wariness of — and weariness of — false promises.

Senior management was exposed to the plan in two ways: as it affected them individually, as members of the budget review committee, and through a focused briefing of the key points and implications. For the latter occasion, the plan's essence was reduced to one or two major points per strategy that were elaborated as interest grew.

The plan concluded with a review of existing and anticipated projects. For each project there was a discussion of the objectives, benefits, implementation plan and resources to be applied. The strategies developed in the remainder of the plan provided the infrastructure for the whole set of projects.

The planning process

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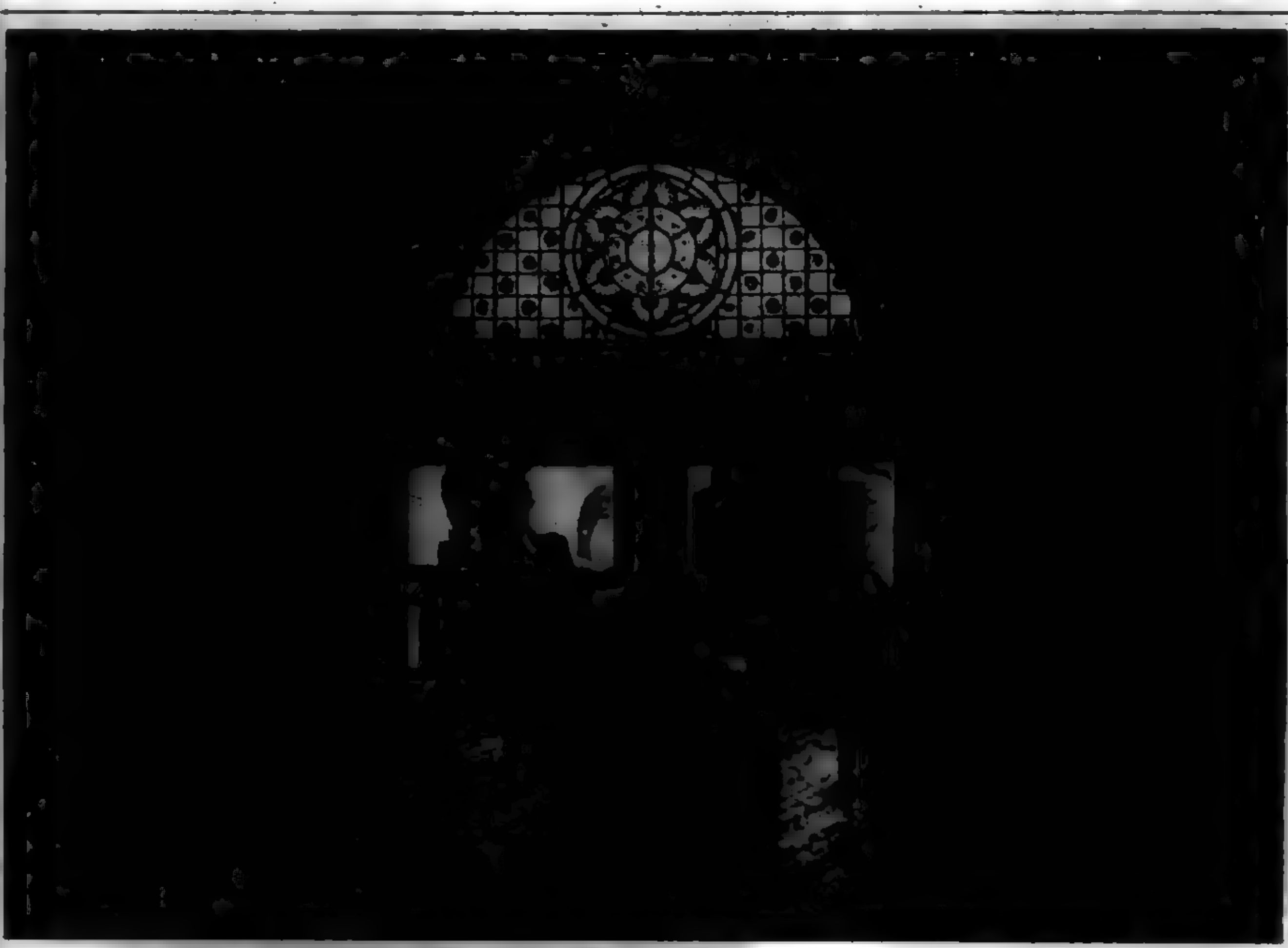

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most important factor in managing the changes required in organizations as they seek to reap the benefits of ever-changing information technology. The Pfizer example outlines the distinction between creating a static "long-range plan" document and relying over a period of time on a documented planning process as an instrument of change.

For nearly two years, the Pfizer systems managers have used the document from the planning process as the agenda, working paper and minutes of their daylong monthly meetings. The document provides the systems managers with a framework for making decisions and a procedure for recording their assumptions, airing new issues and recording their priorities.

Over time, the focus of the plan has changed, corresponding to the progress toward the currently perceived vision. Early on, the emphasis was getting the hardware and software selections settled; now it is integration and telecommunications. Next, the emphasis will fall on reworking the data.

Of course, emphases overlap, and managers can be certain that that cycle will be repeated indefinitely. Already the subject of the first set of issues — personal computing — has resurfaced.

The benefits of being able to convey to user groups a self-consistent systems architecture have become clearly evident. One department that was willing to try out two office systems, and had come to prefer one over the other, gladly went along with the alternative system after seeing the greater benefits of linking to an overall systems architecture.

Another sizable group has given up its predilection toward a brand of incompatible personal computers. A corporate group has had little difficulty in departing from a once strongly held conviction against use of a particular vendor's equipment in the face of a clearly worked out plan that made it the best choice.

After 12 months, the original management group repeated the planning process, including resecuring support from all the constituencies. A mere 68 issues, down from 75, surfaced this time. But, significantly, no discussion of format, audience or "why are we bothering" emerged — only a rapid re-execution of the essence of the process.

With so much resolved in the prior year, systems managers are able to appreciate new opportunities and two new strategies. The managers believe, at least for themselves, that they have defined a way of translating and combining a mixture of theoretical underpinnings, technological opportunities and a hazy vision into the process of managing change. ■

Installation strategies

HARDWARE. Install intermediate (departmental) computers between the corporate mainframe and personal computers.
SOFTWARE. Avoid development of new systems in procedural languages, such as Cobol or Fortran, in favor of fourth-generation languages.
DATA BASES. Construct business-specific data bases from corporate and external sources.
PERSONAL COMPUTING. Maintain a proactive attitude; centralise the purchase of approved hardware and supported software.
OFFICE TECHNOLOGY. Organise clustered hardware for secretaries; forge links from managers' personal computers.
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IN DEPTH

Structured analysis can streamline software design

■ More detailed specifications
■ Errors more easily identified
■ Specifications generated faster
■ Higher quality documentation

By Louis Mazzucchelli

Manual methods help raise the average applications backlog to 30 work-months, so completed applications may no longer even match users' needs. Lately, traditional development tools are giving way to top-down software development methodologies that save time and reduce errors.

The software development industry bears grumbling on a regular basis. Conversations between software engineers, management and end users center on now-familiar themes:

- Software engineers do not have enough time to get applications written on time.
- Completed applications do not perform according to users' requirements.
- Development costs overrun budgets.
- Software engineers do not have the right tools.

These problems are typical of almost every software development effort, whether the development occurs in an MIS, DP or engineering environment and regardless of the size of the company and project.

Numerous software development methodologies are now available that support a top-down logical partitioning of system functions and data requirements. Because the analysis breaks system functions into distinct modules, management can more easily monitor and control the system's development process. Structured analysis, one of the most popular front-end techniques, contributes to the accurate and detailed analysis of a system long before a line of code is written.

A prime example of a project bogging down in the development stage is the Reagan administration's Strategic Defense Initiative (SDI) antimissile defense system. According to a *Washington Post* report, SDI officials cite computer software as the biggest technical obstacle of the entire project. Many top software experts agree there is no conceivable way to write and test the software that would be needed to operate the defense hardware reliably. Close observers of SDI remain pessimistic about the software industry's ability to develop real solutions.

In general, the average application backlog nationwide approaches 30 work-months, according to some estimates. Many shops continue to rely on manual methods to develop systems, a technique that contributes heavily to the backlog.

Once an application finally gets into the development cycle, it often takes as long as two to three years to deliver. Moreover, a completed application often does not suit the end-user's needs simply because those needs have changed during the few years it took to develop the software.

Expensive mistakes

Furthermore, the manual approach leaves applications prone to costly errors. In a few cases, applications are so error ridden that exorbitant costs are incurred to rework and maintain the

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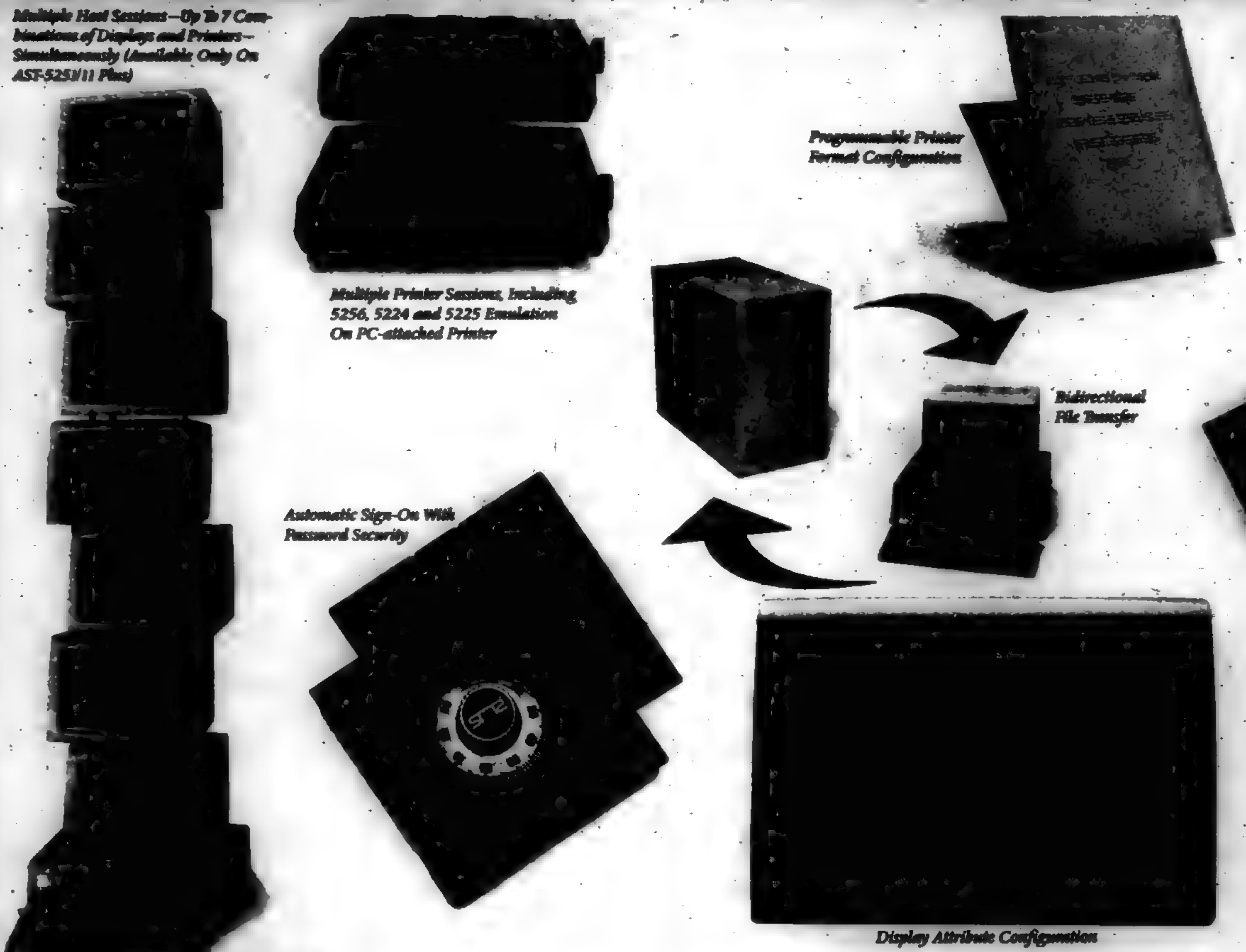
Louis Mazzucchelli is chairman of Cadre Technologies, Inc. in Providence, R.I., manufacturers of workstation-based software development tools.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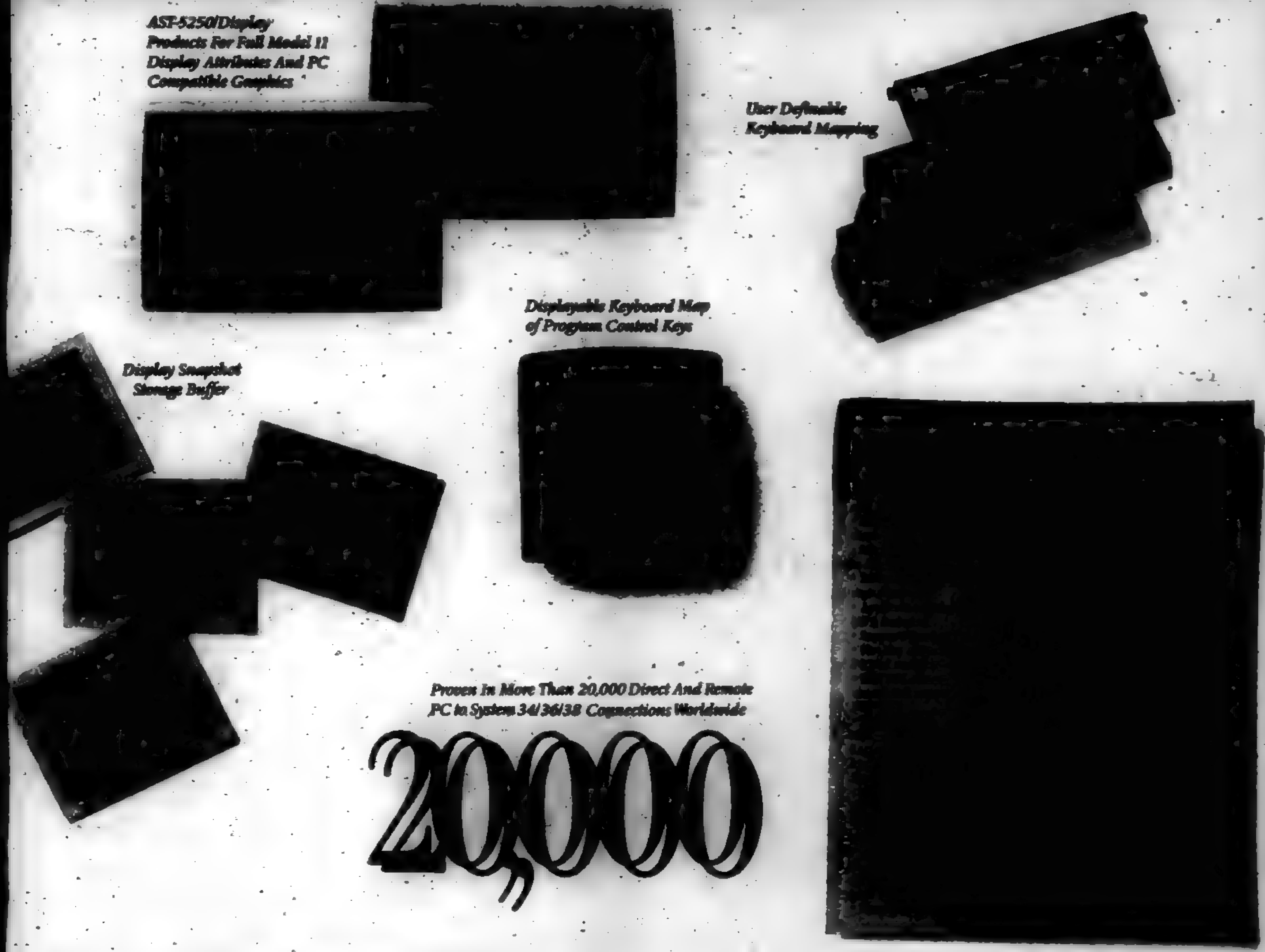
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system — costs that continue throughout the life of the system.

Management continues to demand new applications to run its businesses, and as much as 80% of embedded system functions are software implementations. For the time being, software development teams will continue to feel pressured to produce software better and faster.

> *A majority of system errors are introduced during the analysis and design phases of development — at a point where errors are less expensive to correct. As high as 64% of system errors can be traced to the analysis and design phase.*

Structured analysis

To address these problems, the software industry initially developed programming tools, such as third-generation languages, on-line editors and text processors. When these tools reached the limits of their productivity gains, the industry turned its attention to the front end of development — systems analysis.

In structured analysis, the structured specification replaces the traditional voluminous textual specification and incorporates graphics and text into a clear, logical format. Structured analysis enables end users, managers and software engineers to understand and communicate system requirements clearly and to make changes to those requirements. The lengthy textual specification document is no longer needed.

Computer Sciences Corp. (CSC) conducted seven years of research on productivity and quality associated with the use of structured analysis and design techniques. According to Thomas Clark, director of product assurance, CSC's research shows that there has been a 10% compounded growth rate in productivity over the seven-year period. In addition to productivity gains, there has been a shift in how software engineers spend time during the development phase.

Clark notes that before structured techniques were used, 30% of the development time was spent in analysis and design efforts, while 50% was spent on testing and debugging.

"With structured techniques in place, these figures have been reversed," he says. "Now, 50% of the development time is spent on analysis and design, with 30% spent on testing and the remaining 20% on coding."

The CSC research also indicates that analysts can accomplish more in the same amount of development time and that they produce higher quality work in the same period of time.

Clark explains, "With structured analysis and design techniques, very detailed and complete analysis and design phases occur, and analysts know when analysis is complete" — that is, when specifications represent the users' requirements, and the final lowest level logical processes of the system are described. This kind of detail yields a tenfold improvement in quality.

Structured analysis and design also improves the outcome of the testing and debugging phase. Engineers can now find errors early in the development process, so errors reach the test and debug phase less often; test engineers can spend their time more productively. By reducing errors up front, costs can be reduced in testing and contained during maintenance.

Awkward by hand

As much as they contribute to overall productivity and quality improvements, manual structured analysis techniques are still cumbersome. There is a need for yet more automation.

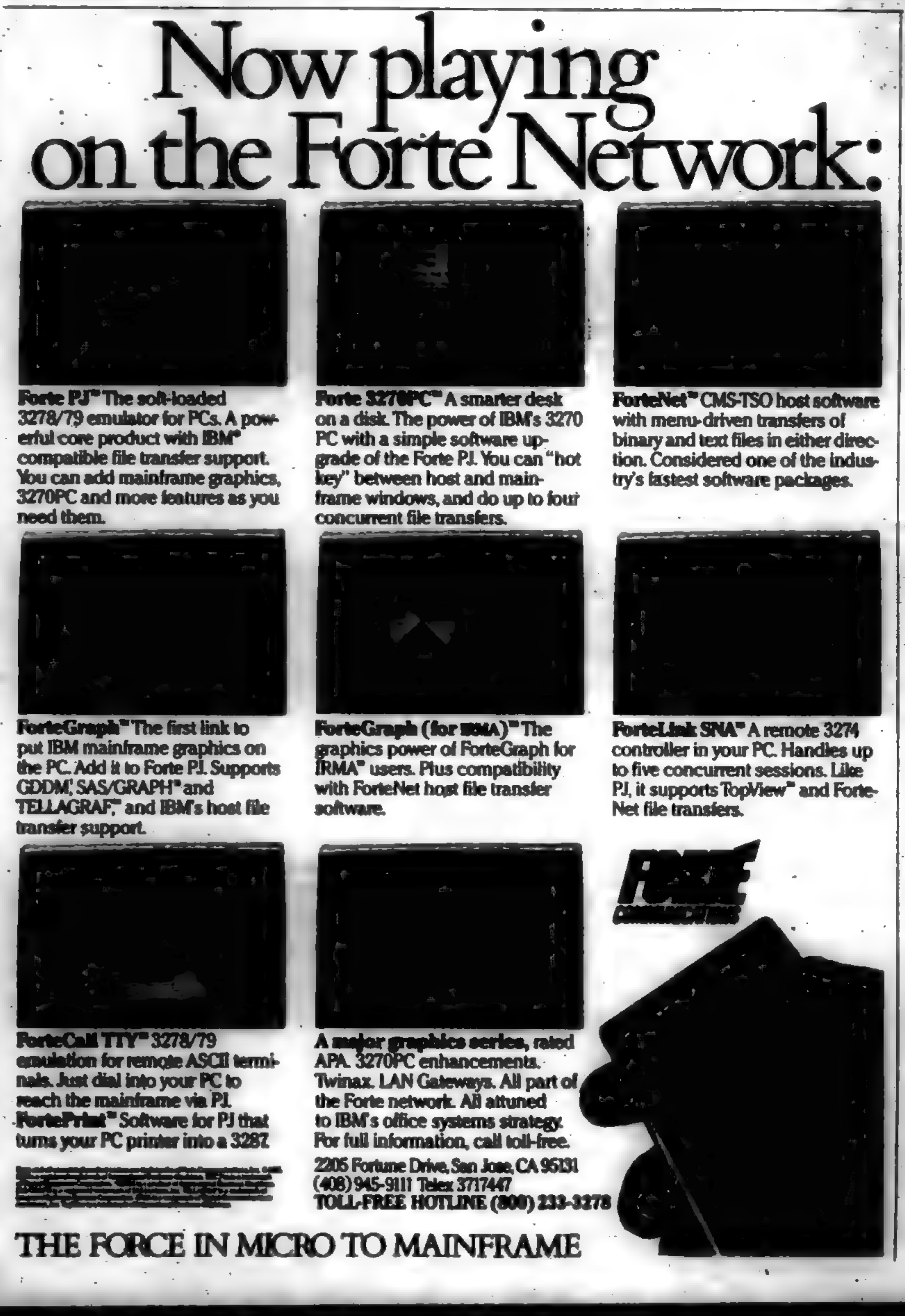
Done manually, specification documents usually are not fully developed to the most detailed level until after the system has gone through later phases of development. Specifications, sometimes done as an afterthought, are not checked thoroughly and therefore are inaccurate. Software engineers are reluctant to do complete specifications because they still have to redraw each project model diagram manually every time there is a revision.

Analysts working on the same project still must shuffle papers to see the entire project model. As a result, communication between team members remains poor, and errors continue to slip through analysis and design, although at a lower rate than before. Analysts simply do not have the time to check through piles of documentation for accuracy.

Software engineers are trained to be creative system designers, not draftsmen, and are extremely frustrated by the clerical functions they must perform. While contributing to better communication and organization, structured techniques — in and of themselves — do not solve the productivity/quality crisis.

The automation of the software development process has begun to address these problems during the last few years. Tools are now available to automate the job of software engineering.

A variety of tools can be chosen to address different development functions and contribute significantly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to increased productivity and especially to quality. While programming tools are important during later stages of development, they will not contribute to overall quality if analysis is incorrect in the beginning.

Early error detection

The benefits of early error detection have become clear only recently. A majority of system errors are introduced during the analysis and design phases of development — at a point where errors are less expensive to correct. As high as 64% of system errors can be traced to the analysis and design phase, according to a TRW, Inc. study.

As errors move through the development cycle undetected, the cost to correct them increases up to multiples of 100 or more. It makes sense to do the programming task right the first time. Software development tools that automate the initial analysis phase will offer more benefits in the long run and will increase the quality of applications and the productivity of software engineers.

According to an International Data Corp. study, five types of automated tools are available to the systems analyst, each designed for the analysis phase of development:

- Stand-alone products for analysis, which may include the design phase. These products run on both personal and mainframe computers.
- Products developed to mechanize a software development life cycle methodology.
- Products that are developed to be incorporated into an in-house methodology.
- Products that are part of a software engineering workstation.
- Products that are part of a software development environment that run in a mainframe environment.

The functionality of automated software development tools is directly affected by the hardware platform upon which they are based. Therefore, the hardware decision is as important as deciding upon the automated tool itself.

Functionality debate

One of the major debates in the software development industry centers on which hardware platform will provide the most productivity functions and support to automated analysis tools. Personal computers, workstations and minicomputers with terminals represent the three most common hardware platforms for automated software development tools. A number of hardware considerations influence the performance and capabilities of the automated tools that run in each of these hardware environments.

Personal computers remain an inexpensive and popular system for business use. Personal computers present a viable platform for a software tool in companies with an installed base of personal computers and only a moderate budget.

However, one of the major problems with personal computer-based tools lies in their limited computing and memory capacities. Limited memory prohibits a thorough system analysis, constrains the project model complexity and hinders the in-depth analysis and validation required for true efficiency.

The lack of networking and multiprocessing capabilities also decreases the attractiveness of stand-alone, personal computer-based tools. When many people, working on a project together, need to share vital project information, multiuser capabilities become critical.

One way to counter the problems with the personal computer environment is to add memory, peripherals, networking and other support that ultimately increase the hardware cost and make the system more technically cumbersome and difficult to maintain. This also increases the cost of the systems — possibly to the point where they are no longer economical for small companies.

The minicomputer with terminal hardware platform offers greater storage and computing power, which argues strongly in its favor. This hardware, however, typically cannot support a large number of interactive graphics users without investing in specialized terminals that approach the cost of low-end workstations.

One of the most promising hardware platforms for software development tools is the workstation. The workstation offers a high-quality combination of personal computer and minicomputer configuration benefits. Workstations provide quick processing speeds, extensive memory capacity and high-quality graphics.

Networking capabilities, such as those of the Apollo Computer, Inc. Domain systems, enhance communication between project team members and let systems analysts share the same project-model information data base, reducing the duplication of effort. Clark says, "The natural, informal communication processes break down when five or more analysts are working together, requiring a formal system for exchanging information. In addition, without a multiuser system, it is a pain to consolidate or reconcile data dictionaries across workstations."

Speed and processing capabilities also contribute to increased analyst productivity. Hardware running on the Motorola, Inc. 68020 processor provides the power required to check and verify detailed models quickly.

Although workstations are relatively new, industry analysts expect the workstation market to grow at a considerable rate and become pivotal to the software and hardware engineering environments.

Functions of automated tools

One of the first distinguishing characteristics of an automated tool is the scope of the tool. Many tools offer a wider range of functions and

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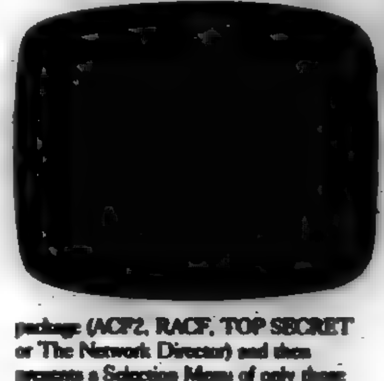

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claim to automate more of the development process. While on the surface this seems attractive, a broad-range system doesn't necessarily have the ability to provide in-depth capabilities. Tools that can go into greater depth and detail will provide better quality analysis and will have greater, more positive repercussions later in the development life cycle.

Ultimately, tools will automate more of the software development life cycle and simultaneously provide comprehensive in-depth analysis capabilities. However, most tools on the market today cannot perform both well.

Most tools are based on some kind of methodology. Some tools were developed in-house to support a company's development department, using proprietary methodologies. Other tools support one methodology exclusively. Therefore, users of automated tools may have to learn a new methodology or may be limited to the choice of tools that support their current approach.

Many tools claim to be "methodology independent," allowing the user to choose any method. Care should be taken in evaluating these tools, as this term is sometimes used to mask inadequacies.

The user interface is very important. Users should be able to see their accomplishments quickly. They should be able to add, revise and delete graphic and textual information rapidly and not have to "wait for the machine." Tools that support a pointing device, such as a mouse, enhance productivity by allowing rapid manipulation of model objects.

Graphics capabilities become critical to users developing data flow diagrams, structure charts or other diagrams. The better the graphics capabilities of the hardware platform, the more productive the user interface can be. Hardware that supports windowing capabilities, for example, enable the user to view many portions of the model at the same time and review, edit or correct work that has already been created — a great efficiency tool.

Users should be able to redraw diagrams quickly and automatically. The less time analysts spend drawing diagrams, the more productive their time will be. Some tools now enable users to identify groups of data flow diagrams and move them to a different part of the project model. For example, the software will copy, paste and regroup data flow diagrams into different configurations. This helps the analyst experiment with different model ideas.

Users should have access to data dictionaries from various parts of the project model. Some tools allow an analyst to access the data dictionary from each data flow diagram, enabling the user to access a definition quickly. Other tools require that users move out of one environment to get to the point where they can access the data dictionary. Integration between these model components proves extremely valuable.

Documentation support is another important feature of structured analysis tools. Documentation serves as the basis for communication between all the different players during the development life cycle.

Some available tools generate reports that incorporate text and graphics. The quality of documentation increases dramatically because engineers no longer must hand-draw diagrams. The tool can print out project specifications neatly and in a logical order. Since end users are the ultimate recipients of such documents, a professional presentation can produce a positive effect on the relationship between users and developers.

Error checking

Checking for errors represents one of the most important features available from automated tools. Consistency checkers go through parts of a project model or the entire model and check consistency between data flow diagrams, data dictionary entries and process specifications.

Some error-checking tools print reports that show all places where consistency errors occur. This makes the job of searching for errors easy, saving considerable time and effort. Automating error checking reduces the total number of errors simply because it does a complete and thorough check — one more comprehensive than any analyst would be willing or able to do manually.

Automated design tools not only improve analyst productivity but also provide management with measures to mark progress. Some tools offer project management functions that keep track of previous projects and provide a data base of information that helps the manager estimate the completion date of a project and calculate budget information.

There has been much discussion about when it is appropriate for a company to obtain software development tools. Many think that a company must be large and have an abundance of complicated software

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A brief history of the software development industry

[illegible] growth is often compared to the growth of the hardware industry. In hardware, technological [illegible] in development provide an impetus for rapid growth. This growth came after many years of hardware developers' experimentation with tools and techniques.

In the early days of hardware development, components were custom made, resulting in one-of-a-kind systems that were hard to reproduce and very difficult to modify for different applications. Tools for building systems were primitive.

In the 1940s and 1950s, mathematician Alan Turing provided the computer industry with several invaluable concepts for developing computer systems. He proposed that hardware engineers use a set of only two or three basic principles to build machine language operating systems. These principles — sequence, selection and iteration — enforced a more logical approach to development and later became the fundamental building blocks of structured programming.

As commercial components have become available, the system building process has become less of a handcrafting operation. Automated tools such as oscilloscopes, logic analyzers and in-circuit emulators have helped the electrical engineer in all areas from conceptual design to circuit design and debugging.

One of the most significant hardware development tools is the desktop computer-aided engineering (CAE) workstation. The CAE workstation provides the engineer with sophisticated graphics capabilities and encourages team development with networking, multiprocessing and interactive capabilities. Engineers now can test circuitry as it is being developed.

The software industry has been slow to reach this level of sophistication. In fact, many observers believe that the failure of software to match the pace of hardware innovation may have led to the current hardware industry slowdown. Software must catch up to provide fertile new applications areas and stimulate a pull for hardware.

During the 1960s, programming was unstructured and to a large extent unplanned. Programming focused on speed, and programs were composed of layer upon layer of code that only the program's creator was able to understand. Documentation consisted of source code listings and limited comments. Program maintenance was tedious, inefficient and, some claimed, virtually impossible.

In 1966, Corrado Bohm and Giuseppe Jacopini [illegible] mathematical proof of the [illegible] three principles. [illegible] a programming language need only [illegible] basic concepts to be [illegible].

In the late 1960s, Edsger Dijkstra presented a paper during a conference on structured programming. Dijkstra came out in support of eliminating GOTO statements and favored the use of the same three principles Turing had introduced years before. With the emphasis on simple, easy-to-understand programming languages and with guidelines for programmers to follow, the structured programming movement grew at a rapid pace.

High-level programming languages such as Cobol and assembly were developed to help the programmer write simple and easy-to-maintain code. Third-generation languages, on-line editors and text formatters contributed to overall higher programmer performance.

These tools were useful but reached a ceiling in their impact on overall project productivity and quality. The bottom-up approach to development focused on the smallest aspects of the application's development — programming and code generation — and often result[illegible]

[illegible] This emphasis [illegible] more logical, [illegible] development process and provided the framework for many of the leading structured methodologies that are used today.

But most methodologies remain manual efforts. Recently, software development teams are moving software development methodologies to the workstation, following the CAE hardware development sector's lead. This provides an automated desktop solution to many of the software development industry's problems.

Graphics, windowing and multiuser support are critical functions that increase the capabilities of the software engineer. It is the combination of hardware support tools and structured methodologies that will ultimately increase the productivity and quality of software development efforts.

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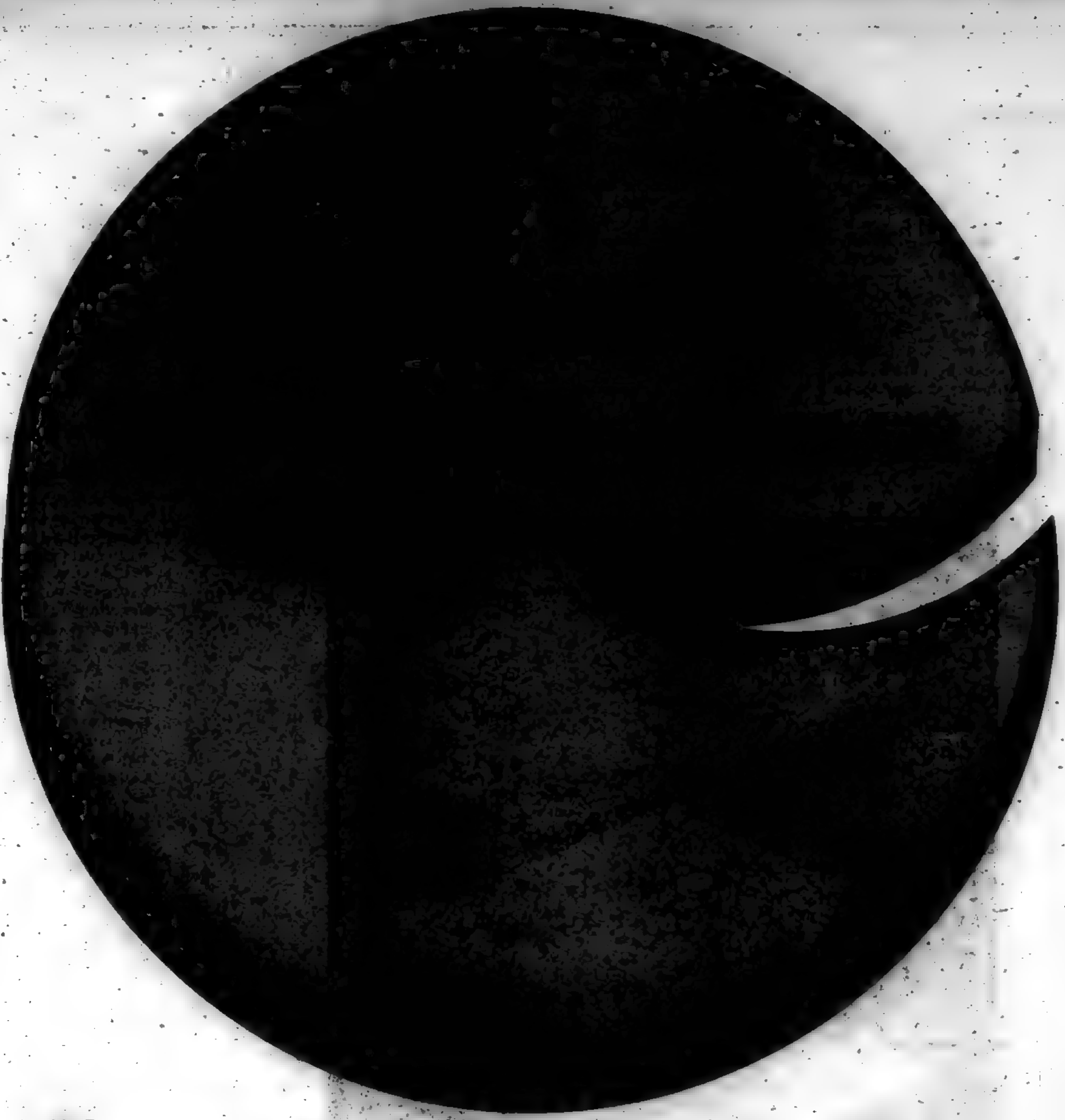

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*Source: *PC World* and *PC Week* magazines, editors of seven U.S. and European trade journals.

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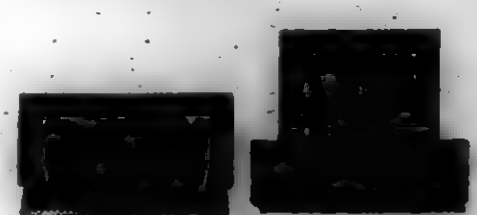

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Continued from page 83

development projects in the backlog. Actually, both large and small companies benefit from automated development tools. From engineering to MIS, almost all software development organizations can see productivity and quality increases from their staffs with the use of appropriate automated tools.

Even projects requiring only one analyst benefit from tools simply because models are then automated. With automation, management and new analysts can access and trace model changes through the original specification, making the maintenance process easier.

As shown above, automated tools offer functions that contribute to overall productivity. Often the improved quality of the specifications produced more than make up for the cost of a development tool because they save so much coding and maintenance time.

As a rule, the more analysts there are working on a project, the longer the project development time and the more complex the system to be developed, the more a development team needs automated tools. Networking, automated drafting capability, consistency checking and error-checking functions can make the analyst's job easier and can provide the support needed to get the job done on time and on budget.

The immediate benefits of automated development tools are many:

■ Detailed specifications contribute to higher quality design. Complete analysis models provide a guideline for the rest of the development process, making a positive impact on the rate and accuracy of design and implementation.

■ Analysts can identify and eliminate errors more easily during the period of development when errors remain inexpensive to correct.

■ Specifications are generated faster. Analysts, therefore, can take the time to conduct exploratory analysis, looking for better ways to design software systems.

■ Automated tools boost the quality of the documentation, enhancing communication between end users, analysts and management. Basing decisions about a project's direction on an easily understood document eliminates misunderstandings, ensuring that the new system meets users' requirements.

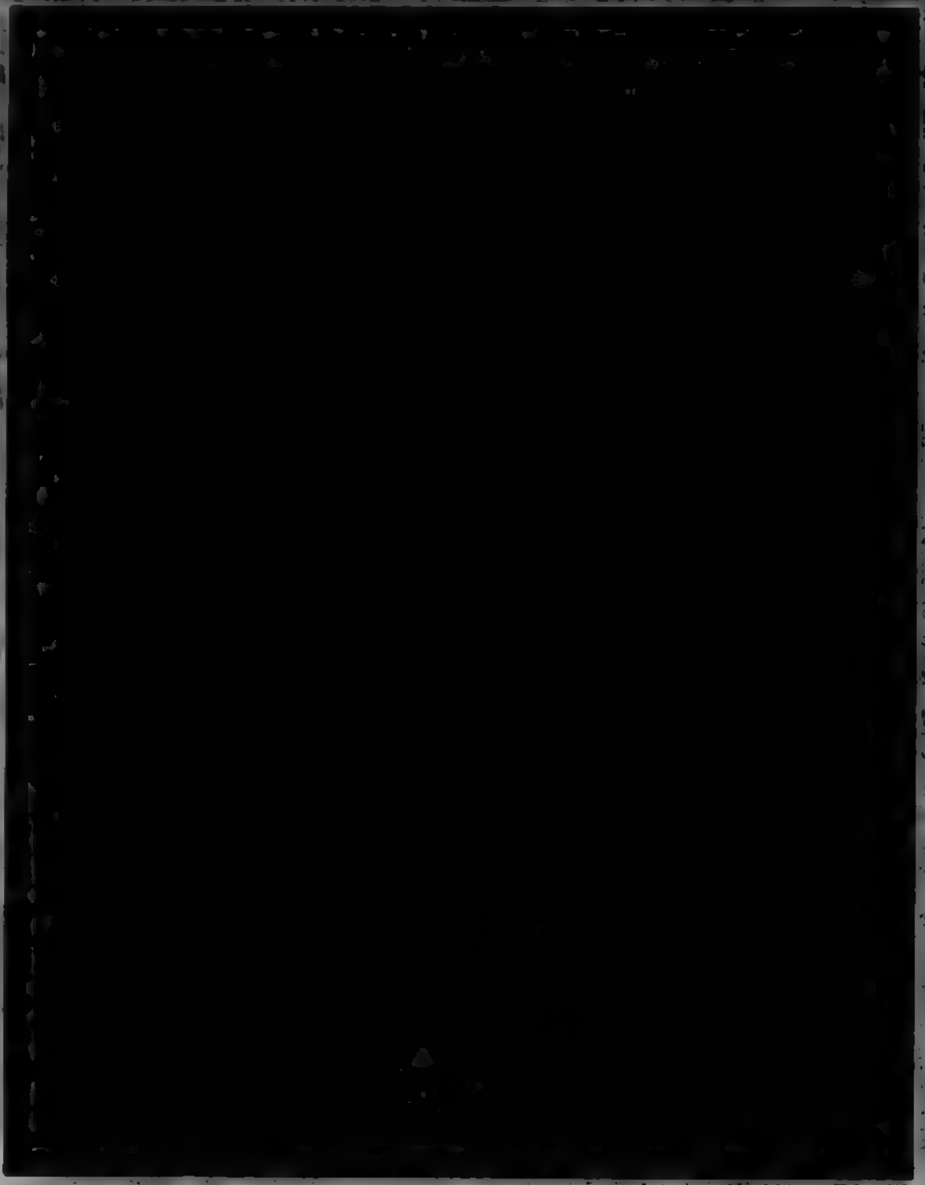
Future tools

At this point, one can only estimate the long-term benefits of using automated software development tools, as the industry is still too new to provide conclusive statistics. However, initial studies indicate productivity increases up to 300% or more with the use of automated tools.

One can expect that automated tools will continue to develop for some time. Industry observers predict that most tool manufacturers will develop complete software development product lines to provide integrated tools that together encompass the entire software development life cycle. Automating the entire process with a single family of software development tools will not be uncommon.

Automated tools may also enable software engineers to conduct tests on a system early in the development process with a minimum amount of coding. This system simulation will help to determine the system's functionality and ensure that it will work according to the specifications.

The automated tools that are already available go a long way toward combating the illnesses of the software development industry. If the software industry does not make the effort to automate itself more fully, productivity and quality will remain low. Management, however, first must begin making the necessary commitments to automated tools. ■



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NEW PRODUCTS

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DEC's VAX Engineering Data Control System operates in CAD/CAM environments.

DEC unwraps data manager

Digital Equipment Corp. of Maynard, Mass., has introduced an engineering data management system for computer-integrated manufacturing.

The VAX Engineering Data Control System (VAX EDCS) uses various hardware, data base management software and communications protocols to manage computer-aided design and manufacturing data, drawings and engineering documents.

The system functions as a department or project data manager in a CAD/CAM environment. It also manages noncomputer-related documents. It maintains CAD/CAM engineering data in a central, common data base designed to function like an on-line library. Data is stored, archived, retrieved and protected in the common library.

VAX EDCS uses the DEC VMS operating system, VAX RDB/VMS relational data base, local and wide-area Decnet networking products and the appropriate disk and tape units. The features it provides include engineering change order control to files; change history and audit trail; and automatic notification of changes in file status using electronic mail.

A complete entry-level system is priced from $105,000 and includes a DEC Microvax II computer with 9M bytes of memory, 426M bytes of disk storage, a 1,600 bit/in. magnetic tape drive and the necessary software licenses. The top-of-the-line system includes a DEC VAX 8600 processor and is priced at about $650,000. The VAX EDCS software is available separately at prices ranging from $12,000 to $30,000.

Easel graphics expanded

Interactive Images adds modules for IBM micros

Interactive Images, Inc. of Woburn, Mass., has unveiled three modules for its Easel graphics interface software for the IBM Personal Computer and compatible systems. The Easel system takes information that comes down from the mainframe and turns the mainframe syntax into icons or graphics.

Easel, which costs $6,500, runs on the IBM Personal Computer, AT and XT and compatibles. The system requires either an IBM Color Graphics Adapter, Enhanced Graphics Adapter or a Tecmar, Inc. graphics board. The package replaces monochrome characters with color icons, windows and graphs.

The 3270 Support module, which costs $3,900, allows programmers to access formatted and unformatted applications to create graphics interfaces. The module is said to enable programmers to put a graphics user interface front end on application environments.

The Easel/Layout module costs $2,500. It allows developers to create, add and modify icons, keys and regions. A pull-down menu gives a choice of standard patterns, shapes and attributes of the shapes. When the developer is satisfied with the created object — color, pattern, location, size, opacity and scale — Easel generates the code necessary to integrate the desired object or screen into the Easel front end.

An Automated Business Graphics module allows users to input data and select graph types from nine different graph options.

The Automated Business Graphics module costs $500.

Multimate ups word processor

Multimate International Corp. of East Hartford, Conn., has updated its Multimate Advantage Professional Word Processor to include columnar operations and a built-in thesaurus.

Version 3.6 supports up to eight columns on a page. Users can set column width and tabs for each column as well as the spacing between columns. The new version also supports winding text and logically associated columns as well as all editing functions in the column mode.

A 40,000-word thesaurus, developed by Proximity Devices, Inc. of Fort Lauderdale, Fla., provides definitions as well as alternate words and phrases for highlighted text without requiring the user to exit from the document.

Version 3.6 also offers a typewriter mode that allows users to create and print text by character or by line from the Print Control Utilities menu, and it provides a keyboard merge that allows users to insert variable information into a document without creating a secondary document.

Multimate Advantage 3.6 is priced at $595. Users who purchase Multimate Advantage 3.5 after Dec. 1 can upgrade to Version 3.6 free of charge. Existing advantage users can update to Version 3.6 for $60.

Dbase software debuts from Ashton-Tate

Ashton-Tate of Culver City, Calif., has introduced the Dbase Ctools series for Dbase III Plus.

The series is composed of two add-in software packages designed to help programmers develop applications. Dbase Ctools allow users to add functions, commands and programs written in the C language to Dbase III Plus applications. The two packages are The Programmer's Library and The Graphics Library. They include built-in C functions and a basic engine for adding the functions to Dbase III Plus applications.

The Programmer's Library provides more than 25 financial, mathematical and statistical functions.

The Graphics Library provides functions that enable programmers to create customized graphs. It includes several business graphics for use with a monochrome monitor, including bar graphs, pie charts and line charts.

The Programmers Library, available in January, and The Graphics Library, available in February, will be priced at $89.95 each.

Ciperlink introduces data translating software package

Software links incompatible systems

Cipherlink Corp. of Los Angeles has introduced a software package to translate data for exchange between incompatible computers. The Calculations Peripheral package is said to be the first in a series of enhancement packages for the company's Any data bridge software utility.

The 2-year-old company developed a line of products that bridges incompatible computer systems, a spokeswoman said. The products do this by capturing screen images, automatically changing data that needs to be changed before it can be entered onto another system and rekeying the data to the new system.

Calculations Peripheral costs $1,500. It is used with the $10,000 Any bridge, which can transfer data residing on any operating system to any other operating system, a spokesman said. Both packages are written in C and may reside on IBM PC-DOS or AT&T Unix-based computers. The Any software resides on an independent computer connected to the source and target computers through a terminal port.

The Any package extracts a desired data field from a source application, transfers it to an intermediate data base and then automatically rekeys the data into the appropriate field in the target application.

Calculations Peripheral ensures that the data in transit conforms to requirements of the target application. While the data is stored in the intermediate data base, Calculations Peripheral allows the user to manipulate specific data fields before data is transferred to the target application.

Mathematical functions as well as table lookups can be performed on the extracted source data, and a data field can be accumulated so that the total amount can be transferred to the target system.

Examples of use include the translation of currency exchange computations so that prices stored on a computer overseas can be translated for use by a computer in the U.S.

NEW PRODUCTS/SOFTWARE & SERVICES

SOFTWARE

Systems software

CGA Software Products Group, Inc. has released **Version 4** of its **Top Secret** security software package.

Version 4 comes with rewritten documentation. Other features include use of the extended memory addressing of the IBM MVS/XA operating system; TSS Chart, which provides a diagram of the organization and structure of the security data base; the ability to associate profiles with a given user; and a provision for different time zones in constructing user profiles.

Version 4 of Top Secret for MVS costs $11,500 for an annual license.

CGA Software, 960 Holmdel Road, Holmdel, N.J. 07733.

S&H Computer Systems, Inc. has introduced **TSX-Plus Version 6**, a multiuser operating system designed to support windowing between concurrent processes on the Digital Equipment Corp. PDP-11 and Professional 300 series computers.

Version 6 supports up to 40 users on the PDP-11 and up to five on the Professional. It offers enhanced password protection and support for special functions keys on VT100 and VT200 series terminals.

Using the Process Windowing feature, up to 10 tasks can be controlled from a single terminal.

TSX-Plus Version 6 is priced at $2,000 on the PDP-11 and $900 on the Professional 300 series. Annual fees for support and updates are $500 and $300, respectively.

S&H Computer Systems, 1027 17th Ave. S., Nashville, Tenn. 37212.

Charles River Data Systems, Inc. has released **Revision 6** of its **Unos** operating system.

The new version enables users of the company's Universe computers to upgrade to the Motorola, Inc. MC68020 microprocessor, and it supports I/O processors. It provides distributed processing capabilities for the International Standards Organization/General Motors Corp. Manufacturing Automation Protocol and Boeing Computer Services Co.'s Technical Office Protocol multivendor environments.

Other features include support of a 140M-byte Winchester disk.

Unos is compatible with AT&T Unix.

Unos Revision 6 costs $3,000.

Charles River Data Systems, 983 Concord St., Framingham, Mass. 01701.

Professional Computer Resources, Inc. has released **Version 6** of its **Resource Management System, RMS/38**, for manufacturing and distribution operations designed for the IBM System/38.

Version 6 includes a new general ledger and financial reporting system, a new purchasing system and a system for physical inventory and cycle counting, which has been added to the inventory control function. A menu master has also been added as well as an integrated system that supports features and options through bills of materials and order processing.

RMS/38 is priced at $125,000.

Professional Computer Resources, 2 Mid America Plaza, Oakbrook Terrace, Ill. 60181.

■

Software International Corp. has announced a new version of its **Payroll/Personnel** system for the Wang Laboratories, Inc. VS computer.

The product incorporates advanced on-line file maintenance processing and immediate update to the Software International general ledger and financial reporting system.

The newest release includes expanded amount fields and account fields, expanded deduction capability and flexibility, 401K-byte reporting, interactive processing, return-code checking and separation of edit and update jobs.

The product, including documentation, is available for a license fee ranging from $18,000 to $33,500, depending on the configuration.

Software International, 1 Tech Drive, Andover, Mass. 01810.

■

Dynamic Products has announced **Automated Time Initiated Sign-Off (ATIS)**, designed to enhance CICS security by providing automatic time initiated terminal sign-off.

If no activity takes place at a terminal within a specified amount of time, the terminal signs off. The amount of time can vary for each terminal in the CICS system. At specified intervals, all terminals in the system are scanned to determine whether anyone has been inactive for the specified amount of time.

ATIS rents for $80 per month, $800 per year or costs $2,400 for a permanent license.

Dynamic Products, 1782 Richard Circle, St. Paul, Minn. 55118.

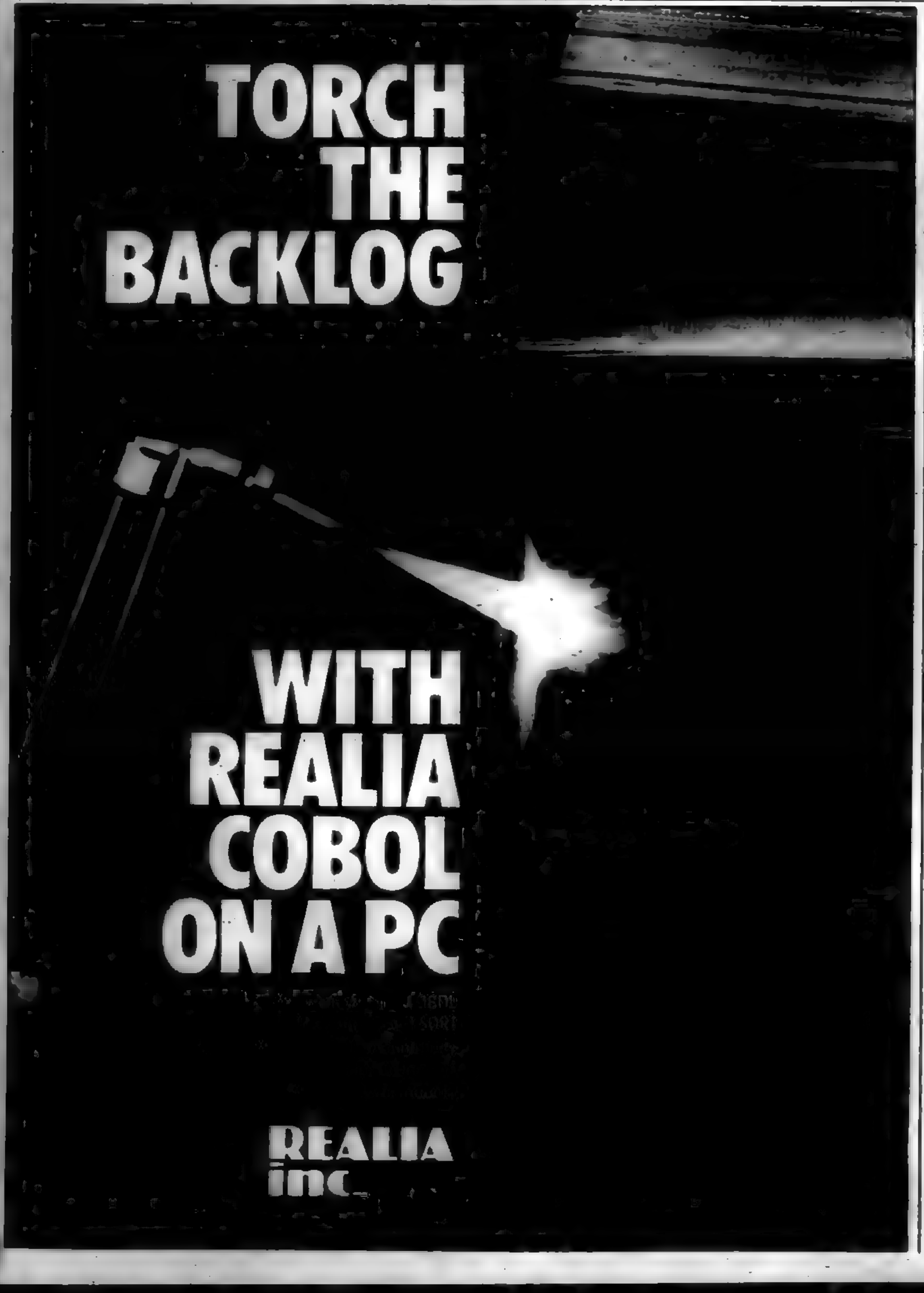
■

Waters Business Systems, Inc. announced the **WBS Mail2 Mail List Management System** for the IBM System/34 and 36 and System 36/PC.

The WBS Mail2 provides name, address and telephone information plus fields for source, industry, territory or region and 12 other user-definable codes. It features screen and menus with on-line documentation. The system output capabilities include a variety of statistical reports, multiple mailing label formats, Rolodex cards and a merge file that interfaces with many word processor programs.

The WBS Mail2 Mail List Management System is priced at $200 for object code and $600 for both object and source code.

Waters Business Systems, 47 New York Ave., Framingham, Mass. 01701.



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NEW PRODUCTS/SOFTWARE & SERVICES

Shop Floor Control (SFC), a manufacturing package for the Wang Laboratories, Inc. VS written in Cobol, has debuted from **MCBA, Inc.**

SFC controls the flow of work on the shop floor by keeping track of materials, operations, personnel, machines and tools.

Functions include an ability to copy production shop orders from base shop orders; forward, backward or manual scheduling; support for a shop packet, which provides manufacturing directions; and the ability to print a dispatch list of each work center's jobs.

Prices range from $4,500 to $7,000.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

■

Expert Systems International has released **Version 2** of its expert systems development shell, **ESP Advisor**, which is written in Prolog 2.

Version 2 allows users to construct knowledge bases of up to approximately 3,000 rules. Features include the ability to invoke programs written in Prolog during consultations using an optional Prolog 2 interpreter, a virtual knowledge base, the ability to reference parameters from within any text item displayed and an on-line Help facility.

ESP Advisor Version 2 is priced at $895.

Expert Systems International, P.O. Box 53678, William Penn Station, Philadelphia, Pa. 19105.

■

System/38 Security and **Burroughs Security Module**, security packages for IBM System/38 and Burroughs Corp. computers, have debuted from **Lawson Associates, Inc.**

System/38 Security provides controlled access to financial information on the IBM System/38. The system provides security down to the program, screen and function levels.

The Burroughs Security Module secures screens within applications or specific functions within programs on Burroughs computers, allowing managers to decide which users can access specific data base information.

Prices are $4,000 for System/38 Security and between $5,000 and $10,000 for Burroughs Security Module.

Lawson Associates, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

■

Versatec, Inc. has enhanced its **Expert PCB Designer** software, part of the Expert Designer series of computer-aided design and engineering systems that run on the Xerox Corp. 8014 workstation.

This release allows users to place parts interactively through dynamic dragging, rotation and rubber-banding of nets. A capability for displaying channel densities shows how many traces run through a given area.

Tools for automated printed-circuit board manufacturing include a method for creating optimal drill paths.

Expert workstations are available in a number of configurations ranging in price from $40,000 to $60,000.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

■

McDonnell Douglas Architectural, Engineering and Construction Systems Co. has upgraded **Moss**, its surface modeling system for civil engineers.

A module, Interactive Moss, is now included in the standard package to provide interactive design, editing and drawing capabilities.

With this enhancement, users can modify designs and remove errors automatically. The package accepts changes as updates to the model data base, the vendor said.

Moss, with the enhancement, is priced from $35,000.

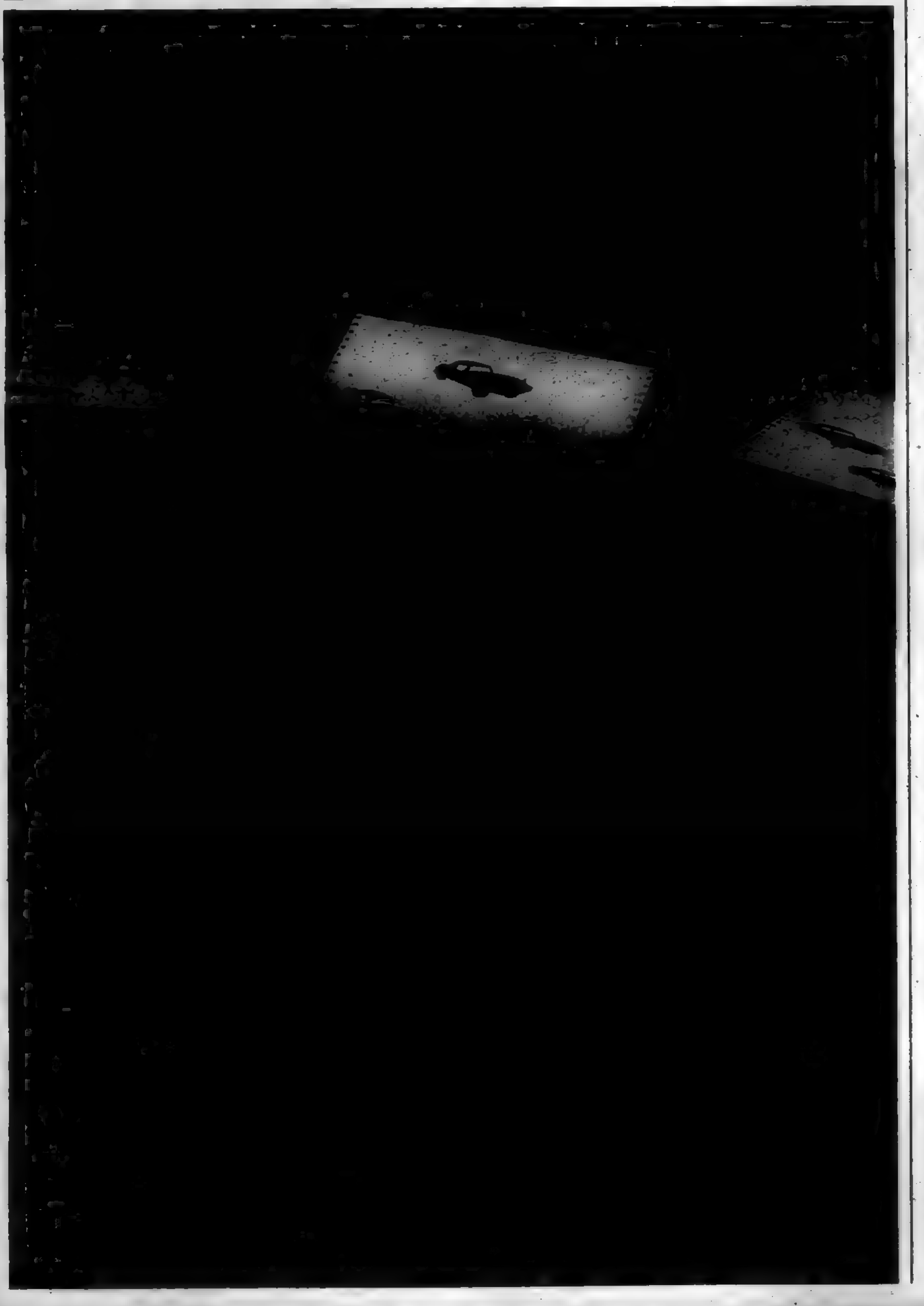
McDonnell Douglas Architectural, Engineering and Construction Systems, P.O. Box 516, St. Louis, Mo. 63166.

■

Plexus Computers, Inc. is distributing four AT&T Unix software development packages for its computer systems: Philon, Inc.'s **Fast/Cobol** compiler and **Fast/Basic-M** compiler; Third Eye Software's **CDB** source code debugger; and Silicon Valley Software's **SVS Fortran 77** compiler.

Fast/Cobol is compatible

Continued on page 95



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"Enable... may be the first program to make you give up your dog-eared WordStar, dBASE II, Smartcom and Lotus 1-2-3 disks." *(Business Software, April, 1985)*

"Each of the five modules in Version 1.1...has a depth of features and functionality rare in an integrated package..." *(InfoWorld, November 18, 1985)*

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SOME THINGS CAN NEVER BE SHARED. OTHER THINGS SHOULD BE.

The people who make database software have some strange logic. They tell you information is the most valuable thing in the world. And then they design their products for single-user systems.

INTRODUCING R:BASE™ 5000 MULTI-USER.

At Microrim though, we don't think anybody who needs data should have to stand in line for it. So we've developed a multi-user version of R:base 5000 that lets users update their database while other people analyze it. And we've made this new version fully compatible with our single-user version. Which means any application you develop on the single-user version today can be run on our multi-user version tomorrow.

DATAPRO RANKS R:BASE 5000 #1.

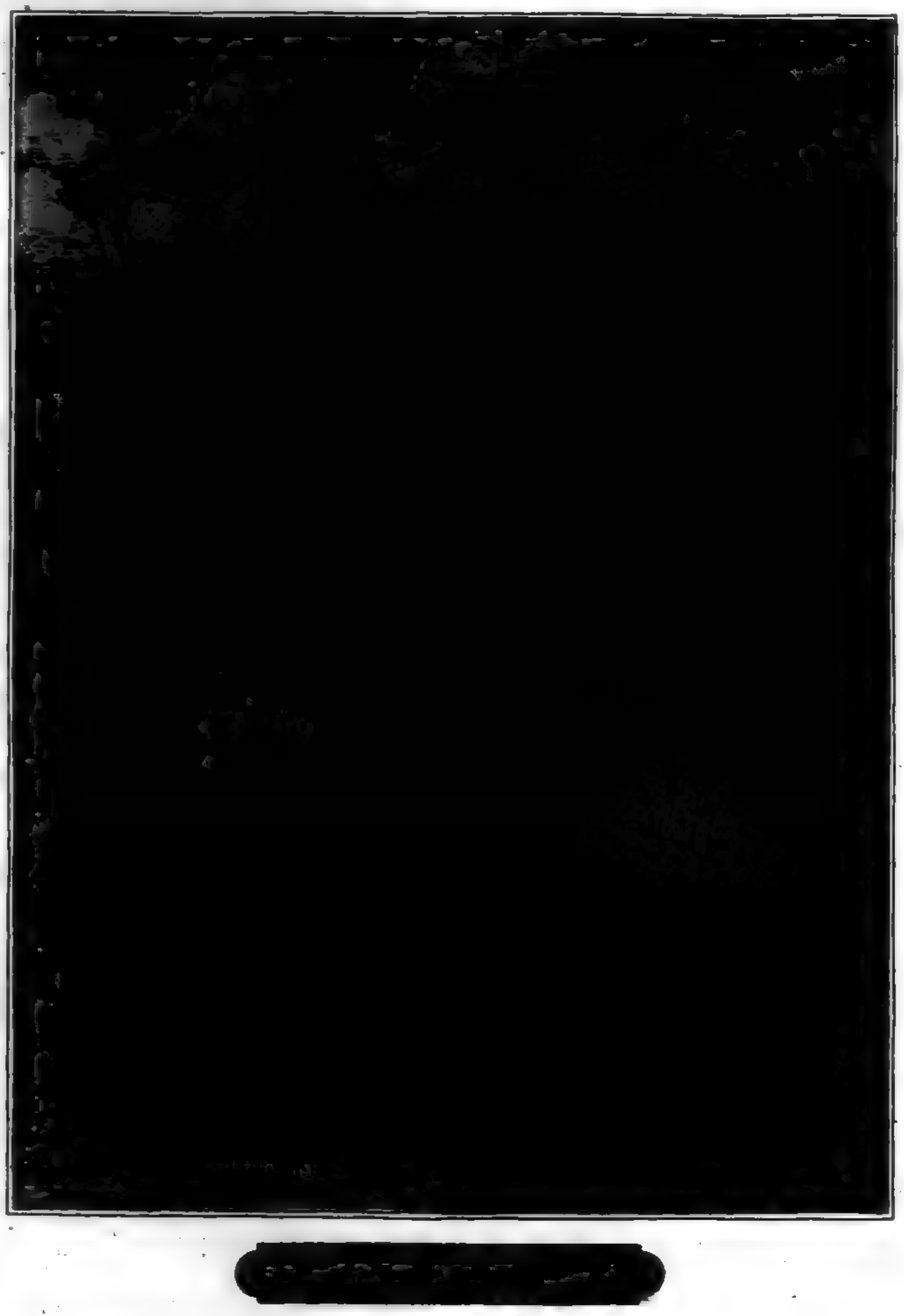
Of course, we gave the multi-user version all the features that convinced the Datapro Research Corporation to rate our single-user version as the best DBMS on the market. But we've also designed it to make optimum use of all the extra capabilities offered by the IBM PC Network (IBM PC DOS 3.1). To optimize data sharing, R:base 5000 Multi-User takes full advantage of the front end processing power of the PC. As a result, multiple users will be able to work with the same database at the same time.

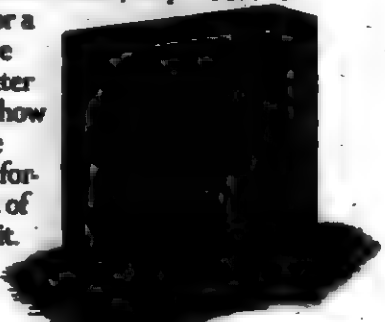
While editing, data integrity is protected by a locking mechanism that operates at the item level. This important feature lets the other users work with columns and rows of the same table. Instead of making them wait around for the other guy to finish his editing job.

SEE FOR YOURSELF: 1-800-547-4000.

The full price is $1500, complete with three sets of documentation. But if you believe in common sense as much as we do, you won't make a decision this big till you get your hands on a copy and see for yourself. And that's just what we'd like you to do. For only $50, we'll send you a copy of the program that has all the features, one set of documentation, and all the functionality of the full product, except for limitations on the numbers of rows, columns and tables.

Just call 1-800-547-4000 and ask for Dept. 867. From Oregon, or outside the U.S., call 1-503-684-3000, Dept. 867. Or head straight for a leading software store or computer dealer. And see how nice it is to take advantage of information. Instead of taking turns at it.





R:BASE 5000 MULTI-USER
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Datapro Report on Microcomputers is published monthly by Datapro Research Corporation.

NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 92

with Ryan-McFarland Corp.'s RM/Cobol. It is General Services Administration certified and conforms to ANSI 74 standards.

Fast/Basic-M is Microsoft Corp. Basic compatible. It lets users write Unix applications code without needing to learn a new language.

CDB complements Unix's built-in C compiler and is Unix System V compatible. It allows programmers to locate and fix bugs in the context in which they were created, according to the vendor.

SVS Fortran 77 helps users convert programs written in Fortran 66 dialects to Fortran 77.

Prices are $2,200 for Fast/Cobol development and runtime versions; $600 for Fast/Basic-M; $950 for CDB on the Motorola, Inc. MC68010-based P/15 and P/20 multiuser computers and $1,200 on the 16-user P/35 and 40-user P/60; and $800 for Fortran 77 on the P/15 and P/20 and $1,200 on the P/35 and P/60.

Plexus Computers, 3833 N. First St., San Jose, Calif. 95134.

Productivity aids

Extended Applications, Inc. has announced **ABC**, an application generating system for creating business-oriented programs and their source code.

ABC is available for Digital Equipment Corp. VAX/VMS, S & H Computer Systems TSX-Plus, Microsoft Corp. Xenix and MS-DOS, AT&T Unix and IBM PC-DOS operating environments. It can generate programs that include data entry, report, sort, transaction processing, graphics, file reorganization and menu. It also provides a standardized source code for each application generated.

Prices for ABC range from $995 to $5,500, depending on the operating system and language.

Extended Application, Building One, 410 Rouser Road, Coraopolis, Pa. 15108.

Application packages

Brits Publishing, Inc. has announced **Deskset/34/36**, a combination of five desk accessories for IBM System/34 and 36 users.

The Deskset/34/36 package includes a full-function desk calculator with rolling tape display, seven decimal modes, memory and a print option, a daily appointment calendar, a monthly calendar, a notepad and a card file including an on-line phone directory, the ability to print labels and an option for printing continuous Rolodex-type cards.

All accessories feature Prompt and Help screens. The package includes all source codes and a user's guide.

Deskset/34/36 costs $99.

Brits Publishing, 1814 Capital Towers, Jackson, Miss. 39201.

■

DCS, Inc. has announced **CMS Commercial Mortgage Servicing** software for the IBM System/38.

The software, developed in cooperation with Southmark Corp., offers on-line, real-time flexibility and data base design, including externally defined files and print files. All screens offer the use of IBM's Help Text.

The system costs $45,000, including source code and documentation.

DCS, Suite 317, 2880 LBJ Freeway, Dallas, Texas 75234.

Michaels, Ross & Cole Ltd. has announced the **RPG** option to its MRC-Reporter report writing module for the IBM System/38.

The RPG option allows users to generate free-form externally described printer files.

MRC-Reporter includes built-in sum and average functions and allows users to define new calculated fields based on the results of sums or averages.

The option allows users to print data base information from up to eight files.

Features include Help key documentation, multilevel security, multifile reports and relational file joining.

The RPG option license fee for MRC-Reporter users is $1,100.

Michaels, Ross & Cole, P.O. Box 4533, Oak Brook, Ill. 60521.

Gary Brown Associates, Inc. has announced the latest version of its **Fixed Assets Management System/On-Line (FAMS/OL)** for the IBM System/38.

New features include five-digit company number, division number, user-defined major control level, user-defined intermediate control level and user-defined minor control level.

Other features include the ability to accommodate $999,999,999.99 in assets, multiple in-service dates, the ability to suppress detail on all reports, the ability to print 50 characters of description on all reports, extensive help text and more.

The price of the product is said to be $6,800.

Gary Brown Associates, 322B Edwardia Drive, Greensboro, N.C. 27409.

Michaels, Ross & Cole Ltd. has released **MRC-Reporter Version 7**, its report writing module for the IBM System/38.

Version 7 provides data masking, a capability said to allow users to access significant digit number systems based on subfields buried within a larger field.

In addition, the vendor's CPF Release 7 data base architecture was included in MRC-Reporter to permit simple reports to share existing access paths.

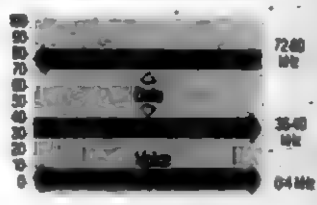
Release 7 of MRC-Reporter also offers a more intelligent communications format that provides messages to keep users informed of their progress throughout the session.

MRC-Reporter licenses for $2,240 per site CPU.

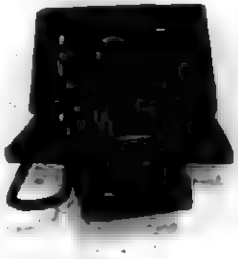
Michaels, Ross & Cole, P.O. Box 4533, Oak Brook, Ill. 60521.

Can you picture a local voice/data network that is powerful, practical and priced right ... even for very small groups of users? It's real. And we've installed more than 40,000 channels.

That's right. At Teltone, we've been showing companies large and small how to manage growing voice and data networks for years, and "cost-effective" is our middle name. Right now, for example, our Data Carrier Systems are helping more than 500 companies extend the useful lives of their telephone systems by letting them double as local data networks. For as little as $450 per channel, DCS enables users to route synchronous/asynchronous data, at up to 9600 bps, to virtually any existing telephone jack. This makes adding or moving a terminal as easy as plugging in a phone—no modems, no cable, and no disruption of voice traffic at any time. We also offer a full line of high-performance multiplexers and other networking products, but most of all we provide expertise. When you do business with Teltone, you deal with our own applications experts—people who know networking inside out, and share your concern about controlling costs. If this sounds like a good idea to you, let's talk. We have offices nationwide, and we'd welcome a chance to communicate with you.



"Piggy-Backing" on the PBX Line



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CAPITAL

VIA Systems, Inc. is offering **Buildingblocks**, an application-specific integrated circuit design package for its VIA Worksystem.

It is a hierarchical automatic placement and routing package for very large-scale integrated circuit layout that uses a library of predefined functional blocks ranging from a single transistor to a complete microprocessor. Library blocks can be shaped irregularly and drawn manually or automatically.

Buildingblocks combines chip-level placement, routing, editing and analysis with cell-level physical design and editing on one workstation.

Buildingblocks, including Blocks placement and routing software, Blocks placment editor, hierarchical placement and routing package, costs $55,000.

VIA Systems, 76 Treble Cove Road, North Billerica, Mass. 01862.

Data base managment systems

Data Language Corp. has announced that its **Progress** data base and application development system is now available on multiuser microcomputers and minicomputers from AT&T, Altos Computer Systems, Inc., Motorola, Inc., Plexus Computers, Inc. and Sun Microsystems, Inc.

Progress is available on the Sun Microsystems Sun 2 workstation, the Motorola VME 121 process control microcomputer, the Plexus P-15 and P-20 multiuser microcomputers, the Altos 2086 system and the AT&T 3B5 minicomputer.

Pricing for the full progress data base and application development system ranges from $3,450 for the Sun 2 to $4,450 for the AT&T 3B5.

Data Language, 47 Manning Road, Billerica, Mass. 01821.

Training

General Electric Information Services Co. has announced **GETutor**, a computer-based training system that operates on GE's worldwide teleprocessing service.

There are 46 courses available on GETutor. Topics include data communications, IBM, data base management systems, programming languages, application tools and operating systems. GETutor is accessible to anyone who operates an IBM 3270 full screen-type terminal.

Prices, based on one student per course, range from $50 to $650. Student materials and communications access service charges are not included.

GE Information Services, 401 N. Washington St., Rockville, Md. 20850.

Goal Systems International, Inc. has released **Version 5.1** of its **Phoenix** system, a computer-based training system for IBM mainframes and plug-compatible systems.

Phoenix 5.1 allows users to broadcast immediate or delayed messages and notes. Other features include additional computer-assisted instruction/computer-managed instruction link options, a program function key user sign-on and the ability to download simulation items onto personal computers.

The full Phoenix system is available for a permanent license fee of $42,000 or a three-year renewable license fee of $1,050 per month.

Goal Systems International, 5455 N. High St., Columbus, Ohio 43214.

■

Specialized Systems Consultants, Inc. has announced **Dial-A-Guru**, a telephone consulting service for AT&T Unix, Microsoft Corp. Xenix and C language users.

Dial-A-Guru provides users with a consultant available by phone during working hours. The consultant is guaranteed to answer all questions concerning Unix, Xenix and C.

Dial-A-Guru is available for a monthly fee ranging from $75 to $195, depending on the number of calls made and the amount of time involved. If questions are not answered, there is no charge for the time.

Specialized Systems Consultants, P.O. Box 55549, Seattle, Wash. 98155.

■

Science Research Associates, Inc., a subsidiary of IBM, has announced **3090 Hardware Operator Training**, an interactive self-study operator training course for the IBM 3090 system.

Continued on page 98

XEROX

Xerox is about to move xerography light years ahead.

Continued from page 97

The computer-based training course comprises menu-driven and student-controlled exercises, drill and practice problems and simulations of the operations of the 3090 mainframe system.

The course operates on an IBM Personal Computer. Simulation drills provided include controlling and invoking the remote support facility and invoking the system activity display frames.

The 3090 Hardware Operator Training is priced at $700 for a 12-month lease and $315 for a 12-month renewal, the vendor said.

Science Research Associates, 155 N. Wacker Drive, Chicago, Ill. 60606.

■

Command Computer Corp. has announced **MicroMatch**, a service that provides interfaces between micros and peripherals.

The service consists of two reference volumes of diagrams and instructions for interconnecting microcomputers to printers, CRTs terminals, modems and plotters.

Two versions of MicroMatch are available: An all-vendor version provides interfaces for major micros and peripherals. A single-vendor version consists of a series of volumes by manufacturer containing interfaces between the specific vendor's equipment and other suppliers' products.

Prices are $690 per year for a subscription to the all-vendor version and between $29 and $149 for individual single-vendor volumes.

Command Computer, 36 Columbia Terr., Weehawken, N.J. 07087.

MICROS

Software

Acme Computer Co. has announced **Linear Optimizer**, a software package for general linear programming on personal computers running Digital Research, Inc.'s CP/M or Microsoft Corp.'s MS-DOS.

The Linear Optimizer package consists of an integrated matrix generator, solution procedure and report writer. The generator accepts a formula-oriented matrix-generation language that features read and write statements and subscripted variables and constraints.

The package costs $400.

Acme Computer, P.O. Box 51193, Seattle, Wash. 98115.

■

Unicorn Systems Co. has announced **MicroCICS/RT** and **MicroVSAM**, two products for the IBM Personal Computer XT/370 family of microcomputers.

MicroCICS/RT is a runtime processing monitor that executes CICS programs. It allows users to port command-level programs to a stand-alone micro environment without rewriting code.

MicroVSAM allows Cobol programs using mainframe VSAM to execute on the XT/370 microcomputers. It supports sequential, indexed and relative VSAM files and I/O, random- and dynamic-access modes.

MicroCICS/RT costs $1,495, and MicroVSAM costs $495.

Unicorn Systems, 3807 Wilshire Blvd., Los Angeles, Calif. 90010.

■

TCI Software Research, Inc. has announced **Version 2.1** of its **T³ Scientific Word Processing System** for the IBM Personal Computer family, the AT&T PC 6300 and the NEC Corp. APC III.

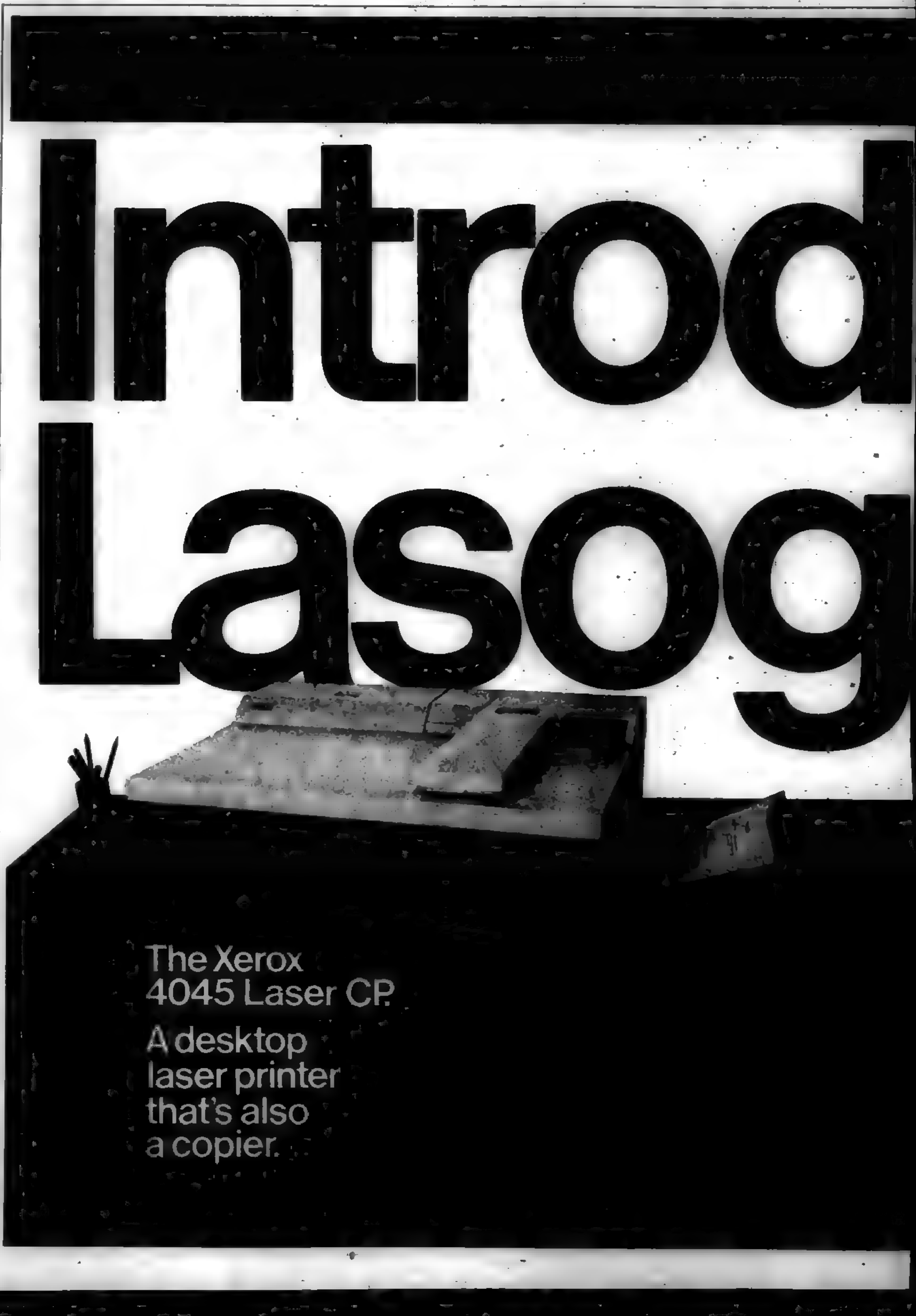
T³ now supports more than 20 printers ranging from dot matrix printers to daisywheel and thimble printers to laser printers including the Hewlett-Packard Co. Laserjet and the Laserjet Plus, the Xerox Corp. 4045 and 2700 and the Quality Micro Systems, Inc. Lasergraphix series, according to the vendor.

The T³ Scientific Word Processing System is priced at $595.

TCI Software Research, 1190-B Foster Road, Las Cruces, N.M. 88001.

Martin Marietta Data System's Software Division has announced **Version 1.2** of its **Runit** DOS shell and utilities program and introduced the **Runit Virtual Disk Utilities** program option.

The enhanced version of Runit provides users with the flexibility to design their own main menu and customize the program banner to a name of their choice. The Virtual Disk Utility is used to create virtual disk drives from IBM Personal Comput-



The Xerox 4045 Laser CP.
A desktop laser printer that's also a copier.

er, Personal Computer XT, AT or compatibles on an IBM mainframe running VM/CMS or MVS/TSO operating systems.

Runit works with Digital Communications Associates, Inc. Irma board, CXI Plus or IBM 3278/3279 emulation boards or an asynchronous port with a Hayes Microcomputer Products, Inc. modem or Renex Corp. protocol converter.

Runit Virtual Disk Utilities requires one disk drive and 128K bytes of random-access memeory. Runit is priced at $100. With the Virtual Disk Utilities, it is priced at $250 per personal computer plus a one-time charge for the mainframe ranging from $3,500 to $5,500.

Martin Marietta, P.O. Box 2392 Princeton, N.J. 08540.

■

Data Law Co. has added the **Report Generater** to its line of legal software.

The Report Generator can be used with either the Datalaw/PC legal time and billing program or the Litigation Support program. It can create custom reports, add, subtract, multiply, divide and merge information from several reports into one.

The Report Generator runs on an IBM Personal Computer XT, AT or compatible.

The Report Generator is priced at $695.

Data Law, Suite E, 6341 S. Troy Circle; Englewood, Colo. 80111.

■

Shawmut Corp. has announced **Quicken**, a check writing, account balancing and expense tracking software product for personal computers.

Quicken allows users to write, print and keep a record of checks as well as maintain their check registers. It runs on the IBM family of Personal Computers and Apple Computer, Inc.'s Apple IIe and IIc.

Quicken is priced at $99 for the IBM version and $79 for the Apple version.

Shawmut, One Federal St., Boston, Mass. 02211.

■

Spectrum Training Corp. has released **Version 4** of its **The Educator** authoring system for the IBM Personal Computer family and compatibles.

The Educator allows the development of computer-based training and application demonstrations. Version 4 is written in C language and has four primary enhancements: It is faster in both authoring mode and in replay; it includes an optional screen capture utility; live applications and procedures can be linked to training; and it is possible to design graphics with a mouse.

Version 4 of The Educator costs $2,500 per yearly license. The capture utility is priced at $300.

Spectrum Training, 18 Brown St., Salem, Mass. 01970.

■

Delphi Data Systems, Inc. has announced **PC/Hibol**, a product designed to develop and test IBM mainframe CICS/VS. Cobol applications on the IBM Personal Computer, Personal Computer XT and AT.

PC/Hibol generates CICS/VS Cobol and Basic Mapping Support maps for the IBM mainframe operation as well as microcomputer Cobol and maps for IBM Personal Computer operation from the same program specification, the vendor said.

Interactive programs can be tested or run in production on the personal computer.

PC/Hibol is priced at $995.

Delphi Data Systems, 9615 Girard Ave. S., Minneapolis, Minn. 55431.

■

Microsoft Corp. has released **Macro Assembler 4**.

Version 4 features the ability to assemble larger source files with more symbols and more macro text. It offers new assembly switches, screen swapping and 100% source and object upward-compatibility with earlier Microsoft and IBM Macro Assemblers.

Microsoft Macro Assembler 4 runs on any Version 2 MS-DOS computer supporting the newer Intel Corp. 80186, 80286 and 80287 instruction sets as well as the standard 8086, 8087 and 8088 instructions.

It is priced at $150.

Microsoft, Box 97200, 10700 Northrup Way, Bellevue, Wash. 98009.

XEROX

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raphy.

About twenty-five years ago something happened that changed the world of information forever.

Xerox introduced the first plain paper copier, an achievement that brought xerography into almost every office.

Since then, for more than a decade, Xerox has been applying the power of laser technology in high speed computer printing systems. Systems that produce superb documents of unsurpassed quality. Quickly, quietly and cost effectively.

Now, through this process which we've named Lasography, Xerox has come up with a revolutionary product that lets smaller offices and work groups enjoy these benefits, too.

Introducing the Xerox 4045 Laser Copier Printer.

It's the desktop copier/laser printer with a totally unique dual personality.

For one thing, it's a sophisticated laser printer. It can print up to ten pages a minute. Which is ten times faster than standard office printers.

And while other desktop printers serve primarily one workstation at a time, the Xerox 4045 Laser CP is designed to accommodate four.

All at the same time.

Not only that, but with the Laser CP's graphics capabilities you can merge all the forms, logos, texts and signatures you want printed and produce documents that anyone would be proud of.

But as we said before, the Laser CP has a dual personality. It doubles as a high quality convenience copier.

The Xerox 4045 Laser CP is only one example of what Lasography has to offer your office, remote or distributed data processing environments.

Because Xerox is already planning ways to apply Lasography toward an even wider selection of products.

All of which will put your office exactly where it belongs.

Light years ahead.

Call 1-800-TEAM-XRX, ext. 179 for information and product demonstration.

Please send me more information on Xerox Lasography.
☐ The 4045 Laser CP
☐ The complete line of Lasographic printers.
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XEROX® and the number names are trademarks of XEROX CORPORATION.

NEW PRODUCTS/MICROCOMPUTERS

Western Union Co. has released **Version 2** of its **Instant Mail Manager** software for IBM Personal Computers and compatibles.

Instant Mail Manager Version 2 offers increased address list functions, a scroll feature for address list maintenance and compatibility with Ashton-Tate's Dbase II and III. Other features include the ability to save unsent messages in the queue when using Instant Mail Manager's unattended send and receive mode and the ability to change the path used for each of the software's configuration files, Help files and address list files.

IMM Version 2 costs $150.

Western Union, One Lake St., Upper Saddle River, N.J. 07458.

■

Productivity Software International, L.P. has introduced **PRD+**, a software program that adapts a personal system of shorthand for keyboard data entry.

PRD+ is a memory-resident program that operates on IBM-compatible personal computers. It comes with a prestored word list of hundreds of common abbreviations and a feature that calculates the number and percentage of keystrokes saved during a data entry session. Users can define as many separate word lists as they want. Each word list can contain up to 40,000 characters.

PRD+ costs $195 and will be available on Jan. 1.

Productivity Software, 1220 Broadway, New York, N.Y. 10001.

■

Conetic Systems, Inc. has released **Version 1.1** of its **Higgins Administrative Software.**

Among the new features are compatibility with IBM's Topview, notification if appointments are scheduled at conflicting times, expanded directory report options, unlimited capability on retrieval and summary screens and files that automatically close and reopen if no entries are made for two minutes.

Higgins Version 1.1 requires an IBM Personal Computer XT, AT or compatible with a hard disk drive, 256K bytes of random-access memory, a color or monochrome display and IBM PC-DOS 2 or Microsoft Corp. MS-DOS 2 or higher.

Higgins Version 1.1 costs $395 for a single-user copy. The multiuser version ranges from $695 to $2,495.

Conetic Systems, 1470 Doolittle Drive, San Leandro, Calif. 94577.

■

Abacus Computing, Inc. has announced **Indexer** and **Abacus Utilities**, two programs for the IBM Personal Computer family or compatibles.

Indexer, designed to work with word processors such as Micropro International Corp. Wordstar and Microsoft Corp. Word, builds a word list and then produces an index based on either line or page number.

Abacus Utilities can be used to enhance the operation of IBM PC-DOS. The utilities permit the user to copy screens to disk, copy printer output to disk, replace a character string in a file and change the date and time stamp on a file, according to the vendor.

Indexer costs $49.50, and Abacus Utilities costs $24, the vendor said.

Abacus Computing, 271 Vose Ave., South Orange, N.J. 07079.

Systems

Targa Systems Corp., The Travelers Cos. and **AT&T's Electronic Photography and Imaging Center** have introduced the **Decision Images Presentation System** that integrates color-television-quality pictures and sound with information and presentation graphics.

The Decision Images System includes the Decision Images IBM PC-DOS-based software and the AT&T Truevision Video Display Adapter with Digital Enhancement board that displays more than 1,000 colors simultaneously on standard digital red-green-blue monitors.

The system can be used for delivery of product information, management presentations and reporting, training, education and sales and marketing support.

The product is priced from $1,400 for basic workstation hardware and software to approximately $10,000 for a

Continued on page 104

XEROX

9700 Laser Printing System

2700 Laser Printing System

As you can see Xerox has developed an entire family of laser printers.

Each one designed to fit a variety of needs.

But they all have many things in common.

For instance, Xerox has long set the industry standard for quality printing. The laser printers you see here uphold that standard nicely.

Our laser printing speed is as versatile as your output needs.

From our small desktop 4045 Laser CP's ten pages a minute, to our high volume 9700's 120 pages a minute.

You can handle everything from a few quick documents at a workstation, to thousands of catalogues.

But the flexibility of Xerox laser printers doesn't stop with speed or output. They're versatile enough to give you a choice of hundreds of type styles.

Four of our models can produce graphics with stunning clarity.

And all of them, the 4045, 2700, 3700, 8700, and 9700, will even print out almost any kind of form, not to mention text, tax forms, invoices, billing statements, and catalogues.

And our laser printers are so quiet that, in many cases, you hardly know they're there.

The point is, whatever your size or application, Xerox has a laser printer that seems customized to your needs. For your office, remote and distributed data processing environments.

All providing you with extremely cost effective laser printing solutions.

Which shouldn't really surprise anyone.

After all, Xerox invented laser printing.

So our entire family has something other printers find hard to duplicate.

It's called quality. And a built-in dependability that was meant to last a long, long time.

All backed by something special.

The Xerox name and the team that goes with it.

Team Xerox.

We'll send you a lot more information on our whole line of laser printers. Just send in the coupon.

Or simply call 1-800-TEAM-XRX, ext. 179. It may be the easiest step you'll ever take to move your office ahead at the speed of light.

3700 Laser Printing System

8700 Laser Printing System

So the
top guy said,
"What does a system
that can handle
thousands of
on-line transactions
a day buy me?"

And we said...

"You can own the market."

Transaction Processing. How fast you can do it keeps customers happy and business growing. How well you do it helps keep your company in the black.

Nobody does it better than Honeywell.

Our Transaction Processing systems help give you what you need for high throughput, fast response processing that delivers results where you need them most—the bottom line.

Look at it as your Business Action Partner. Ready to help whenever you need it. Whether for inventory or financial control or personnel scheduling, Honeywell TP can handle it.

DATA INTEGRITY FOR PEACE OF MIND

A Honeywell TP system allows you to keep your data base up to date and well protected, an important consideration where loss or destruction of key data could bring business to a standstill.

Honeywell's data base management and TP software provide features such as audit trails and data images for recovering data. TP also has an automatic restart capability, as well as other data integrity and recovery management features.

AN INTEGRATED APPROACH WITH IBM NETWORKING

Because Honeywell takes an integrated approach to data processing, your TP function is just one part of a total system linking management, individual departments, and end-users in one easy-to-use network.

And Honeywell offers distributed data access and distributed processing in networked systems that include IBM mainframes.

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Honeywell

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 100

fully integrated artistic creation system, including all components for audio, video and presentation graphics.

Targa Systems, Cityplace, Hartford, Conn. 06103.

■

Concept Technologies, Inc. has enhanced its **Concept System** integrated text and graphics system for the IBM Personal Computer XT or AT, the Zenith Data Systems Corp. 158 and the Compaq Computer Corp. Deskpro.

The enhancements include the Conceptequation Setter software package, Version 1.1 of the Concept System software and a stand-alone version of the system's word processor called the Conceptprocessor 50.

Both the Conceptequation Setter and the Conceptprocessor 50 are priced at $495. Version 1.1 of the software is available free of charge to current users of Concept 100 or Concept System.

Concept Technologies, P.O. Box 5277, Portland, Ore. 97208.

■

Absolut Software has unveiled its **Add-On**, designed to bring AT&T Unix-based multiuser, minicomputer capabilities to the IBM Personal Computer AT.

The package, which fits inside the AT cabinet and allows simultaneous use of Microsoft Corp. MS-DOS with up to 16 additional users, includes Absolut's Wholesale Distribution and Accounts Receivable Software; Unify Corp.'s Relational Data Base Management System; AT&T's Unix System V; a 12.5-MHz Motorola, Inc. 6800 central processor; 60M-byte cartridge tape; up to 280M-byte hard disk; up to 4M bytes of main memory; and a 1,200 bit/sec. modem.

Add-On is used for order entry, inventory control, purchasing, receiving, quotation generation, prospect tracking and telemarketing.

Pricing starts at $23,950.

Absolut Software, 2001 Beacon St., Boston, Mass. 02146.

■

Tandy Corp. has introduced the **Tandy 1200** personal computer with two 360K-byte floppy disk drives.

The Tandy 1200 features an industry-standard keyboard and 256K bytes of random-access memory expandable to 640K bytes on the main board. It functions like the IBM Personal Computer XT, using the same software and option cards.

The floppy disk and printer circuitry is on the main board of the Tandy 1200 so it does not occupy an expansion slot.

The Tandy 1200 is priced at $1,499.

Tandy, 1800 One Tandy Center, Fort Worth, Texas 76102.

Communications

ABM Computer Systems Co. has introduced **Bright Modem**, a Hayes Microcomputer Products, Inc.-compatible 200/1,200 bit/sec. internal personal computer-compatible asynchronous modem.

Bright Modem features autoanswer capabilities and will autodial in tone or pulse.

Bright Modem uses the personal computer's speaker to synthesize the dialing and call progress sounds that it can detect over the phone line. It features two telephone jacks.

Bright Modem is priced at $199.

ABM Computer Systems, 3 Whatney, Irvine, Calif. 92718.

■

Packet/3270, an IBM Systems Network Architecture (SNA) 3270 emulator for the IBM Personal Computer that allows access to 3270 SNA host applications via asynchronous modems has debuted from **Packet/PC, Inc.**

Four functions are implemented: IBM 3278 Model 2 CRT/keyboard emulation; file transfer; application program interface; plus data integrity and compression during transmission.

At the Personal Computer, Packet/3270 requires IBM PC-DOS 2 or higher, 128K bytes of memory and an asynchronous communications adapter. MVS or MVS/XA running VTAM Version 2 or greater is needed at the host. The NCP Packet Switching Interface is required in the IBM 3705 communications controller.

A Packet/3270 host license costs $7,500; the Personal Computer license fee ranges from $145 to $295, depending on volume.

Packet/PC, Suite 412, 266 Pearl St., Hartford, Conn. 06103.

Storage

Microscience International has introduced **Easycard**, a 20M-byte disk drive on a card for the IBM Personal Computer, AT&T PC 6300 and compatibles.

Easycard plugs into slots on any of the personal computers. It can be connected to an additional 10M-, 20M- or 30M-byte hard disk or streaming tape drive. It has a data transfer rate of 5M byte/sec. and an average access time of 80 msec.

Easycard requires IBM PC-DOS 2 or higher.

It is priced at $1,095.

Microscience International, 575 E. Middlefield Road, Mountain View, Calif. 94043.

■

Quadram Corp. has added the **Quadtape 20MB** cassette and the **Quadtape 60MB** cartridge, two internal half-height tape streamers, to its hard disk drive product line.

The Quadtape 20MB cassette has a 90 in./sec. tape speed, a recording

Continued on page 106

UDS delivers 212A LPs at rock-bottom prices

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Universal Data Systems

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 104

density of 8,000 bit/in. and a transfer rate of 86K bit/sec. The 60MB cartridge unit has a 90 in./sec. tape speed, an 8,000 bit/in. recording density and a 90K bit/sec. transfer rate.

The Quadtape 20MB cassette is priced at $1,095 and the 60MB cartridge is priced at $1,795.

Quadram, One Quad Way, Norcross, Ga. 30093.

Printers/plotters/peripherals

Calcomp has introduced the **2500 series** of digitizers for personal computer-based workstations in applications such as computer-aided design and graphic arts.

The 25120 has an active digitizing area of 12 in. by 12 in. The 25180 has an active digitizing area of 12 in. by 18 in. Both models allow selectable resolution of up to 1,000 lines per inch.

The Model 25120 costs $950, and the Model 25180 is priced at $1,400.

Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

■

Calcomp has introduced its **Colormaster** thermal transfer plotter-printer for personal computers.

Colormaster features seven colors, a speed of approximately 1.5 minutes per ANSI-size-A page, a horizontal resolution of 203.2 dots per inch and a built-in rasterizer.

Colormaster comes with one color and one monochrome ribbon, 500 sheets of paper, transparencies, a user's and a programmer's manual.

Colormaster will be available in January for $4,495.

Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

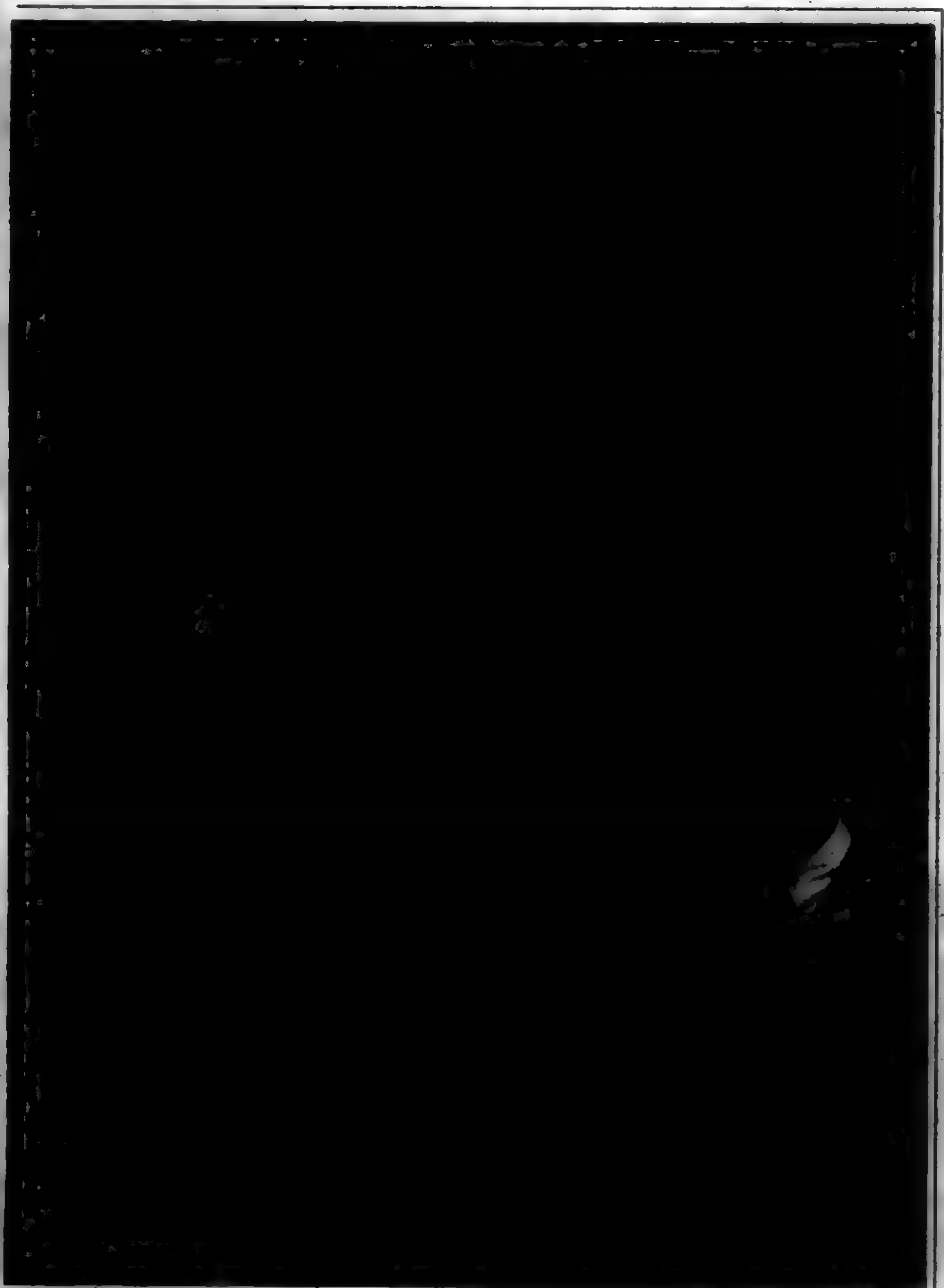
■

Fujitsu America, Inc. has announced the **SP320E** daisywheel printer.

It features 88-, 92-, 96- and 192-character print wheels, full extended character set, IBM Personal Computer graphics character set compatibility and Diablo Systems, Inc. 630 extended character set command code compatibilty. It has a dual Centronics Data Computer Corp. parallel and RS-232C serial interface, a print speed of 48 char./sec., proportional line spacing programmability and word processing functions.

The SP320E costs $1,495.

Fujitsu America, 3055 Orchid Drive, San Jose, Calif. 95134.



Link Technologies, Inc. has announced **PC Term**, a multiuser terminal for the IBM family of personal computers.

PC Term features a 14-in. green or amber CRT that displays the full 256 character set in the IBM Personal Computer font style. It supports both 80- and 132-column display.

PC Term costs $649.

Link Technologies, 2260 Paragon Drive, San Jose, Calif. 95131.

■

Zenith Data Systems Corp. has introduced its **ZVM-1330** 13-in. high-resolution color video monitor.

The monitor features a 25-line by 80-char. format that supports a 640- by 240-pixel resolution display. It offers 16 colors. It has on/off, brightness and contrast controls as well as horizontal and vertical size and positioning controls on the front panel.

The ZVM-1330 monitor costs $649.

Zenith Data Systems, 1000 Milwaukee Ave., Glenview, Ill. 60025.

Board-level devices

Aid/88, an intelligent diagnostics system for IBM Personal Computer and Personal Computer XT has bowed from **Vu-Data Corp.**

The Aid/88 personal computer tester is preprogrammed with 10K bytes of software that monitor IBM's resident diagnostics.

Aid/88 reports the test that causes the Personal Computer to halt. In addition, internal firmware lets the unit perform bus-shorted and bus-stuck testing. By using two keypad buttons, an operator can test a good system board in 25 seconds.

Aid/88 sells for $2,795 in single quantities.

Vu-Data, 7122 Convoy Court, San Diego, Calif. 92111.

■

Victor Technologies, Inc. has introduced its **Speedpac 286** turboboard for the IBM Personal Computer, Personal Computer XT and Victor VPC.

Speedpac 286 fits into a half slot. It uses an 8-MHz Intel Corp. 80286 microprocessor that increases speeds by more than 600%.

The introductory price of Speedpac 286 is $595. After March 31, the price will be $795.

Victor Technologies, 10 Victor Sq., Scotts Valley, Calif. 95066.

■

ABM Computer Systems has announced the **Mini-EMS** board, a short-slot board that provides up to 1.5M bytes of Lotus/Intel/Microsoft Expanded Memory Specification memory, an advanced random-access memory disk, a pop-up windowing spooler and diagnostic software on a self-booting disk.

Up to 512K bytes of parity-protected memory can be installed on the main short board. The Expansion RAM Module provides up to an additional 1M byte of memory. Up to 8M bytes of memory can be supported on a single machine using multiple Mini-EMS boards.

List prices are $169 for the main Mini-EMS board with no bytes of memory installed and $79 for the Expansion RAM Module with no bytes of memory installed. Memory is

Continued on page 110

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In the torrid race to claim the fastest high speed modem, many companies advocate basing your buying decision on one thing: speed. What's happened, unfortunately, is that these speed claims are beginning to blind people. So much so, in fact, that modem purchasers are losing sight of the difference between modem speed and data throughput. Between addition and integration. And between out-of-pocket expenditures and intelligent investments.

Codex would like you to take one step back for just a minute. Allow us to submit the following questions.

What level of performance do you really want out of a modem which operates at 19,200 bps? How much more efficient will it make you? How much throughput can you expect? What support, such as line conditioning, centralized network control capabilities and staffing will you need to maximize efficiency and control costs?

These are the *most important considerations* when evaluating a high speed modem. Any high speed modem. Especially ours.

Introducing the Codex 2680

It's the thoroughbred of 19.2 kbps modems. We say this so unequivocally

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The new Codex 2680 19,200 bps high speed modem.

because the Codex 2680 fully answers the most important considerations. And because it is not a revolutionary design, but rather an evolutionary one, based on the technology of a series of modems which have remained the most technologically advanced in the industry since they first appeared: the Codex 2600 Series.

High speed modems vs.
high speed communications

The Codex 2680 sets new standards for performance and reliability among very high speed modems. By combining the Codex proprietary custom VLSI design and the power of the Motorola 68000 microprocessor, the Codex 2680 provides the highest and most consistent level of data throughput of any 19.2 kbps modem available.

This superior performance is achieved in a number of ways. By utilizing enhanced 64-state 8-dimensional Trellis Coded Modulation (64 x 8 TCM), one encoding bit is interwoven with every 28 bits of the original transmitted stream. The result, quite simply, enables the receiver to both interpret and select the best sequence of bits which most accurately represent the data transmitted. Codex also positions the error-correcting data in a smaller signal constellation, thereby making it less susceptible to line disturbances.

In actual use the Codex 2680 delivers 99.9% error free data over more than 90% of standard 3002 D1 conditioned lines at 19.2 kbps.

The Codex 2680 also incorporates Codex's Adaptive Rate System (ARS). This feature eliminates the need for manual monitoring and reconfiguring of data rates, optimizing throughput under all line conditions.

The big payoff

Speeds of 19.2 kbps allow you to realize dramatic increases in efficiency *and* productivity. Without increasing expenses or staff resources.

You can use D1 lines instead of C-conditioned lines, so you can achieve substantial savings in monthly leased-line costs. From day one.

And these savings add up. Fast. With its standard 2-channel multiplexer, you can eliminate extra lines. For example, by combining two separate 9600 bps circuits into one leased-line at 19,200 bps, typical savings for a New York to LA link are greater than $24,000 per year.* And that's just in leased-line charges. You'll save more on hardware as well.

What's more, the Codex 2680 offers complete network management capabilities for monitoring and fault isolation. It can operate independently or with your present central site Codex network management and control systems, to ensure greater network availability.

In short, it's a modem that's really a true network system resource.

It's all perfectly clear

Another important feature of the Codex 2680 is the fact that it is shipping right now. Not tomorrow. Now.

If you still have questions or would like a product demonstration, simply call **1-800-426-1212, ext. 227.** Or write Codex Corporation, Dept. 707-227, 20 Cabot Boulevard, Mansfield, MA 02048.

The quicker you do it, the faster you'll be achieving what you really want out of a high speed modem.

Performance.

codex

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---

*Based on average installation and leasing charges for 3002 D1 circuits as of 10/85.

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 100

available in 256K-byte increments for $50. A 1.5M-byte board lists for $602.

ABM Computer Sustems, 3 Whatney, Irvine, Calif. 92718.

■

Corvus Systems, Inc. has introduced two **NSC/DXZ Omninet** local-area network cards that allow the IBM family of Personal Computers to communicate with Digital Equipment Corp. minicomputers over the Corvus Omninet local network.

The DQZ card emulates DEC's DZV11 multiplexer and allows the minicomputer to communicate with up to four personal computer users. The DUZ card emulates three DEC DZ11 multiplexers and enables the mini to communciate with all micros located on up to three Omninet networks.

The DQZ Omninet/Q-bus interface kit is priced at $2,795. With the DUZ card, the kit costs $6,395.

Corvus Systems, 2100 Corvus Drive, San Jose, Calif. 95124.

■

Hayes Microcomputer Products, Inc. has upgraded its **Transnet 1000** to 512K bytes of random-access memory.

Transnet 1000 performs document storage, printing and communications functions without using processor time from a microcomputer. It can answer telephone calls using an external modem and store and print messages when no computer is present. The mailbox can operate in the background while Transnet 1000 serves the computer as an intelligent printer buffer.

Transnet 1000 is compatible with computers that have a serial RS-232 port. It connects to printers, plotters and other peripherals via either a parallel or serial port. It costs $549.

Hayes Microcomputer Products, P.O. Box 105203, Atlanta, Ga. 30348.

■

Paradise Systems, Inc. has introduced the **Modular Graphics Card** that extends the IBM Color Graphics Adapter (CGA) standard to IBM Personal Computer-compatible monochrome monitors as well as to color monitors.

The card adapts CGA-compatible software to monochrome monitors, portraying color values as shades. It displays up to 16 colors on a color monitor and up to 16 shades on a monochrome monitor. It supports full screen graphics and comes with connectors for a light pen and a radio frequency modulator. It also includes a random-access memory disk and print buffer software.

The Modular Graphics Card costs $395.

Paradise Systems, 217 E. Grand Ave., South San Francisco, Calif. 94080.

Auxiliary equipment

Computer Perfect has announced the **Computer Perfect Kit**, said to protect microprocessors from dust, smoke, dirt, oxide buildup, static electricity and misuse or operator error.

The Computer Perfect Kit contains a maintenance schedule that explains when to care for and service components; disk drive head cleaning disks; disk drive head, keyboard and printer cleaning fluid; antistatic screen-cleaning spray; screen polish; lint-free cloths; cleaning swabs; pressurized dust blower; antistatic room spray; and recommendations for keeping microcomputers in good working order.

The list price is $49.95.

Computer Perfect, P.O. Box 276, Mahomet, Ill. 61853.

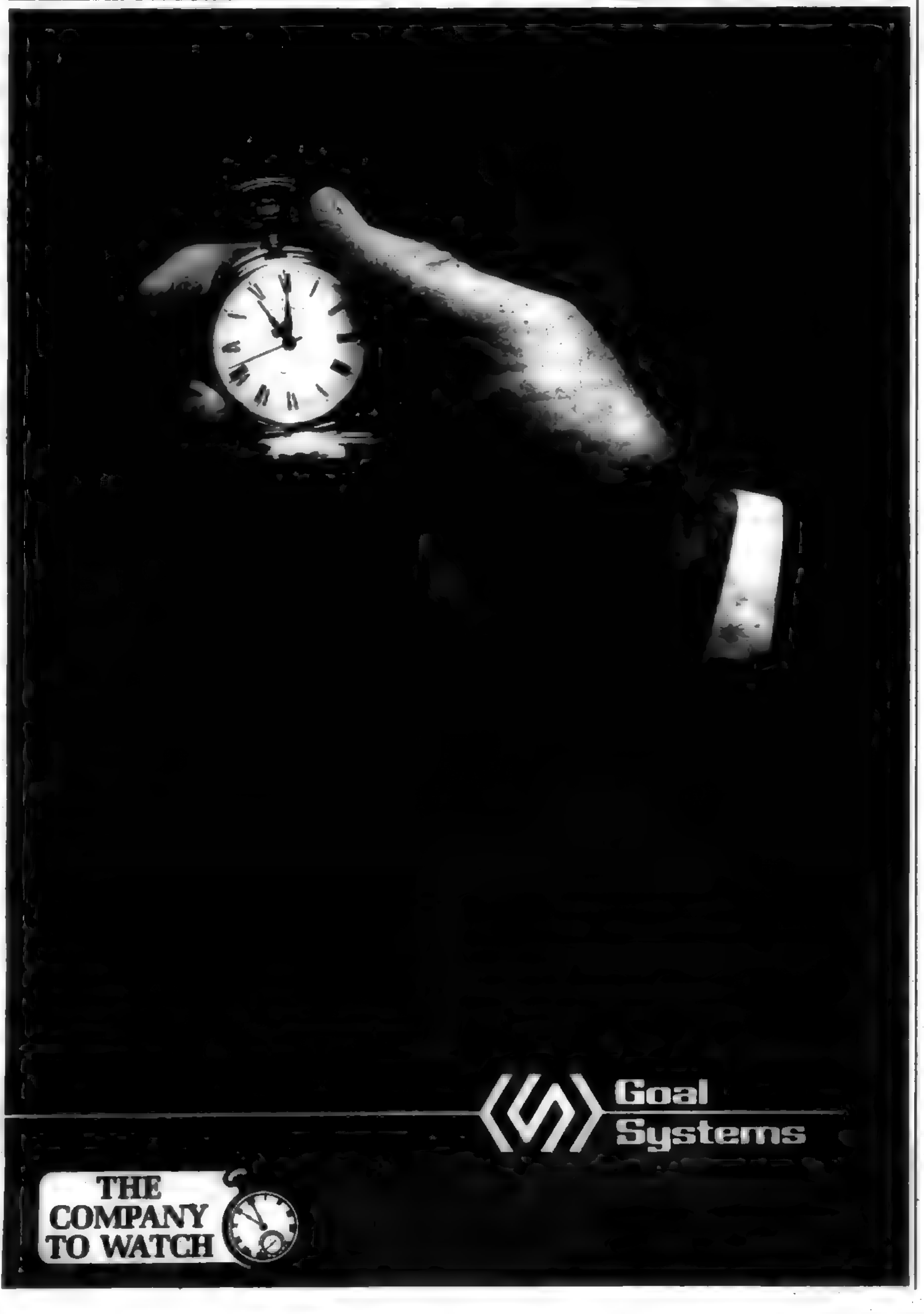
■

Micro-Software Developers, Inc. has introduced **Bitwriter**, a copy protection and diskette duplication system for the IBM Personal Computer, Personal Computer XT, AT and compatibles.

The Bitwriter system consists of a host-transparent hardware card that plugs into a Personal Computer expansion slot and connects to the existing diskette controller. Bitwriter software activates the card, which writes a magnetic signature on the diskette that can be read by the computer but cannot be written or copied by the Personal Computer controller.

The Bitwriter system is priced at $1,495.

Micro-Software Developers, 214½ W. Main St., Saint Charles, Ill. 60174.



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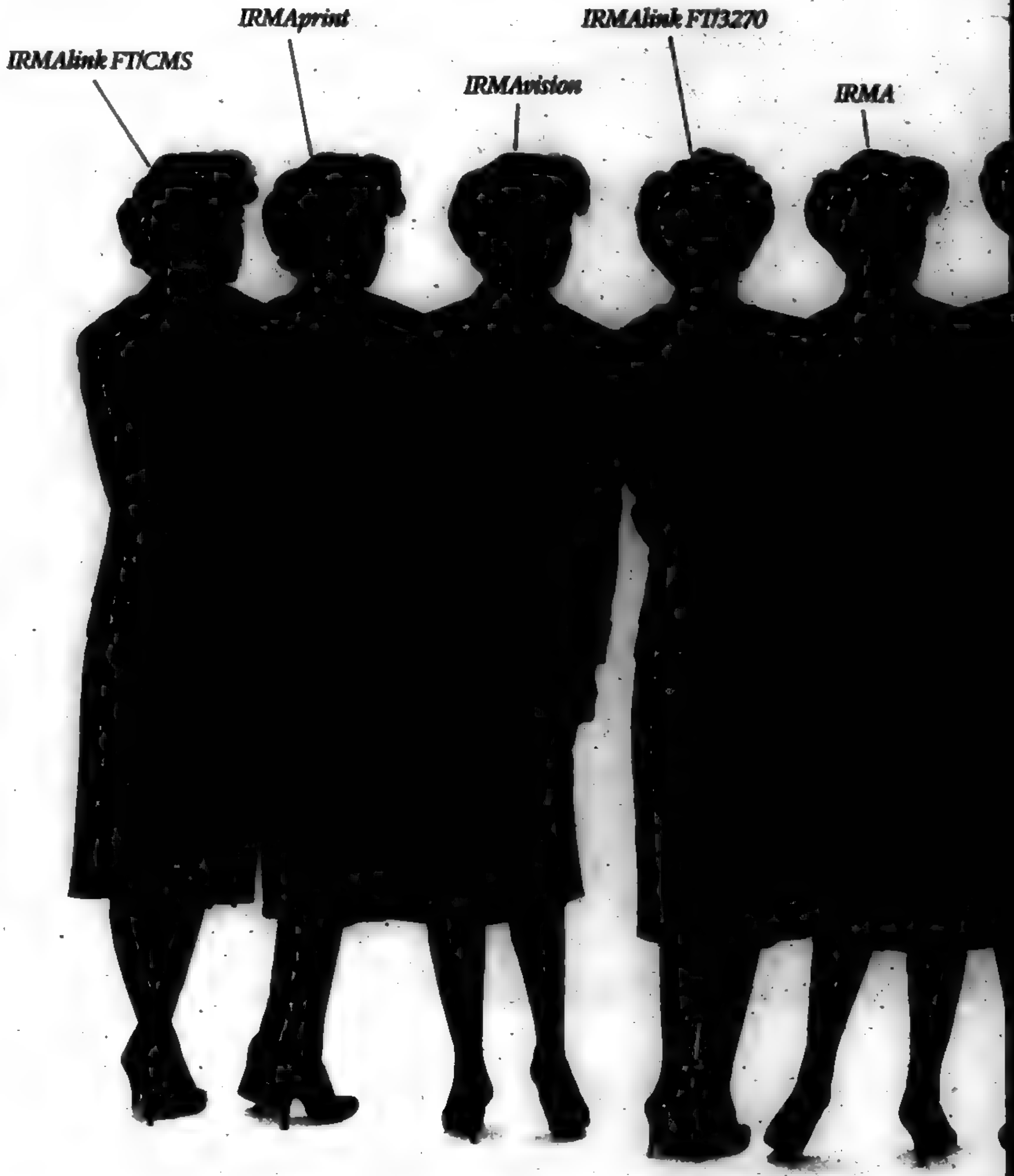

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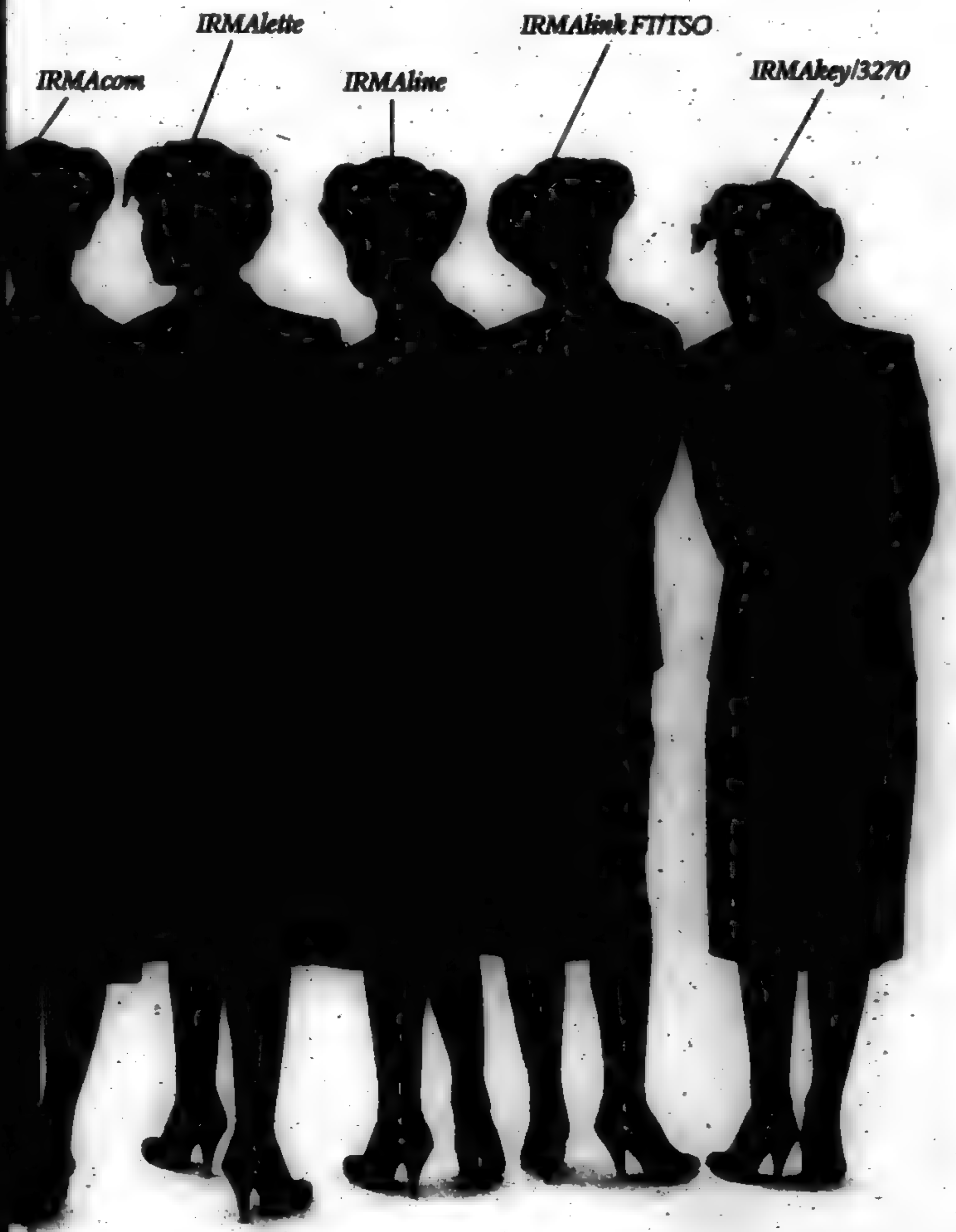

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NEW PRODUCTS/MICROCOMPUTERS

Enigma Logic, Inc. has introduced **Safeword PC-Safe**, a security system for the IBM Personal Computer and compatibles.

Safeword PC-Safe provides positive identification of all personal computer users and automatic encryption of all personal computer data and programs.

Safeword PC-Safe costs $250.

Enigma Logic, Suite 301, 2151 Salvio, Concord, Calif. 94520.

COMMUNICATIONS

Controllers

Telex Computer Products, Inc. has introduced the **Telex 076** remote control unit, which is capable of supporting up to eight IBM 3270 terminals.

The Telex 076 is compatible with IBM's 3276 controller and allows the attachment of either Telex or IBM 3270 terminals.

It communicates with the host processor using either IBM Synchronous Data Link Control or binary synchronous protocol.

The Telex 076 is priced at $4,500.

Telex Computer Products, 6422 E. 41st St., Tulsa, Okla. 74135.

Voice/data communications

General Electric Information Services Co. has announced that its **Genie** consumer information service for personal computer users is available at 2,400 bit/sec. in 63 U.S. cities.

Genie allows personal computer users to access a variety of entertainment, information and software exchanges, communications and other services, the vendor said.

The sign-up fee for Genie is $18. For 2,400 bit/sec. access, there is a $10 per hour surcharge, bringing the total cost to $15 per hour for non-prime-time access and $45 per hour for prime-time access.

General Electric Information Services, 401 N. Washington St., Rockville, Md. 20850.

Software

Communication Devices, Inc. has enhanced its **Modem Use Monitor** network diagnostic and management system to print a graph that shows a one-hour status of up to 64 modems each minute.

The system detects "ring no answer," "locked-up modems" and hackers trying to get into a system. A 24-hour summary shows peak usage of 64 modems divided into a maximum of eight trunk hunt groups, displaying the in-use minutes of all modems. The system calculates the Erlangs for each of eight hunt groups on an hourly basis.

Modem Use Monitor comes with a real-time calendar clock and 64 LEDs that display each modem's status.

Modem Use Monitor costs $2,300.

Communication Devices, Botany Village, 1 Forstmann Court, Clifton, N.J. 07011.

■

Concept Development Systems has announced **Straight Line**, an asynchronous telecommunications software system that permits computer-to-computer communication, and **Remote Line**, which allows access from one personal computer running Straight Line to another.

Straight Line dials, answers and hangs up the phone on command. Command sequences can be prerecorded. It allows file transfer, terminal emulation and offers over 100 Help screens.

Straight Line runs on the IBM Personal Computer and compatibles and the NEC Informations Systems, Inc. APC III.

Straight Line is priced at $199. Remote Line is priced at $99.

Concept Development Systems, Suite 349, 2778 Hargrove Road, Smyrna, Ga. 30080.

■

Issco has announced **Tell-A-Graf Version 6** software.

Version 6 offers support for six protocol converters, spool file capability and increased graphical interactivity with the pinpoint software option. Tell-A-Graf Version 6 adds 300 chart stencils.

Tell-A-Graf operates on mainframes, minicomputers and certain 32-bit microcomputers from IBM; Digital Equipment Corp.; Prime Computer, Inc.; Hewlett-Packard Co.; Sun Microsystems, Inc.; and Apollo Computer, Inc. It is priced between $3,600 and $40,000, depending on the configuration.

Issco, 10505 Sorrento Valley Road, San Diego, Calif. 92121.

■

Sun Microsystems, Inc. has added **Sunlink X.25** to its Sunlink series of data communications products.

Sunlink X.25 extends Sun Microsystems' wide-area networking facilities to packet-switched public data networks. It offers two types of service: stand-alone or networked Sun workstations. Networked workstations can link to remote stand-alone or networked Sun systems and data can be transmitted between Sun and non-Sun systems implementing the CCITT X.25 protocol.

The software operates directly on a Sun CPU over a local RS-232C port.

Sunlink X.25 software costs $2,000.

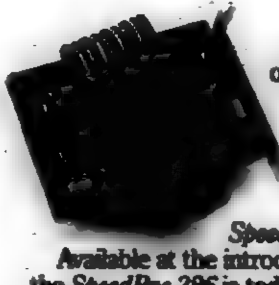
Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043.

Multiplexers/modems

K212, a single-chip AT&T 212A modem with 300 and 1,200 bit/sec. asynchronous and synchronous communications capability, is available from **Silicon Systems**.

Continued on page 117

Get the speed and brains of a $5000 AT for only $595.



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The Ultimate Productivity Enhancer

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Continued from page 114

The intelligent modem resides in a single 22- or 28-pin dual in-line package. Features include a call-progress monitor and dual-tone multifrequency dialer.

The bus structure controls modem functions and directly interfaces with many brands of 8-bit processors. An optional serial command bus is said to conserve board space and port lines.

K212 modems are priced at $28.45 in 10,000-piece quantities.

Silicon Systems, 14351 Myford Road, Tustin, Calif. 92680.

Auxiliary equipment

R. K. Burtchaell Co. has introduced **Ry-Tek's Exclude-A-Phone and Tap Detector.**

Exclude-A-Phone blocks out an extension phone from being able to interfere when that line is already in use. Tap Detector warns a user when someone has intruded upon the line in use with both a red light and an audible tone.

Exclude-A-Phone is priced at $23.95, and Tap Detector costs $59.95.

R. K. Burtchaell, Suite 201, 516 S.E. Morrison, Portland, Ore. 97214.

■

Cosmos, Inc. has introduced the **Network Revelation Bump Disk** for its Revelation Database Applications environment.

Each Bump disk allows an additional four users on a local-area network to be attached to any Revelation-based product. Each system can be bumped as many times as necessary to reach the desired configuration, although each bump disk can only be used once.

Bump disks cost $499 each.

Cosmos, Suite 102, 19530 Pacific Highway South, Seattle, Wash. 98188.

SYSTEMS & PERIPHERALS

Processors

L/F Technologies has announced that it has added the multitasking **Concurrent DOS** operating system from Digital Research, Inc. to its **1600** series of multiuser business computers.

The 1600 series can support up to 32 terminals, four shared serial printers and four auxiliary devices. Concurrent DOS provides the addition of random-access memory (RAM) disks on systems with 1M byte of RAM. Other features include password protection, network subdirectory support, file locking and record locking.

System pricing with an Intel Corp. 80186 processor, 1M byte of RAM, a 24M-byte Winchester disk, RAM disk, a floppy drive and Concurrent DOS starts at $6,495.

L/F Technologies, 2800 Lockheed Way, Carson City, Nev. 89701.

■

The Automation Group, Inc. has announced the **MDL-22**, an intelligent peripheral and data acquisition device for industrial process control, monitoring and data logging.

MDL-22 features include 22 eight-bit analog inputs, 16 digital I/O lines, serial port for RS-232 or 20-MA current loop communications, parallel printer port, battery-backed real-time clock, quick disconnect connectors, an optional piggyback switching power supply and 40-col. printer.

The MDL-22 is priced at $159.

The Automation Group, 848-0 Nandino Blvd., Lexington, Ky. 40511.

Data storage

S-MOS Systems, Inc. has announced **Model SRM 2367C** and **Model SRM 2368C**, two 16K-bit static random-access memories (RAM).

Model SRM 2367C is a 16K- by 1-bit RAM with a typical operating current of 80 mA and a typical standby current of 20 microamps. It requires no external clock or refreshing circuit and comes in 35-nsec and 45-nsec versions with 20-pin dual in-line plastic packages.

SRM 2367C 10,000-piece quantity prices are $8.12 for the 35-nsec version and $5.99 for the 45-nsec version. In like quantities, SRM 2368C prices for 45-, 55- and 70-nsec devices are $5.99, $4.31 and $3.52, respectively.

S-MOS Systems, Building 7, 50 W. Brokaw Road, San Jose, Calif. 95110.

■

Data Devices International, Inc. is offering the **Mark 300** portable magnetic tape cleaner, said to run at 350 in./sec.

Built around the Intel Corp. 8749 microcontroller, the Mark 300 also provides automatic marker placement detection for missing beginning-of-tape markers; automatic unload to remove leader from the machine when unattended; tactile feel switch; archival wind speed of 200 in./sec.; and self-diagnostic test of critical components and motor.

The unit sells for $1,995.

Data Devices International, 20236 Bahama St., Chatsworth, Calif. 91311.

■

Qualogy, Inc. has introduced a line of memory boards, called the **QM-630**, for Digital Equipment Corp's Microvax II and has added **three models** of 5¼-in. Winchester tape systems to its Cyclone series.

The QM-630 boards offer 2M or 4M bytes of dynamic random-access memory (RAM) on a single quadwide board. They use 256K-byte dynamic RAM and employ Microvax II's 32-

Continued on page 118

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Continued from page 117

bit-wide Q-bus.

The three new Cyclone models are the D938GL, containing one 160M-byte, 5¼-in. Winchester; the D968L, combining two 160M-byte drives; and the D998GL, with four 160M-byte drives.

The 4M-byte QM-630 is priced at $2,495. The Cyclone series models range from $8,396 for a single 36M-byte Winchester to $22,395 for the Cyclone D998GL.

Qualogy, 2241 Lundy Ave., San Jose, Calif. 95131.

■

EMC Corp. has announced a new release of its **EMCVT-780** memory subsystem used to upgrade Digital Equipment Corp.'s VAX-11/780 computers from older 256K-byte memory cards to 1M- and 4M-byte memory arrays.

The package includes as standard parts 4M-byte memory arrays, an enhanced power supply and memory system diagnostic software.

An 8M-byte EMCVT-780 costs $19,750.

EMC, 12 Mercer Road, Natick, Mass. 01760.

■

Hewlett-Packard Co. has introduced two external 40M-byte hard disk drives, the **HP 9133L** hard-disk, stand-alone model and the **HP 9134L** 3½-in. microfloppy/hard-disk combination.

Both drives are compatible with the HP 9000 Series 200 and 300 engineering workstations, HP 250 and 260 business computers and Touchscreen II micros.

Features of both include 40M-byte storage capacity, 40-msec access time, the ability to subdivide the disk in as many as eight volumes and an optional 3½-in., built-in microfloppy disk drive for the HP 9133L.

Pricing for the HP 9133L and HP 9134L is $4,450 and $4,050, respectively.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

Terminals

Teleray, Inc. has unveiled **Model 20-7306**, a Honeywell, Inc. VIP7306 emulator that provides a menu-selectable ANSI mode and displays in either 80- or 132-col. format.

The terminal offers RS-232 and RS-422 interfaces and generates and responds to the same commands as its Honeywell equivalent.

The 20-7306 differs from the VIP7305 in that it provides 5,760-char. display memory, 7,366-char. nonvolatile function memory, a buffered bidirectional printer port, an ability to reprogram its 32 keys and an ability to set up operating parameters from the keyboard. Available in rack-mount or executive (9-in. CRT terminal) configurations, the terminal contains a 14-in. green or amber nonglare monitor.

The Model 20-7305 costs $1,295.

Teleray, Box 24064, Minneapolis, Minn. 55424.

■

Carroll Touch, Inc. has added a **touch system** for the Sony Corp. PVM-1910Q monitor to its line of **Smart-Frame** computer products.

The 19-in. Smart-Frame unit attaches to the color Sony monitor. It was designed for use with interactive videodisk-based applications such as point-of-sale, public information and training.

The single-quantity price for the Sony PVM-1910Q touch system is $1,150.

Carroll Touch, P.O. Box 1309, Round Rock, Texas 78680.

Printers/plotters

Avatar Technologies, Inc. has announced the **Avatar PA3500** protocol converter designed to link ASCII printers into IBM System/34, 36 and 38 environments.

The PA3500 emulates several IBM printers including the 5224, 5225 and 5256. It connects via standard twinaxial cable and is software and hardware transparent. It supports both serial and Centronics Data Computer Corp.-compatible parallel printers, the vendor said.

The converter allows applications to take advantage of printer features such as dot-addressable graphics, alternate character sets and bar code generation.

The Avatar PA3500 is priced at $1,495.

Avatar Technologies, Hopkinton Development Center, 99 South St., Hopkinton, Mass. 01748.

Graphics systems

Lexidata Corp. has announced **Wiggleview**, computer graphics firmware for displaying large amounts of seismic trace data used in geophysical applications.

The product is available as a firmware option on 1,280- by 1,024-pixel Lexidata Lex 90 60Hz raster-graphics display processors. With Wiggleview, seismic sample data can be sent directly to the Lex 90 for display of wiggle traces, variable-area displays, variable-density displays and horizon flattening. Users can select type of plot, data, gain, color, trace and sample spacing and trace direction.

The Wiggleview firmware option on a Lex 90 system sells for $2,995.

Lexidata, 755 Middlesex Tnpk., Billerica, Mass. 01865.

VG Systems, Inc. has added five hardware capabilities to its **VG 9250** color raster display system.

They are a graphics processing enhancement, a gateway, an extended system memory, a high-speed transformation and clipping and 3270 mode and RS-232C attachment.

These capabilities make the VG 9250 compatible with computer-assisted design, manufacturing and engineering applications software and with software that runs on IBM 4300 or 3400-compatible computers supporting IBM 5080 or 3250 channel commands and order sets.

Continued on page 121

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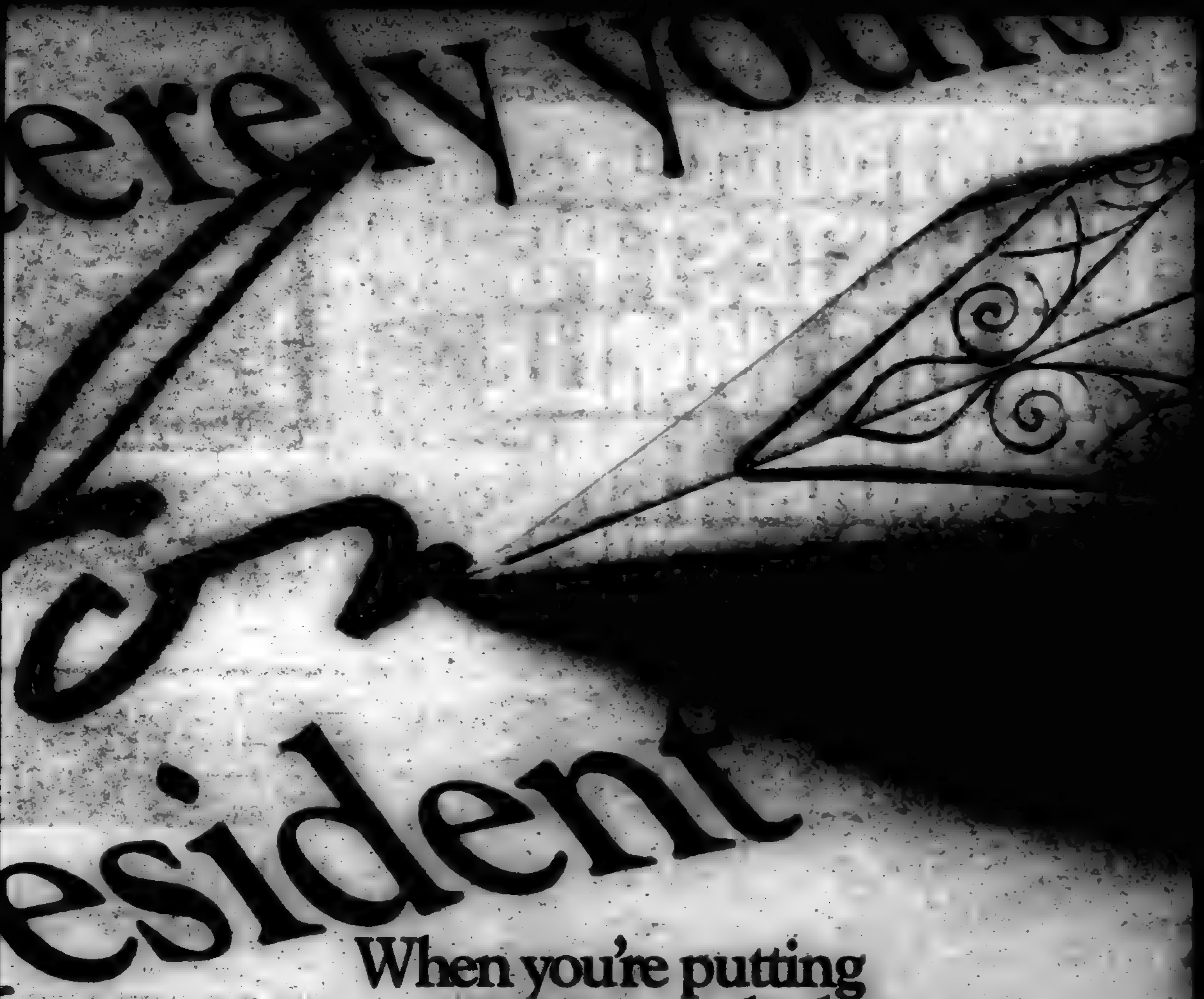

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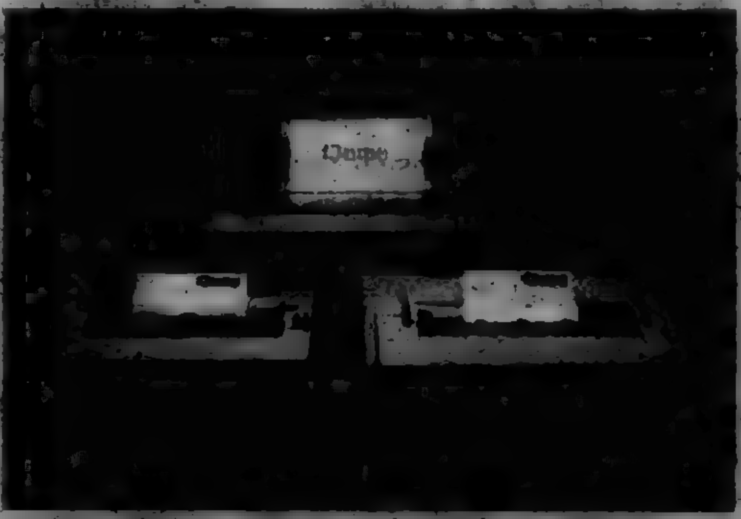

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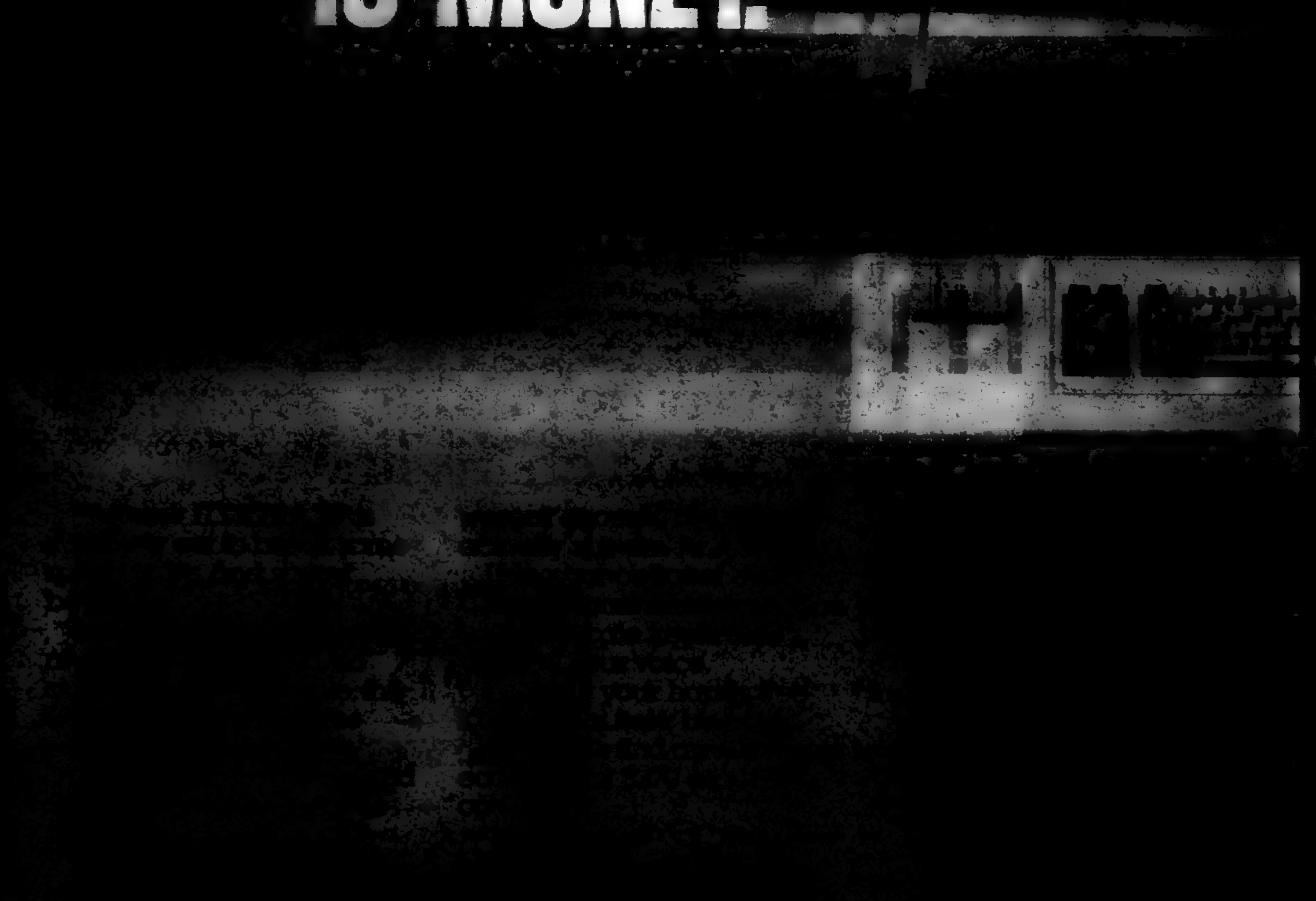

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 118

Prices for a VG 9250 system containing the enhancement modules start at $26,500 per workstation.

VG Systems, 21300 Oxnard St., Woodland Hills, Calif. 91367.

Power supplies

Brooks Power Systems has announced the **At Surge Stopper**, a surge suppressor that protects computers, terminals, printers, typewriters, disk drives and scientific testing equipment from damage caused by electrical surges, spikes and noise interference.

The At Surge Stopper absorbs voltage surges greater than or equal to 6,000V and responds to air incoming transient in less than 5 picoseconds.

In addition, the surge suppressor includes an indicator light, an illuminated master on/off switch, 6-ft cord and mounting brackets.

The product costs $95.

Brooks Power Systems, Suite 102, 3569 Bristol Pike, Bensalem, Pa. 19020.

■

General Power Systems Co. has developed a series of **37.5-kVA and 50-kVA on-line uninterruptible power systems** (UPS) that provide a small footprint and low decibel level.

The 37.5-kVA UPS measures 70-in. high by 27-in. wide by 30-in. deep, and the 50-kVA unit is 70-in. high by 33-in. wide by 31-in. deep.

The 37.5- and 50-kVA series are based on sine wave technology and provide a synchronized bypass switch to transfer the power load to and from the utility during an overload.

Configurations include three-phase, 50 or 60 cycles. The units reportedly provide a limit of 3% total harmonic distortion on the output waveform.

Prices start at $39,950 for the 37.5-kVA series and at $43,750 for the 50-kVA series.

General Power Systems, 1400 N. Baxter St., Anaheim, Calif. 92806.

■

RTE Deltec Corp. has added **3-kVA and 5-kVA units** to its 7000 series uninterruptible power systems product line.

Both the 3-kVA and the 5-kVA units offer compact sizing, LED status indicators and a digital readout.

Options that are available include a manual bypass switch and a selection of battery reserve packs offering various backup times.

Prices for the new 7000 series products start at approximately $5,000.

RTE Deltec, 2727 Kurtz St., San Diego, Calif. 92110.

Board-level devices

Interactive Circuits and Systems, Ltd. has unwrapped the **ICS-100**, a VMEbus multichannel filter board with four simultaneously sampled, optically isolated analog inputs and four analog outputs.

Input, output and filter sections can be separately accessed and controlled from the VMEbus to apply the board to real-time applications, such as multichannel programmable filtering, cross-correlation/autocorrelation, complex adaptive equalization and harmonic analysis.

ICS-100 VMEbus interface capability includes standard and short addressing modes with or without address modifier codes. Users can select any of seven levels of interrupt on the VMEbus.

Single-quantity prices range from $1,495 to $3,295.

Interactive Circuits and Systems, 3101 Hawthorne Road, Ottawa, Ont., Canada K1G 3V8.

■

A 64K-byte CMOS static random-access memory (RAM) series, the **SR64K4-45M**, that offers 45-nsec access times over the full military temperature range, 55 degrees below zero Celsius to 125 degrees C, is available from **Lattice Semiconductor Corp.**

The SR64K4-45M series uses temperature-compensated substrate bias, depletion devices and decoupling circuits to provide a speed derating of less than 1 nsec per 10 degrees C.

Organized as 16K by 4 bits, SR64K4-45M CMOS static RAM memory chips cost $330 in quantities of 1,000 or more. A 55-nsec version sells for $235 in similar quantities.

Lattice Semiconductor, 15400 N.W. Greenbrier Pkwy., Beaverton, Ore. 97006.

Cyberchron Corp. has announced **CVM-630**, a high-density 1M-, 2M- and 4M-byte memory card for Digital Equipment Corp.'s Microvax II.

CVM-630 communicates with the CPU through a high-speed private memory bus. It has on-board parity generation and checking.

The CVM-630 operates with or in place of DEC's Model MS630 memory module.

The list price is $2,495 for the 4M-byte model, and the 2M-byte version sells for $1,795.

Cyberchron, P.O. Box 164, U.S. Rt. 9, Garrison, N.Y. 10524.

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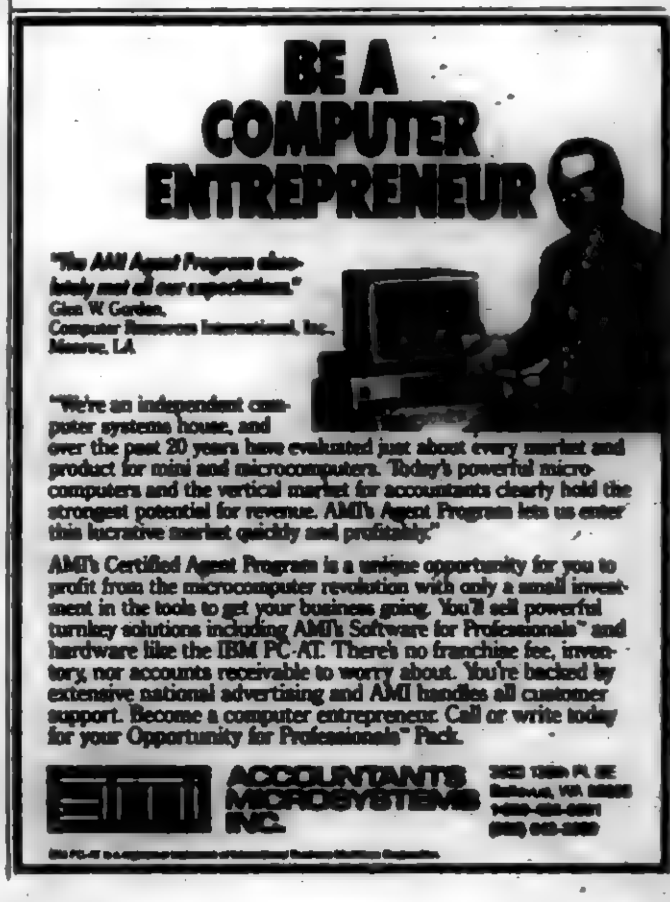

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Analogic Corp. has announced the **IB 1400, IB 1100** and **IB 1101**, a series of intelligent Intel Corp. Multibus I and Motorola, Inc. VME bus-compatible, analog, digital, I/O subsystems for industrial applications.

The first products in the series are three microprocessor-based I/O subsystems for Multibus I-based industrial measurement and control computers. The IB 1400 is a combination analog and digital I/O subsystem. The IB 1100 is an intelligent, 16-channel, isolated analog input subsystem, and the IB 1101 is a 16-channel, industrial analog input subsystem.

Prices range from $600 to $1,500.

Analogic, 8 Centennial Drive, Centennial Industrial Park, Peabody, Mass. 01961.

■

ISI International Corp. has added the **MCB-4LX** dynamic memory module for Intel Corp.'s Multibus to its line of Multibus-compatible boards.

The MCB-4LX is fully Multibus and ILBX bus compatible. It provides either 20- or 24-bit addressing and is compatible with all Intel single-board computers or equivalents that use Intel 8088, 8086, 80188, 80186 and 80286 CPUs.

The product is available in 256K-, 512K-, 1M-, 2M- and 4M-byte versions.

There are 4M-byte versions available that sell for approximately $2,500.

ISI International, 1275 Hammerwood Ave., Sunnyvale, Calif. 94089.

Auxiliary equipment

Data General Corp. has announced **Spare Mail**, a mail-in exchange and repair service for spare parts from its computer systems.

The service offers four levels of spare parts exchange. Spare Mail Express provides emergency next-day delivery of spare parts for exchanges; Spare Mail Priority exchanges or repairs parts five days after receipt by DG; and Spare Mail Saver provides economy, three-week exchange or repair.

These three levels are said to include automatic installation of the latest engineering change orders. A fourth level, Spare Mail Repair, reportedly does not install engineering change orders but provides two-week turnaround to repair and return a customer's parts at the original revision level.

According to the vendor, all repairable DG hardware and peripheral equipment parts, including printed-circuit boards, read/write heads, keyboards, data modules and spindles, are available through this service.

Parts are exchanged and repaired for a fixed price that varies according to the specific part and service option.

DG, 50 Maple St., Milford, Mass. 01757.

■

Inmac Corp. is offering the **3480 Storage System**, a modular cartridge storage system for IBM 3480 system cartridges.

The system comprises cabinets, shelf units and end panels. Cabinets hold either 240 or 480 cartridges. The 240-cartridge cabinet can be fitted with 12 shelves and the 480-cartridge cabinet with 24 shelves.

Prices for the 3480 Storage System are $219 for the 240-cartridge cabinet, $319 for the 480-cartridge cabinet, $10 for shelf units, $129 for the end-panel set for single-depth configurations and $189 for the end-panel set for double-depth configurations.

Inmac, 2465 Augustine Drive, Santa Clara, Calif. 95054.

■

Tektronix, Inc. has announced the **Tektouch** interactive panel, a touch-sensitive overlay panel for CRTs and other displays, including electroluminescent and plasma displays.

The Tektouch panel may be installed over existing monitor screens or display devices to allow an operator to input data by direct touch. The panel can be manufactured in sizes up to 25-in. diagonal and a height-to-width ratio up to 1:4.

Prototypes are available in sizes up to 13 in. for a cost of $800 each.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

Honeywell, Inc. has introduced the **HVS 300 series** of active optical proximity sensors for industrial measurement and control applications.

The HVS 300 series sensors are said to provide 100% parts inspection at a rate of 1,200 parts per minute.

Applications include verifying the position of moving tools, detecting parts on conveyers and detecting when material is outside of acceptable limits for welding, stamping or drilling.

Prices for the HVS 300 series sensors start at $550 for single-unit purchases.

Honeywell, Honeywell Plaza, Minneapolis, Minn. 55408.

■

C. H. Systems, Inc. has introduced **Supersleuth**, a port protection device designed to work with the Hayes Microcomputer Products, Inc. Smartmodem and compatibles.

Supersleuth requires users to enter a name and password. It then disconnects the line, verifies user authorization and, if authorization is confirmed, initiates a callback sequence to the user's telephone. It is menu driven and can be programmed only at the host site. Access to the menu requires a special password.

Supersleuth is compatible with all computers using RS-232C interfaces. It costs $590, which includes the unit, power supply, manual and telephone cable.

C. H. Systems, Suite 106, 8533 W. Sunset Blvd., Los Angeles, Calif. 90069.

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Simple to install and simple to use, the POUNCE DATABASE MANAGEMENT SYSTEM combines HIGH SPEED network file access with LOW SYSTEM OVERHEAD and an exceptional degree of DATA INTEGRITY.

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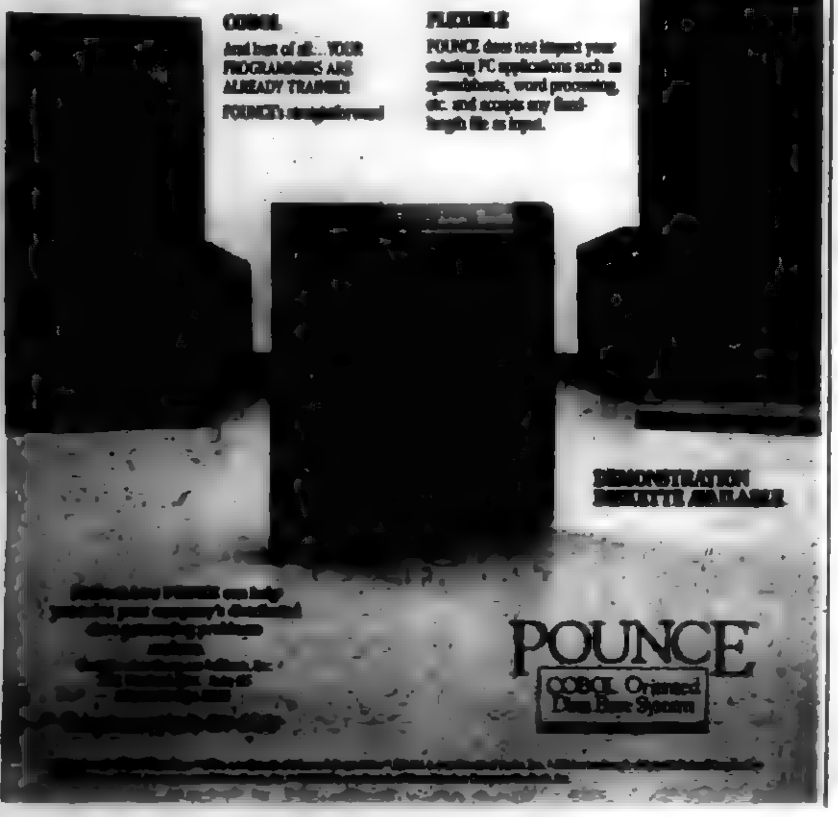

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DataNews is a weekly newspaper for over 12,000 computer professionals and computer industry executives. *Micro Mundo* is a monthly magazine for over 30,000 personal computer users. And *PC Mundo*, a magazine for IBM PC and compatible product end-users, is distributed every other month to *DataNews* and *Micro Mundo* subscribers.

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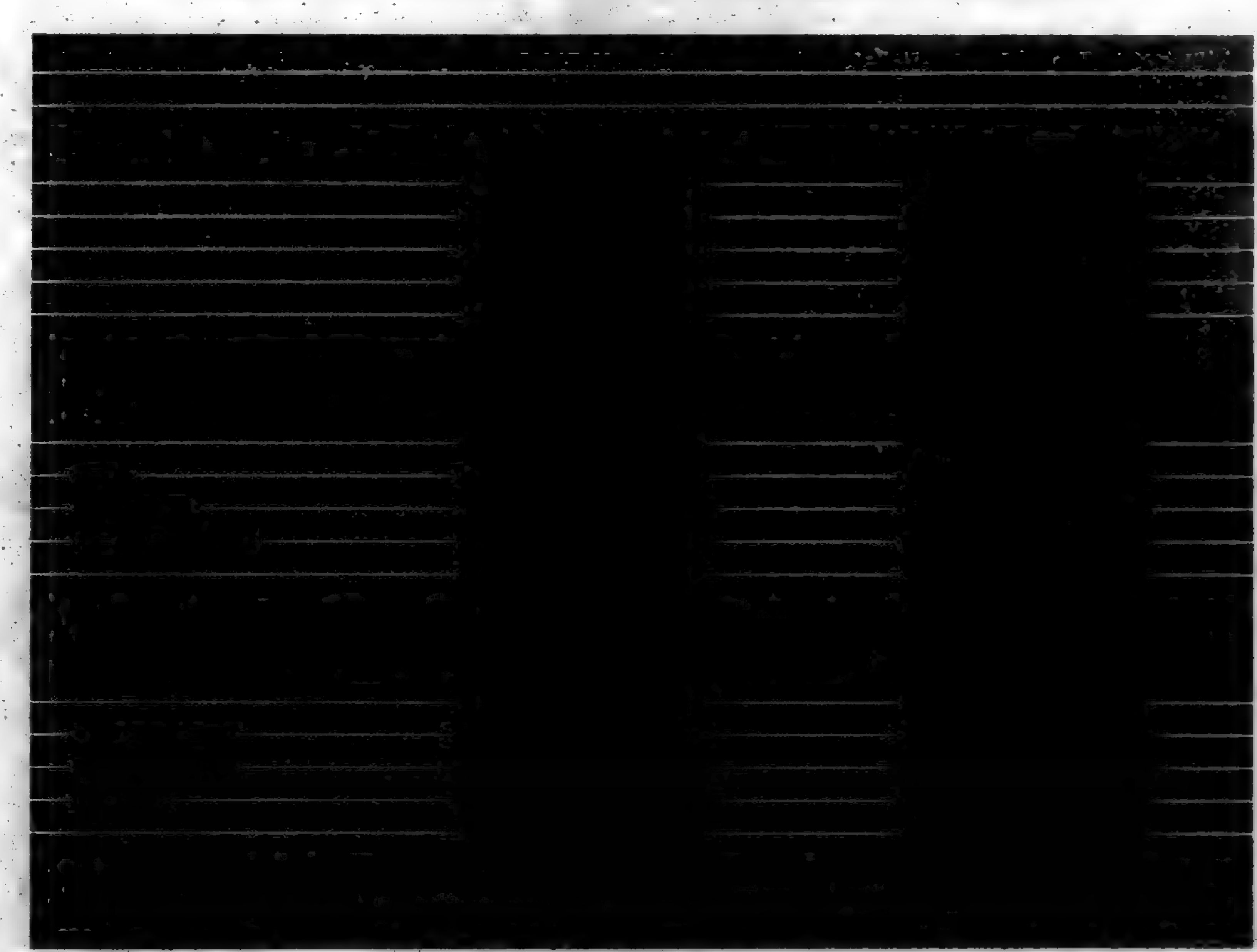

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Candle

Candle Corporation
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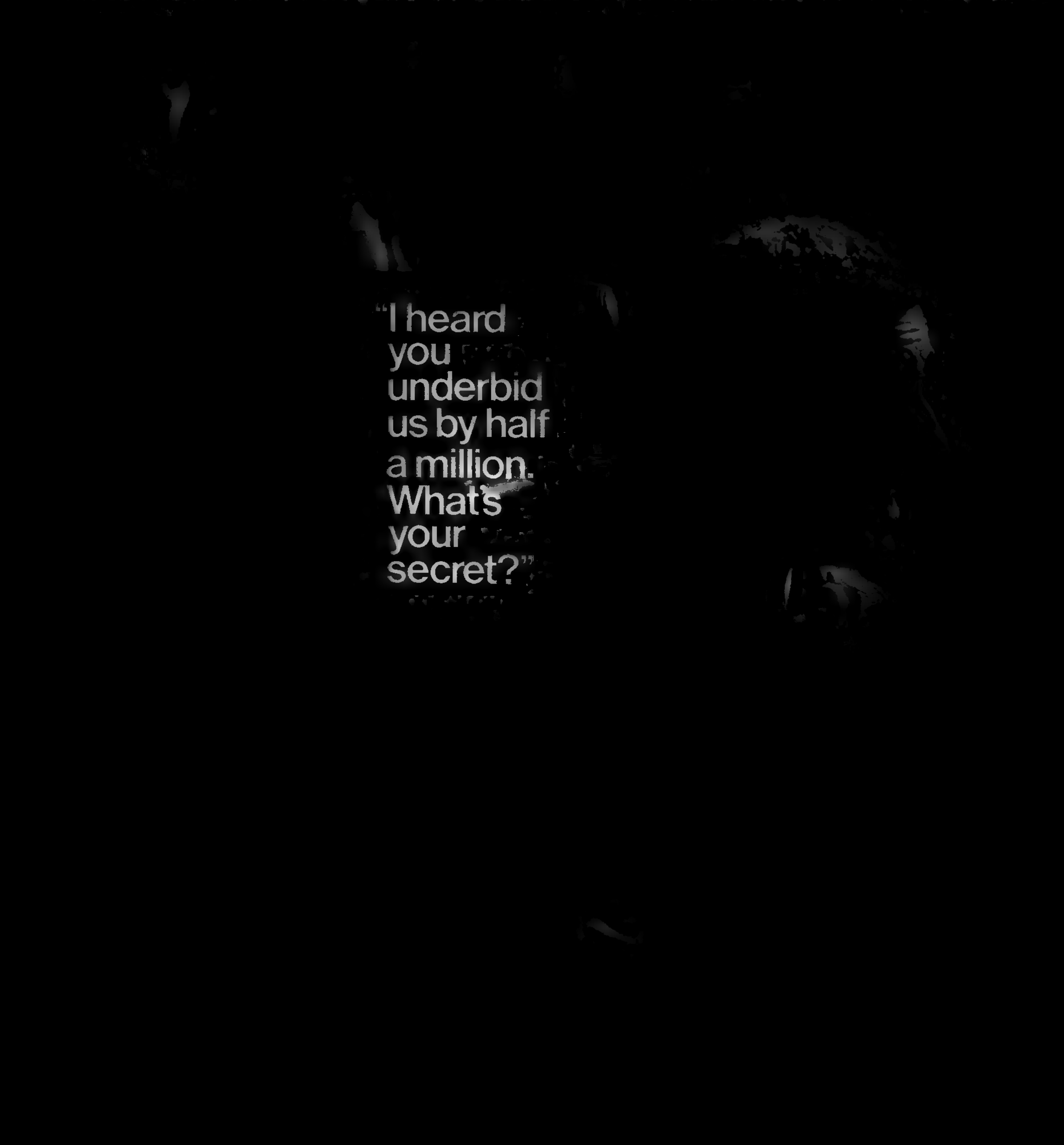
Which includes Xerox 8010 Star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XEROX

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It's lonely for the [illegible] charged with [illegible] sion of PC [illegible]

Tallgrass mass storage [illegible] three-point data survival [illegible]

First: Backup PC data [illegible] you backup your mainframe [illegible]

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COMPUTER INDUSTRY

ACTIVE ISSUES

Chip stocks up in market rally

This article inaugurates a weekly Computerworld *feature exploring financial market activity regarding publicly traded companies that provide computer-related products. Kathy Porteus, author of the weekly series, is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.*

Finally, some good news on the semiconductor front.

Since early November, the price per share for each of the major U.S. chip makers — Advanced Micro Devices, Inc., Intel Corp., Motorola, Inc., National Semiconductor Corp. and Texas Instruments, Inc. — has jumped by at least 10%. Moving in tandem with the overall market, semiconductor stock prices have benefited from the latest market rally.

Yet most analysts agree that this rise in stock price also reflects a growing optimism among investors that the battered semiconductor industry is showing certain signs of recovery.

Tom Kurlak, who follows the electronics industry as a vice-president with Merrill Lynch, Pierce, Fenner and Smith, Inc., says he believes that there is "a growing feeling that the [chip] industry is now moving back into better times because order rates have begun to improve and actually have been improving since late August."

Jim Barlage, first vice-president of research for Smith Barney, Harris Upham & Co., says he believes that stock prices now anticipate "an acceleration of orders over the next two or three months."

Monthly order rates, a key indicator for the semiconductor industry, have

See CHIP page 136

Zenith's micro success story

Marketing acumen pays off in projected sales growth

By Clinton Wilder

John Frank, vice-president of marketing for Zenith Data Systems Corp., said he believes his company reached a turning point at the Comdex/Spring show back in 1984. "That was the first time we didn't hear anyone walk by our booth and say, 'Gee, I didn't know Zenith made computers,' " Frank said.

Dilworth, president of Zenith Data Systems

Although Frank admitted that he still hears that statement occasionally, the word is slowly getting out on one of the microcomputer industry's most underpublicized success stories. Among the clones and confusion of the IBM-compatible marketplace, Zenith's computer sales will grow by 34% this year to $370 million, according to market research firm Future Computing, Inc.

Glenview, Ill.-based Zenith Data Systems, the 4-year-old subsidiary of television giant Zenith Electronics Corp., trails only Compaq Computer Corp. in the IBM-compatible market share sweepstakes. Zenith Data Systems President Robert Dilworth attributes his firm's success to a fundamental understanding of what the compatible manufacturer actually sells.

"Many people in this business have a fear of calling it an electronic commodity business," Dilworth said in a recent *Computerworld* interview. "Since our mainline business, TV sets, is electronic commodities, we're much more comfortable in that environment. Basically, we move boxes."

"We're not trying to create applications; we're selling hardware in an IBM environment," Frank added. "We believe ours is better, faster and less expensive. That's about it — that and letting the user know that he'll get an adequate level of support."

Although Zenith has achieved much of its success to this point through big-ticket contracts to military installations and colleges, it would still like to do more business with Fortune 500 accounts. At Comdex/Fall '85 last month, Zenith kicked off a national account program that provides more

See ZENITH page 134

COMPUTER INDUSTRY NOTES

Sales may rise for the occasion

Good news for personal computer vendors is that this Christmas' buying binge will be as good as, if not better than, last year's holiday sales period, according to Dataquest, Inc. The research firm said holiday sales may be up from 29% to 48% over those of a year ago in dollar terms, but unit sales could decline slightly or increase by as much as 12%.

■

Digital Applications was launched in 1973 and recorded sales of more than $8 million during fiscal year 1985. Third-quarter declines and a gloomy outlook for the remainder of the year forced the board of directors to close the Phoenix facilities, the spokesman said. The company is now seeking a buyer of its assets.

■

Modular Computer Systems, Inc. (Modcomp) of Fort Lauderdale, Fla., announced the layoff of 12% of its work force, or 120 employees, in a cost-cutting move. Effective early this month, the layoff affects 100 U.S. and 20 overseas pro-

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INSIDE

The issues of leasing equipment with upgrade options/**128**

Apple is using a wide-area network to support its dealers and manage costs/**129**

Ericsson will go it alone in the U.S. market/**131**

INSTANT ANALYSIS

"This development should also be viewed against the background of what is arguably the worst cyclical downturn in the history of the computer business."

— L. F. Rothschild Unterberg Towbin investment analysis of the Applied Data Research acquisition by Ameritech

Tandy plays hardball in IBM's Personal Computer park

Lineup includes price, performance, support

By James A. Martin

Tandy Corp. of Fort Worth, Texas, is making it clear it intends to play ball in the park staked out by the IBM Personal Computer family standard.

Along with the company's introduction at Comdex/Fall '85 of the Tandy 3000, said to rival the IBM Personal Computer AT, a Tandy spokesman told *Computerworld* that an IBM-compatible laptop and an Intel Corp. 80386 microprocessor chip-based computer could be forthcoming within 18 months.

Two years ago, Tandy decided its microcomputer operating system, TRS-DOS, was still viable, but MS-DOS-based processors would better lead the computer and electronics vendor/retailer into the future. Today, with its family of personal computers now complete, Tandy is aggressively courting the home and small business markets with an eye toward moving to the top of the IBM-compatible heap.

It is a heap already overcrowded with "me too" vendors and products, and recent Tandy introductions — most notably its 600 laptop and its AT rival — belong to market segments cluttered with competitive models.

But Tandy is betting that the price and performance of its products, along with a strong national sales and support service, will give the company that necessary competitive edge.

For example, the Tandy 3000 is based on the Intel 80286 chip and is said to be 33% faster and 40% cheaper than its rival while allowing access to the same library of software. It is available in hard and floppy disk drive configurations; a Xenix 5-based 3000 supporting up to six simultaneous users is expected during the second quarter of 1986.

Tandy's Graham C. Beachum Jr., vice-president of computer merchandising, suggested in a recent interview that another 80286-based personal computer is being considered. "We're not sure that [the 3000] is the end of the [286] story," Beachum said. He did not elaborate.

In addition, the company is looking at the 80386 chip, said to be the basis of the next microcomputer generation, and at telecommunications technology. "These are all things we will be looking at during the next 12 to 18 months," Beachum said.

Another possibility for Tandy is an IBM-compatible laptop. At present, the company offers three laptops, the most recent of which — the Tandy 600 — was introduced Oct. 28 and offers enhanced word processing, spreadsheet and telecommunications applications.

But some critics have said the 600 will not be a strong contender in the market because it is expensive ($1,599) and not IBM compatible. In addition, AT&T's recent announcement of its agreement with Ing. C. Olivetti & Co. to produce an IBM-compatible laptop, as well as IBM's own rumored machine, has caused speculation that there is already too much product in a market for which there has been too little demand.

The 600 is most often purchased as a secondary computer, Beachum said, by sales and marketing representatives, journalists, educational researchers and other professionals who require a portable computer.

See TANDY page 134

Look before leasing: Upgrading old systems can be tricky

OUTSIDE LINES
A. D. Saunders

You are fully aware of the drill. You currently lease or are about to lease a major system, and the bottom line requires that you have a system that meets not only today's needs but also tomorrow's needs. The popular solution is a lease with an upgrade option, that is, a lease that allows you to obtain better equipment as needed.

Before you sign that lease, it might be wise to consider four issues that are always sticking points in the decision.

First, it is necessary to understand what upgrading really means. It is important to distinguish between not wanting the current system and not needing it. The distinction is important because equipment lessors are not in the habit of allowing their customers to upgrade whenever it becomes convenient to do so, unless, of course, they pay a premium. No, it will be necessary to upgrade based upon demonstrable technical needs or overall business purposes.

These technical and business operations considerations usually boil down to three words in the lease. To upgrade requires that you evaluate the terms obsolete, surplus and compatible.

One court, having examined seven technical computer references, including the IBM Vocabulary for Data Processing, Telecommunications & Office Systems, concluded that there are no special definitions of obsolete or surplus. This means that in the absence of some special meaning given to these terms by you and the owner/lessor, the courts will use the common dictionary meaning.

Webster's and the American Heritage dictionaries define obsolete as no longer usable due to outmoded design or construction — a technical requirement. Surplus means excess to need, and therefore pertains to overall business purpose and operations. So on the question of want vs. need, the court advised that if you have an I/O that works with both an IBM 360/30 and an IBM 360/40, that I/O is neither obsolete nor surplus, but compatible with both.

Entire vs. partial system upgrade

This brings us to the question of upgrading the entire system vs. upgrading parts of the system. Some companies argue that when the CPU becomes obsolete, the entire system becomes obsolete. Other companies contend that the entire system is to be upgraded only if the major components, that is, the CPU and the I/O, are obsolete. The system therefore remains, and the parts or items that are obsolete or surplus are upgraded.

Given the fact that reasonable people may differ regarding upgrading items or entire systems, it is absolutely necessary for the lease or other contract to be clear on the issue. It has been held that the phrase "item of equipment," combined with references to the individual items in a schedule or appendix, expresses an intention to allow upgrading to those specific, individual items rather than the system as a whole. The items of equipment that form the system should therefore be specifically identified, together with model numbers, serial numbers and the manufacturer's original invoice cost.

Courts also tend to favor leases that, by negotiation, allocate risk of loss by obsolescence or change in the character of business. This is an especially important factor when the cost of the CPU alone may represent nearly one-third the cost of the total system.

If upgrading involves terminating the lease with respect to the item involved and renting or buying another item from the same or another party, then another consideration is who will make the decision to upgrade. The lessee, having knowledge of its own needs, should make the determination. But make sure the contract is clear on the point.

Phrases such as "by lessee in lessee's sole judgment" usually pass muster, but this is not to say that the decision is left entirely to the lessee's unfettered discretion. The sole-judgment privilege must be exercised by the lessee in a reasonable and honest fashion. Upgrading due to growth in the volume of business is legitimate. But upgrading because of savings when the I/O depreciated faster than the CPU does not constitute reasonableness, unless the contract or lease specifically allows for such a cause.

Finally, there is the consideration of the termination procedure itself and especially the termination charges. If the lessor requires payment of a charge upon the rightful exercise of the option to terminate, it may be wise to have the contract require that both parties use their best efforts to obtain written offers for the purchase of lease of each

See LOOK page 132

Saunders is a Boston-based attorney whose practice focuses upon corporate finance and international law.

For four days
in March,
your top
competitors
will have
unlimited access
to your
hottest
prospects.

Apple's Macintosh, Geisco network offer business link

Aids communications with remote sites

By Peggy Watt

CUPERTINO, Calif. — Combining aspects of the desktop microcomputer and the wide-area network to link far-flung field offices with headquarters and with each other has produced a communications system that Apple Computer, Inc. is using as a competitive weapon.

That fledgling system first appeared this fall as Applelink, an electronic communications system that now links about half of Apple's more than 5,000 dealers with its corporate offices. The system was jointly developed by Apple and General Electric Information Services Co. (Geisco) of Rockville, Md., a division of General Electric Co. The generic design, dubbed Businesstalk (or Dealertalk, depending on the potential customer) is being marketed by Geisco as a service for businesses and features use of Apple's Macintosh micro.

Potential customers include automobile parts and appliance manufacturers or any suppliers of products sold through dealers, according to Geisco representatives.

"Communicating with remote sites is the key," said Steven P. Korn, Geisco's Dealertalk marketing manager.

Automatic dial and connection to the network is traced on screen through a half dozen icons, which are also used to pinpoint problems. Apple's network interface relies heavily on the mouse, the Mac's trademark pull-down menus and icons.

Geisco's network is "very much in the background," and users interface indirectly with the Macintosh. Direct access calls are available in 750 cities, and the network spans 31 countries and 23 time zones, said Matthew Leek, Geisco's Silicon Valley regional manager. The net can accommodate approximately 5,000 simultaneous users and handles approximately 300,000 user sessions daily.

Applelink's mission is to provide Apple dealers with up-to-date information and easy communication with corporate sales and support staff, according to Ellen Nold, Applelink project manager.

Dealer support expenses were doubling yearly and rose along with sales. Telephone tag was an entrenched problem. Applelink was born as an attempt to put a lid on "astronomical" phone costs, hundreds of thousands of dollars spent on express mail, a $500,000 annual budget just to print price lists and ever-increasing dealer support costs — which seemed only to accompany and dampen increased sales, Nold said.

Geisco has added optional access to Gannett Co.'s USA Today Update electronic information service, an on-line conferencing facility, an order service module and electronic software distribution capability, for future customers.

Applelink's system features three bulletin boards, though not all are available to all users. The most heavily used is the technical information bulletin board service for dealers to glean product tips and hear the latest news.

The data bases include price lists and even on-line order forms, which can be printed out and mailed or handled entirely electronically.

Electronic mail is also relied on heavily and is gradually replacing a time-sharing network Apple previously used internally. Icons of in and out boxes indicate delivery, and senders can send "carbon" copies or request return receipts.

Also appearing on Applelink are contributions of dealer interest from Microsoft Corp., Lotus Development Corp. and other developers with Apple and, particularly, Macintosh products.

"We put up a lot of 'how to' messages," said Delores Bergstrom, leader for product support and applications at Microsoft. Early messages explained Multiplan functions and offered tips and tricks for using Microsoft Word for mailing labels.

Bulletin boards and other on-line systems are becoming increasingly common for support, Bergstrom added. "This is an efficient way of getting a lot of general information to a large number of users," she said.

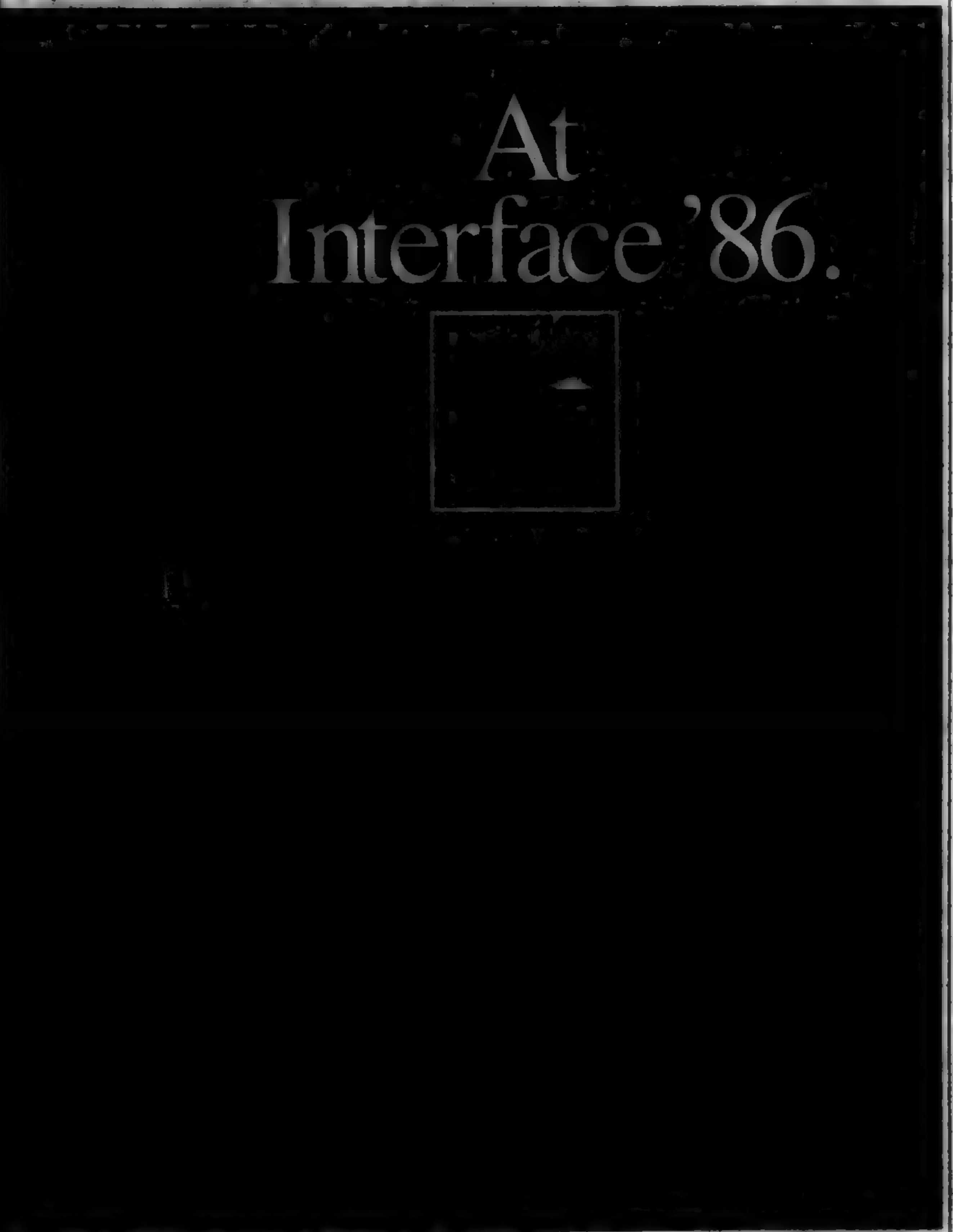
Applelink subscribers call the system some 4,000 times daily, Nold said. Besides dealers, employees in or dealing with field offices also have accounts. Developers, vendors and engineering groups are scheduled to go on-line with Applelink in the months to come, she said.

Apple subsidizes use

Apple subsidizes its dealers' network use, giving them a free hour of connect time each month and charging a flat $15 per hour beyond that. Different fees may apply to other subscribers.

Geisco's Businesstalk fees are a little heftier than Appletalk's charges. Geisco charges a flat fee of $35 per hour in prime time and $18 per hour in off time. Initial hookup fees vary.

The systems rely on the Macintosh interface, and Businesstalk customers must negotiate purchase of the computers from Apple, though Geisco's Korn said another interface might be developed if a subscribing firm had a sizable base of another kind of micro and preferred to use it.



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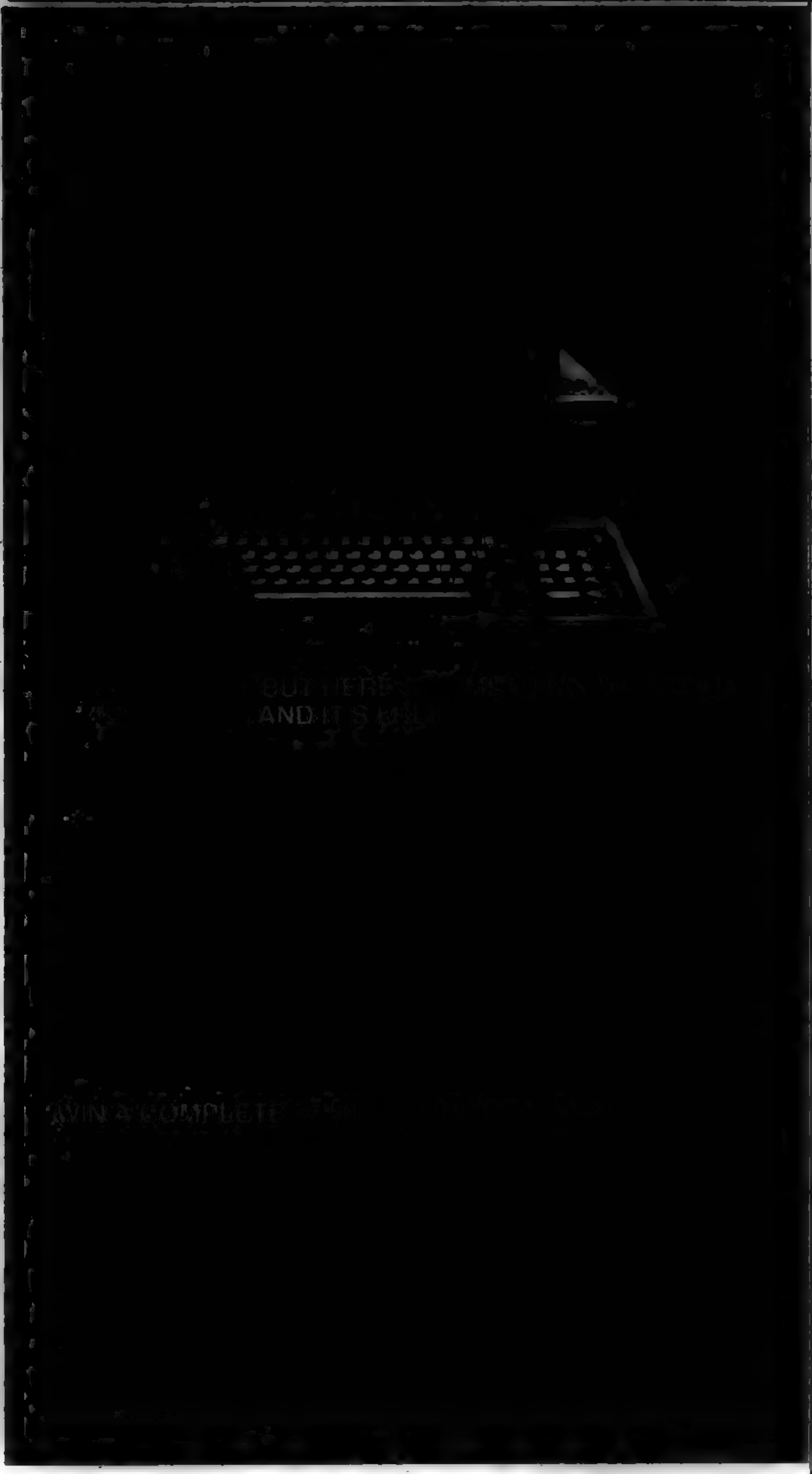

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BASF

Arco sells share in firm

Ericsson buys out U.S. subsidiary

RICHARDSON, Texas — L. M. Ericsson recently announced the buyout of the joint owner of its U.S. subsidiary, Ericsson, Inc.

L. M. Ericsson will pay $42 million to joint owner Atlantic Richfield Co. (Arco), which will essentially cover the accounting write-off taken by Arco earlier this year. The deal is expected to be finalized by Dec. 31.

Arco's divestiture is part of the company's restructuring program that it announced last April. An L. M. Ericsson spokesman said sole ownership will facilitate product introductions and business expansion by the Swedish parent company in the U.S.

Group picks standard

MENLO PARK, Calif. — A standard interface for index file access developed for the AT&T Unix operating system has been selected by European manufacturers for creating, managing and manipulating indexed files.

The standard, picked by the major manufacturers represented in a group called X/Open group, is called C-ISAM. It was originally developed by Relational Database Systems, Inc. of Menlo Park, Calif. The X/Open group includes Groupe Bull, ICL Ltd., Nixdorf AG, Ing. C. Olivetti & Co., Philips N.V. and Siemens AG.

Relational Database Systems said the X/Open group was formed to increase the volume of software applications that are portable at the source code level betweeen different products.

X/Open said in a statement, "Together we have chosen a common standard which will unify a wide variety of systems marketed by the principal European computer manufacturers. The availability of this interface on X/Open systems will not only provide application portability but will ease and encourage integration."

— **Bryan Wilkins**

AEI lands federal contract

WASHINGTON, D.C. — The National Archives Trust Fund Board has selected Automation Engineering, Inc. (AEI) of Orange, Calif., as its prime contractor for an automated service order and financial data processing system. The base contract of $384,600 contains options that could expand the contract to $550,000.

Automation Engineering is a subsidiary of Memcom International Holdings Plc., a systems integration company that specializes in turnkey electronic filing and information systems.

Under the contract, Automation Engineering will provide hardware procurement, software development, systems integration, testing, installation, maintenance and training services, a company statement said.

The National Archives Trust Fund Board administers historical gifts to the National Archives and disseminates historical and audiovisual materials.

— **Mitch Betts**

EXECUTIVE REPORT

Sumware, Inc. has announced the appointment of **Rowland W. Day** as president and chief executive officer. Prior to joining Sumware, Day served in various executive positions with TRW, Inc.

■

Wayne Shelton has been named president and chief operating officer of Planning Research Corp. (PRC). Shelton is former president of PRC Government Information Systems (GIS), one of PRC's four operating groups. **Stuart C. Johnson** has been named to replace Shelton as president of GIS. Johnson will also be a vice-president of the corporation.

■

William D. Engel, former senior vice-president of marketing for Xerox Computer Services, has been named president and chief executive officer of Language Technology, Inc. He replaces **George McQuilkin**, who remains a director and financial consultant with the company.

■

Cygnet Systems, Inc. has

See EXECUTIVE page 132

EXECUTIVE from page 131

announced the appointment of **Phillip R. Trapp** to president and chief executive officer. He has also been elected to the board of directors.

■

Silicon Solutions Corp. has announced the appointment of **Thomas Popek** as president and chief operating officer, a newly created position at the privately held company. Popek was most recently senior vice-president and general manager of Zilog Corp.'s components division.

■

Edward T. Cuddy has been named vice-president of manufacturing at Delphax Systems, Inc. Cuddy previously was the vice-president of manufacturing operations at Infinet Corp. and prior to that was vice-president of operations at Prime Computer, Inc.

■

Martin Marietta Corp. has announced the appointment of **William P. Osborne** as vice-president, communications systems, for its information and communications systems company.

■

Martin Wei has joined Spartacus, Inc. as the vice-president of engineering. Most recently Wei was director of engineering for the communications networks division at Racal-Milgo, Inc. and has held positions at Bell Laboratories and IBM.

■

Storage Technology Corp. has announced the appointment of **Harris Ravine** as executive vice-president, chief administrative officer, secretary and general counsel.

■

NBI, Inc. has announced the following appointments: **John L. Melanson** as vice-president of advanced development and **Lynn B. King** as vice-president of engineering.

■

Avant-Garde Computing, Inc. has announced the following appointments: **Michael L. Sawyer** has been elected president, chief operation officer and director of the company; **Timothy P. Ahlstrom** was elected chairman and chief executive officer; and **P. Morgan Lamarche** was elected vice-chairman.

■

W. Douglas Hajjar has been appointed chairman of the board, president and chief executive officer of Telesis Systems Corp., replacing **John J. Schickling**, who has resigned. Hajjar, most recently was chief operation officer, executive vice-president and chief financial officer at Genrad, Inc.

■

Bill L. Collinsworth has been named senior vice-president operations at Intecom, Inc. Collinsworth joins Intecom from Storage Technology Corp., where he held a number of managerial and executive positions. Prior to that he was with Texas Instruments, Inc. for a number of years.

■

Apple Computer, Inc. has announced the promotion of **Deborah A. Coleman** from director of manufacturing to vice-president of manufacturing.

■

Cipher Data Products, Inc. announced that **Gary E. Liebl**, formerly group operating officer for the Information Systems Group of McDonnell Douglas Corp., has joined the company as president and chief operating officer and is to become a member of Cipher's board of directors.

■

Tallgrass Technologies Corp. has announced the promotion of **Emmett W. Johnson** to the position of president and chief operating officer. The company has also announced that the current president, **David M. Allen**, will now assume the position of chief executive officer and will continue as chairman of the board.

■

Charles M. Clough has been elected president and chief operating officer of Wyle Laboratories. As president, he succeeds **Stanley A. Wainer**, who will continue as Wyle's chairman of the board and chief executive officer.

■

Lancore Technologies, Inc. has announced the appointment of **Peter N. Vicars** as president and chief executive officer of the firm. **Dennis Resnik**, a founder of Lancore, will assume the responsibilities of executive vice-president of marketing and sales and the title of chairman of the board.

■

Charles Recchio, former president of CPI Systems, has been named president and chief executive officer of Modern Technologies International, Inc.

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Look before you lease systems

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Upgrading requires the user to know exactly what equipment is needed, what upgrading really means in legal-terms and what lawful procedures are available for proper exercise of that option.

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Tandy plays ball in IBM's park

From page 127

IBM compatibility, he added, is not necessarily the issue in the laptop market as files created on the 600 can be uploaded via an acoustic coupler to many host systems for further processing.

Beachum said upcoming laptops from AT&T and IBM will "lend some credibility to the market." It is a cluttered market already, he agreed, but the vendor with the right product at the best price should be able to find its niche, and there is room for both compatible and incompatible models.

"If there is to be a laptop compatible, then we probably have the advantage because of our installed base of laptops and our reputation for the product," Beachum said. "It's something we have to think about."

The laptop is only one corner of the business, however. With its variety of personal computers, including the IBM Personal Computer-compatible Tandy 1000, the Personal Computer XT-compatible Tandy 1200 along with its Vianet local-area network due — after some delay — by year-end, Tandy is hoping to act as an MIS department to small business, according to Beachum.

"The small business manager probably does not make a lot of computer decisions and doesn't have an MIS department to do it for him," Beachum explained. "We want them to be able to come into a Radio Shack store and let us know what their application needs are. We can then arrange our products to fit the solution.

"There are too many other vendors and dealers trying to sell [small businesses] more machines than they need," he added, "without much relation to one another. That's why many small businesses are staying away from computers. Tandy can offer the most powerful microcomputer, the 3000 for serious data processing needs, down to a 1200 for word processing and can tie them together with Vianet."

Sales support and service is becoming a hot topic for 1986, and Tandy boasts some 6,000 store locations, 188 computer centers, 330 training centers and some 600 technicians nationwide. "That is all important to a small business manager who doesn't have a DP department that can take care of it all for him and doesn't want to have to go to each vendor for problems with different kinds of equipment," Beachum said.

Although Tandy posted a 33% earnings decline and only a 2.5% sales increase for fiscal 1985, the company predicts a stronger 1986. Chairman John V. Roach recently told shareholders that earnings should be up 30% for the fiscal year ending June 30, 1986, due to an improved economy, new products and strong sales support. Recent corporate acquisitions of consumer electronics chains Video Concepts and Scott McDuff are expected to offset effects from any continued computer industry slump.

The company is planning to strengthen the training of its sales representatives as new technology emerges and will devote some $80 million to renovations of Radio Shack stores over five years.

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Zenith's micro success story

From page 127

incentives for local dealer support of its direct sales force.

Dilworth said the new marketing thrust should not change Zenith's reputation as a niche targeter. "The Fortune 500 is really just a new niche," he said. "It's 500 accounts. Compared with our government business, that's really a small number."

While other vendors flounder on boasts of superior technology, industry observers have continued to praise Zenith's marketing-driven approach. "They put their personal computer business plan together in light of realities, not a set of ego goals," said Aaron Goldberg of market research firm International Data Corp. "They say they won't go after every bit of business, only those they can get. It's a pragmatic approach that can be very hard for some companies."

Zenith Data Systems gets much of that approach from its parent company's experience in consumer electronics, where cut-rate Japanese and Korean competition has made falling personal computer prices look tame. And while some of its competitors have shifted so much production offshore that executives are asked if they still run an American company, Zenith continues to build computers in St. Joseph, Mich. — with very little outside component sourcing.

Zenith said it expects microcomputer prices to continue to fall but feels it will be ready. "We've had to learn how to take the cost out of the box and leave the quality in," Frank said. "Other companies look at ways to cut the $30 parts; we look at ways to cut the 40-cent parts."

Dilworth and Frank said they believe the micro industry's long-term survivors, with the exception of Compaq, will be the billion-dollar players — IBM, AT&T, Apple Computer, Inc., Hewlett-Packard Co., Zenith and possibly ITT and NCR Corp. As the industry continues to shake itself out, extensive capital and marketing resources will be critical assets. "For that reason, I think Zenith has a better chance to do well than the single-product companies," said Future Computing analyst Timothy Williams. "They don't have to put all their eggs in one basket."

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Chip stock up in mart rally

From page 127

improved 25% since bottoming out last July. "The fact that orders are increasing slowly but steadily is a positive one for the industry," says Dan Klesken, vice-president of research at San Francisco-based Montgomery Securities. Klesken would like to see the semiconductor market avoid another boom-bust cycle like that of 1983 and 1984.

Investors are also pleased that chip makers have begun cutting costs. Intel, Motorola, National Semi and TI have laid off workers and shut down production facilities in an effort to lower their break-even points. Advanced Micro Devices, which still abides by its no-layoff policy, has trimmed executive pay 15% and that of salaried workers by 10%.

Most semiconductor companies reporting losses last quarter say they hope to regain profitability during the second half of 1986.

Despite these indications of a brighter future, the near-term outlook for the semiconductor industry remains troubled.

"The problem," Kurlak says, "is that the recovery in orders which we are now seeing is only what is necessary to support the current level of shipments. . . . Backlogs are still declining. Until backlogs begin to improve, I think the outlook remains very negative."

Paul Johnson of L. F. Rothschild, Unterberg Towbin is not as negative. Although uncertainty abounds as to when semiconductor unit growth and consumption levels will return to health, he says he believes that shipments could begin improving during the first quarter of 1986.

Referring to recent cost cutting by major semiconductor firms, Johnson maintains that "if we don't see an uptick in shipments, then we are going to see more cuts."

Two other concerns for analysts and investors alike are the increasing Japanese presence in the worldwide semiconductor market and uncertain levels of capital spending in 1986.

Where are the investment opportunities among semiconductor companies? Short term (one to three months), most analysts say they believe that semiconductor stocks will perform in line with the overall market.

Long term, Kurlak of Merrill Lynch said he favors companies targeting market niches with limited foreign competition. He recommends Standard Microsystems Corp., LSI Logic Corp. and Monolithic Memories, Inc. Kurlak also recommends Intel, which should benefit from enthusiasm for its new 80386 microprocessor and its association with IBM.

Both Klesken of Montgomery Securities and Barlage of Smith Barney recommend Intel, Motorola and Advanced Micro Devices. On Johnson's buy list at L. F. Rothschild are Advanced Micro Devices, National Semi and Monolithic Memories.

Notes: From Wang to CCI

From page 127

fessional and management employees.

The move will cost Modcomp $3.5 million but will save $8 million in long-term expenses, according to a spokesman. He added that Modcomp will refocus its marketing efforts toward industrial automation.

■

Computer Consoles, Inc., (CCI) the computer systems vendor that signed on former Wang Laboratories President John F. Cunningham as chairman and chief executive officer, recently announced it had hired a top sales executive away from Wang. John P. Jacobson, who served in a number of sales and operations posts for Wang's international divisions, was named vice-president of international operations.

■

The American Electronics Association (AEA) said recently it estimates the U.S. negative trade balance with Japan in electronics products will reach a record $18 billion this year, up 20% from 1984. The U.S. negative trade balance with all countries will total $8 billion, up 30% from 1984, according to the AEA estimates.

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DASD Analyst — New IBM/MVS Data Center. This new position manages all disk activity, including backups, assignment, rearranging and communications for support of national systems. Requires UCC5, FDR and/or strong DMS experience. Ft. Worth location. To $39,000.

IBM Operating Systems Development. Nationally-known software supplier seeks professional with strong ALC coding experience. Participate in a creative, elite group. Earn royalties on products you develop. MVS/VM internals experience not required but preferred. Dallas location. To $50,000.

VAX Systems Programmer. Growing suburban data center with multiple DEC VAX's including the new VAX 11/8600 seeks professional with two or more years experience. Dallas location. To $49,000.

Tandem Applications Programmer — Rapid Growth. Fastest growing bank holding company in Texas is implementing a national ATM network controlled by IBM/Tandem combination. Group of 24 will double in the next 12 months. Dallas location. To $46,000.

R & D Software Programmer. Large, multinational firm seeks professionals for long-term CAD/CAM, Robotics and "Star Wars" projects. Diverse hardware/software combinations will be used, including DEC VAX, Z8000, SEL, M68000, PASCAL, Assembler, C/UNIX, FORTRAN and ADA. Fort Worth location. To $45,000.

Technical Support Analyst. Fortune 500 corporation seeks professional with three or more years experience with LAN and PC-to-mainframe links in a commercial environment. Provide pre- and post-sales support to local companies with state-of-the-art systems. San Antonio and Austin locations. To $40,000.

Software Engineer. Major manufacturer seeks professional with three or more years experience with micro-processor control systems or communications software. Requires C language or 8080 Assembler proficiency. Combine a high-tech environment and the South Texas lifestyle. To $40,000.

Programmer Analysts — Industry Leader. This growing, national corporation headquartered in Houston seeks professionals with solid COBOL programming skills with an exposure to IDMS. To $35,000.

Senior Programmer — Passport Current? International firm seeks a professional to function as a Project Leader. Solid RPG III and System 38 skills are required. International travel. Houston location. To $42,000.

Product Specialist. Introduce leading edge Office Automation Systems into this highly visible and aggressive Houston firm. Coordinate network design and installation of DEC VAX systems with an IBM MVS Host Data Center. Key skills are communications, user interface, DEC software, and the ability to implement a major project company-wide. To $40,000.

Programmer Analysts — Banking. Financial institution headquartered in Albuquerque seeks Programmer Analysts to lead implementation of new applications packages. On-line CICS and banking. To $28,000. Senior Programmer/Analyst To 33,000.

EDP Auditor — New Position. Rapidly expanding Oklahoma corporation seeks a professional with a minimum of one year auditing experience. To $30,000.

Data Base Analyst — New IBM System. Oklahoma-based corporation seeks a professional for its state-of-the-art IBM data center. A minimum of three years IDMS design experience preferred. To $30,000.

Programmer Analyst — State-of-the-art IBM shop seeks Programmer Analyst with CICS and COBOL experience for major systems development. Enjoy the South Texas sunshine. San Antonio. To $30,000.

Systems Analyst — Professional with three or more years of insurance systems experience sought for IBM environment in a fast-growing Austin-based company. To $35,000.

Sales Representatives — Major vendor of Office Automation and Business Systems products seeks experienced Sales Representatives for Austin and San Antonio territories. Company needs professionals with two or more years experience selling automation, small business systems, or other state-of-the-art products to Fortune 500 clients. Package high $40's.

Software Specialists. Rapidly growing Phoenix-based software development organization has openings for software specialists. One position involves customer support, training, and new product research. Second position is in development group for new software products for IBM compatible software for IMS/CICS advanced program products. To $46,000.

Senior MVS and IMS System Programmers. Nationally-known Phoenix company seeks professional for MVS and IMS performance evaluation, hardware evaluation and planning, extensive TP network design and training of junior staff members. To $46,000.

Programmer — RPG II Growing Arizona organization seeks a professional with solid RPG programming skills to assist in financial and inventory development. Broad business applications exposure preferred. To $25,000.

Customer Support Representatives. Phoenix-based vendor is developing new products for SNA financial networks. Seeks technical contributors with communications background for Customer Support Representatives with experience in developing technical requests, project specifications, and managing project development. Will develop IBM SNA standards including new point-of-sale terminal systems. To $35,000.

Business Systems Analyst — Top Management Experience. Fast-growing diversified Phoenix company in the financial field seeks a professional for business development, planning and research. Position reports directly to MIS director. To $43,000 plus profit sharing.

Project Manager — On-Line Development. Suburban Phoenix organization seeks a professional with project management experience to direct the development of new on-line financial systems. Strong project control techniques and communication skills sought. Prefer distributed systems experience with IMS. To $46,000.

Junior Programmer Analyst. Progressive New Mexico OS shop offers an exceptional opportunity in the development of on-line administrative systems. Will consider person with one year experience using COBOL or Assembler language. Will train in CICS. To $25,000.

Programmer Analysts and Senior Programmer Analysts Fortune 100 Phoenix firm with state-of-the-art OS/MVS data center has multiple openings for Programmer Analysts with at least two years of IMS/DB experience. IMS/DC preferred. Client will train on new development applications for on-line systems. Commitment to structured methodology. Seek strong technical professionals with desire for career growth. Professional environment, no commuting problems, excellent corporate benefits. To $39,000.

Systems Programmer — Learn MVS. Oklahoma corporation seeks qualified Systems Programmers with a minimum of two years experience. State-of-the-art environment. To $40,000.

Programmer Analysts — Data Center Expansion. Manufacturer with headquarters in Tulsa suburb seeks Programmers for its growing data center. Three years experience with CICS background preferred. To $32,000.

Programmer Analysts — Banking. Phoenix-headquartered bank, building programming staff, seeks professionals with two or more years experience in banking applications or financial systems. People-oriented shop with a variety of applications exposure and a strong support group. Excellent visibility and interface with banking staff. To $30,000.

Programmer Analyst — New Development. Industry leader located in rural Oklahoma seeks a professional for its DOS/VS and CICS environment. One year of DOS/COBOL experience desired. To $29,000.

Programmer Analyst. Major transportation corporation seeks professionals with PL/1 coding experience and IMS applications exposure. Tulsa location. To $35,000.

Consulting Technical Analyst. Your solid IMS DB/DC skills will allow you to provide technical expertise to all levels of DP within this organization. Career path options include consulting, management or moving into a user area. Beautiful new Houston facilities are outside downtown traffic patterns. To $45,500.

Systems Programmers. Major energy-related corporation located near downtown Houston seeks System Software Specialists with MVS or CICS internals experience. Employee oriented company, dedicated to maintaining a state-of-the-art OS/MVS/XA data center including the installation of a new Information Center. To $55,000.

Systems Analyst — Learn Relational Database. Houston-based energy company seeks professionals for new systems development in a fourth generation relational database. High visibility. Houston location. To $41,500.

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Middle South Services, Inc., the technical service arm of Middle South Utilities System, offers excellent data processing opportunities at its New Orleans location. Current environment includes IBM 3080, 3084, MVS/XA 4381VM and Tandem.

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Submit resumes to:

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#5-128
Minnesota Job Service
390 Second Avenue South
Minneapolis, Minnesota [illegible]

SYSTEMS ANALYST - Design and develop proprietary software products for company in the area of communication and system software for Burroughs B20 series and XE-520 microcomputers. Test and evaluate all software requirements including preparation of related design documents, user manuals and technical reference guides for system operation; direct and supervise EDP personnel in installation of company software making modifications where necessary to meet specific client needs; maintain software including problem solving and system correction; provide periodic enhancements to software to upgrade operational efficiency; serve as technical advisor to EDP staffs and client programmers in problem analysis and system operation. Bachelor's degree in Computer Science or Engineering plus 2 years as a systems analyst or 2 years software design analysis experience required. 2 years required experience must involve managing teams of data processing professionals and include at least 1 year of work with Burroughs B20 series and XE-520 microcomputers, communication protocols and terminal emulators, PASCAL and Assembly programming languages and BTOS operating system. 40 hours per week, $32,000 per year. Send resume to: 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202. Reference Number [illegible].

ADVANCED DEVELOPMENT PROCESS ENGINEER

Lead fabrication effort to produce solid state electronic and electro-optic sensors for pressure, temperature, flow and analytical measurement.

Requires PhD in Electrical Engineering. Requires 1 year experience in semiconductor process development from mask layout and generation through photolithography, oxidation, diffusion, chemical vapor deposition, physical vapor deposition and reactive ion etching of glass, metal thick, spin-on glasses, silicon micromachining, planarization of thin film topography, and laser processing of wafers; thin film optics processes, optical materials and nonlinear optics. Requires experience with or knowledge of sample analysis: electron and optical microscopy, spectroscopy, and optical measurement and also in statistical data analysis. Salary $3400 per month.

Submit resumes to:

Mr. [illegible]
#5-130
Minnesota Job Service
390 Second Avenue South
Minneapolis, Minnesota [illegible]

Consultant for engineering and software development firm. Duties include: Analysis of stress, strain and strength in engineering materials and selection of materials for mechanical elements on basis of costs, strength, formability and machinability; use of computer for design and analysis: structural analysis with finite modeling using PATRAN, NASTRAN and MENTOR 1-2-3; dynamic systems analysis using CSMP; interactive programming using Fortran 77; modeling using Plot-10. $[illegible] per year to start. Requires at least a B.S. in Mechanical Engineering and at least two academic courses in each of the following areas: Strength of Materials, advanced Fracture Mechanics; Computer-Aided Mechanical Design; Polymer Mechanics. Send resume to 7310 Woodward, Room 415, Detroit, Michigan 48202; refer to No. [illegible]. Employer paid ad.

PROGRAMMER ANALYST: Work in team of 3-4 programmers to design, develop, test, document and maintain programs for small business systems in a large financial institution. Equipment IBM PC or PCXT. Prepare feasibility studies and determine data processing requirements and function specifications for the computerization of user department activities. Prepare logical flow charts for systems design and write code. Develop test plans and operate computer using test data to verify program capabilities. Prepare user documentation and assist the operations department in the maintenance of production systems. B.S. Computer Science and 1½ yrs exp in the job offered or 1½ yrs exp as a computer programmer and at least 6 mos exp using IBM PC or PCXT. 40 hrs/wk, 9-5 M-F. $[illegible]/yr. Send Resume to Illinois Job Service, 910 S. Michigan Ave., Room 333, Chicago, IL 60605, Attn: [illegible], Ref. [illegible], AN EMPLOYER PAID AD.

IBM SYSTEM 38 PROGRAMMER

A dynamic crafts distribution company located in Danville, IL is seeking IBM System 38 Programmer/Analyst with minimum of 1 year experience in on-line programming. Order entry, invoicing, sales analysis, data base design, and additional experience a plus. Send resume to Herr's Inc., 70 East Gate Drive, Danville, IL 61832.

Miami
Systems Programmer

Responsibility for installation and maintenance of all systems software. Requires knowledge of DOS/VSE, 370 Assembler, CICS, VTAM, NCP. VSE/SP 2.1 a plus. Hardware is IBM 4381. Minimum five years system experience. Mail resume with salary history to PO Box 693636, Miami, Florida 33169, Attn: Director of Data Processing.

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SYS PROG MGR

Prominent BOSTON-area corp seeks DOS/VSE specialist to supv staff of 4 in this attractive 43XX CICS data ctr. This position calls for a hands-on pro w/diverse product installations, conv & upgrade exp. Outstanding visibility in an expanding tech environ. Salary to $42,000

FIN'L SYS DESIGNER

Well-estab fin'l svcs org seeks well-grounded tech designer w/structured methodology. Bkgrd should incl IBM OS/MVS CICS COBOL + have some supvry exp. Hi-vis position within fin'l sys grp. Salary to High $30's

ROBERT HALF
of Boston
100 Summer Street
Boston, MA 02110
(617) 423-1200

BUFFALO

MFG SYS ANALYST

Major F500 mfr w/extensive DEC/VAX based mfg sys seeks several sys supervisors & staff analysts to study & implement shop floor control & other factory automation sys. Excellent co in NY Southern Tier. To $32,000

ROBERT HALF
of Buffalo
420 Main Street
1310 Liberty Bldg.
Buffalo, NY 14202
(716) 842-0801

PROVIDENCE

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ROBERT HALF
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900 Turks Head Building
Providence, RI 02903
(401) 274-8700

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ROBERT HALF
of Austin
400 East Anderson
Suite 334
Austin, TX 78752
(512) 836-0883

HARTFORD

PROJ MANAGERS

Fortune 100 firm seeks person w/strong proj mgmt skills in mfg or distr. Sys/38, MAPICS are major assets. Excellent benefits, relo. Salary to $45,000

TECH CONSULTANTS

Prestige tech svcs firm has excellent career opptys for people w/strong IMS, DB/DC skills. Hi stability, generous bonuses, limited travel, chance to teach full or part-time at top accounts. Salary to $48,000

SYSTEMS ANALYST

Join a dynamic growing co in a SUBURBAN setting. Work on state-of-the-art fin'l & life sys. Min 5 yrs exp w/Life sys, IBM exp, CICS & data base skills a+. Excellent benefits, growth potential. Full relo. Salary to $40,000

PROG/ANALYSTS

Major fin'l org seeks qualified prog/analysts to work on a number of on-line, devel projs in a CICS/IMS environ. Min 2+ yrs IBM exp & COBOL qualify for these exciting positions. Co provides excellent benefits & full relo. Salary to $32,000

SYS PROGRAMMERS

Min 3+ yrs tech bkgrd in IBM/MVS sw + excellent people skills required by CT corp for indiv to assume top tech staff positon leading to near term mgmt respon. Full relo costs offered! Salary to $40,000+

MGR DATA SECURITY

Min 8+ yrs DP exp w/current emphasis on data/physical security hw, sw sys. RACF, IBM/MVS, Disaster Recovery, etc., bkgrd required for this "start-up" dept! Salary to $40,000

ROBERT HALF
of Hartford
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

OMAHA

SYSTEMS PROGRAMMER

Degree with 4 years DP experience and 1 year systems. IBM mainframe. MVS, DOS and should have knowledge of both COBOL and BAL. Excellent opportunity with salary based on experience.

SENIOR PROGRAMMER

3 years experience IBM mainframe, COBOL, IMS, DB/DC or CICS. Insurance background a plus. Excellent salary and benefits.

ROBERT HALF
of Omaha
7171 Mercy Road
Omaha, NE 68106
(402) 397-8107

PACIFIC NORTHWEST

DATA BASE ANALYST

Seeking individual with 10+ years data processing experience including IBM MVS and extensive use of DL/1 and CICS developing major data bases. Any relational data base experience helpful. To High $30's

VP OF DP

Seeking individual with current experience managing programming, operations and technical support departments in an industry which depends upon data processing to remain competitive. Must be innovator with strong technical background and demonstrated ability to implement plans on time and within budget. To $70,000

TELECOMMUNICATIONS MANAGER

Seeking individual with 10-15 years experience in data processing and communications including 8+ years large scale network design. Will be responsible for coordination both voice and data communications activities. To $55,000

SENIOR DATA BASE ANALYST

Seeking individual with 5+ years data base development experience which must include training and hands on data base development experience using DBII. Any CICS or IMS helpful. To $45,000

Marjie Peterson
ROBERT HALF
of Washington State
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Seattle, WA 98101
(206) 624-9000

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(301) 652-1360

ST. LOUIS

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Engineering applications, DEC VAX hardware using UNIX, C, and Fortran to develop computer aided design and translator systems. Start up opportunity. BS degree required, very good benefits. Excellent growth opportunity! Salary to $30,000

VAX/VMS SYSTEMS PROGRAMMER-GRAPHICS

Service organization specializing in engineering applications needs a VAX/VMS Sys Prog with 3 yrs experience programming in C, VAX MACRO, and DCL. Knowledge of Fortran and/or CAD systems a plus. Salary to $40,000

IMS SYS PROGRAMMER

Fortune 500 firm needs a seasoned IMS Sys Prog with sysgen experience (1.3 best). Must be able to do complete integration, including user and operator training on enhancements and new IMS features. This is an MVS shop supporting CICS, UCC products, TSO and JES. Salary to $38,000

PROGRAMMER

Major Midwest Corp in a rural location needs 2 COBOL programmers with 2-4 yrs experience in an MVS shop. Will program and design business applications using CICS, IMS, some micros and an IBM 3090 CPU. Comprehensive benefits pkg and an excellent relocation package. Salary to $32,000

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Expanding DEC shop seeks multi-tasking hardware expert. Be responsible for evaluation of new hardware, reconfigurations, & designing telecommunication networks. High visibility. To $35,000

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of Kansas City
127 W. 10th Street
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Multi-million $ services organization headquartered in Mpls is in the planning stage of a major DOS to MVS conversion. The professional they seek must have a minimum of 2+ years as an MVS systems programmer and a 4-year degree. Great benefits, which are all company paid, accompany this highly visible position. To Low $30's

PROJECT MANAGER

Fast-growing Twin Cities based firm seeks project manager to assume responsibility for analysis, design and overseeing development of new distribution and manufacturing systems. Outstanding new opportunity for advancement at leading Midwest company. Requires manufacturing or distribution systems experience and IBM background. To $40,000

Mark David or Tim Smith
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FLORIDA

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National Corp in S FL is currently expanding development staff. Your technical background must include 3 yrs minimum IMS (DB/DC), COBOL, Large MVS. Opportunity to grow with an industry leader. Excellent benefit program with relocation included. Fee Paid. Salary to $44,000

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DP MANAGER

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In TX dial (512) 736-2467

NEW ORLEANS

PROGRAMMER ANALYSTS

The demand for 2-3 yr exp'd COBOL programmers exceeds the supply. Any combination of OS/JCL, TSO/SPF, CICS, IMS DB/DC, mfg, ins, fin'l will get you the job. PAID RELO. Excellent benefits. To $40,000

ROBERT HALF
of New Orleans
P.O. Box 57629
New Orleans, LA 70157
(504) 835-4290

ALBUQUERQUE

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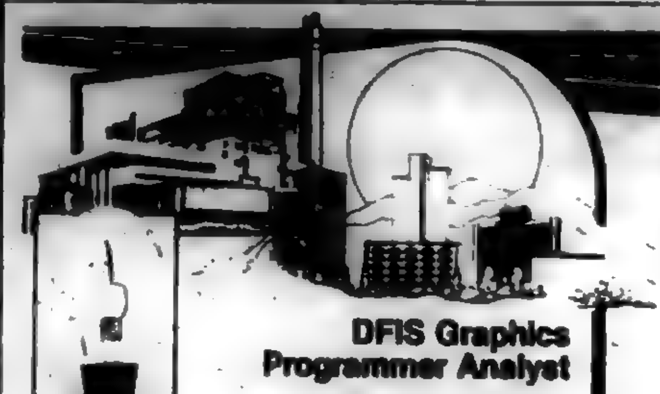

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[illegible]

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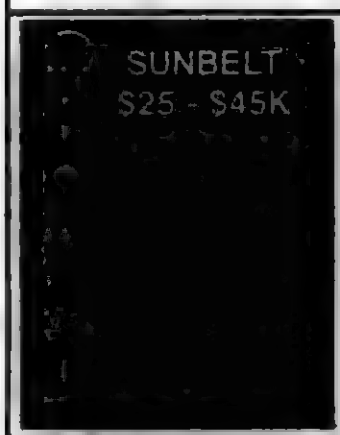

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- Feb. 3 - Unix
- Feb. 10 - DP as a Profit Center
- Feb. 24 - Application Software Development
- Mar. 3 - Mass Storage Systems
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Product Spotlights

- Jan. 27 - Manufacturing Software
- Feb. 17 - 2400 bit./sec. Modems
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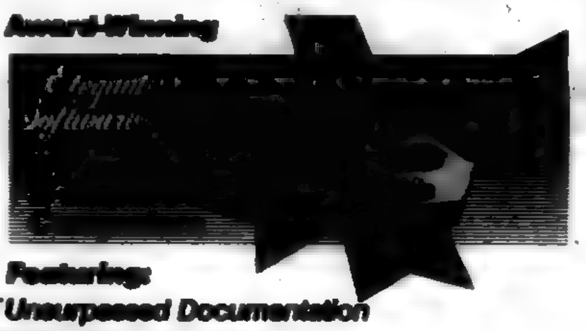

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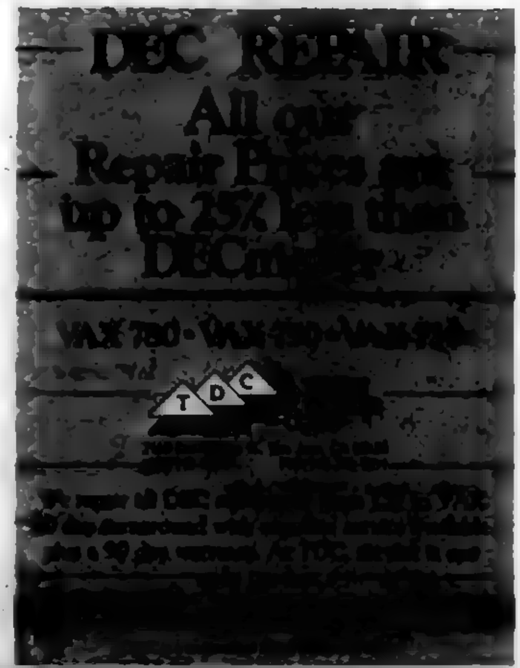

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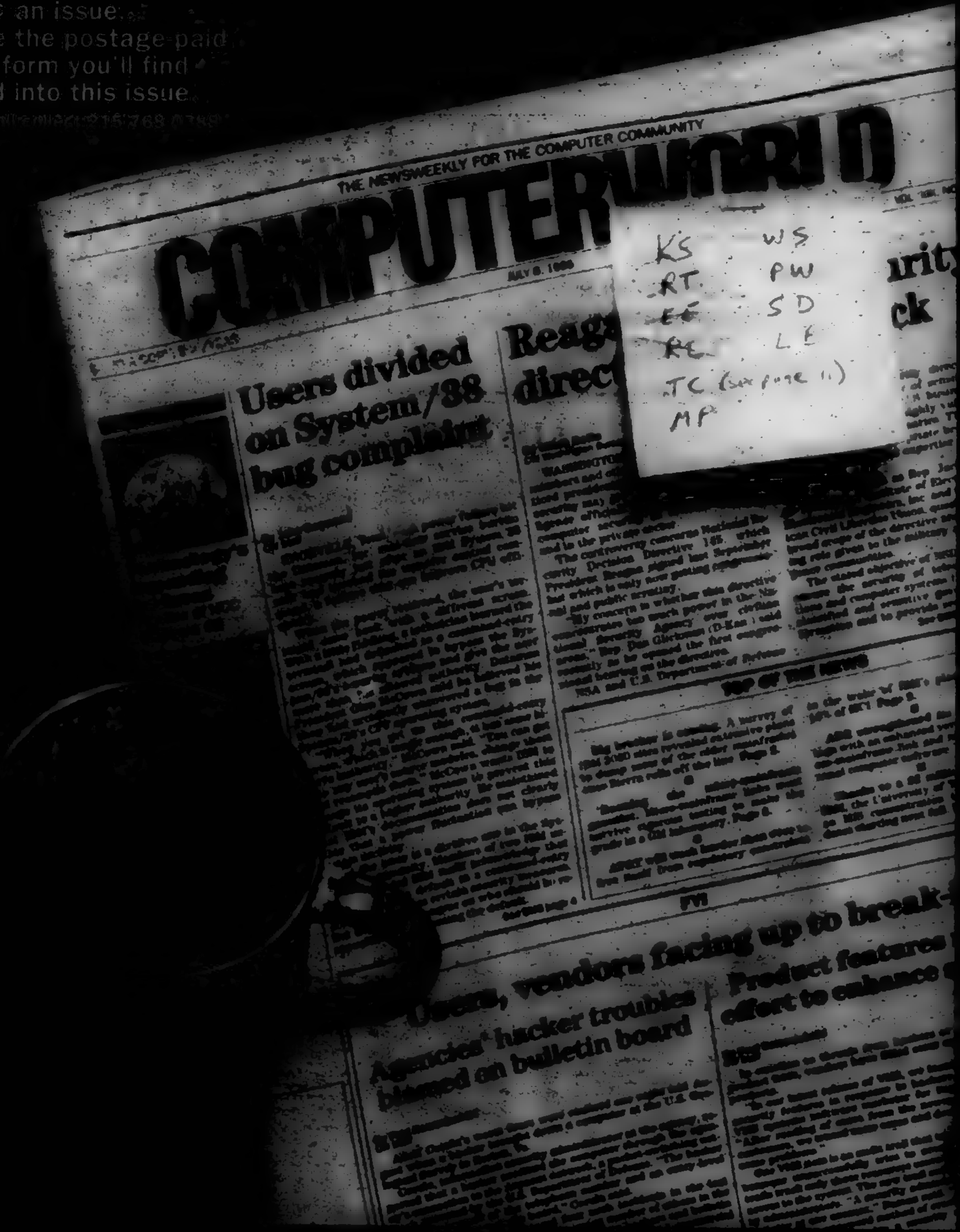
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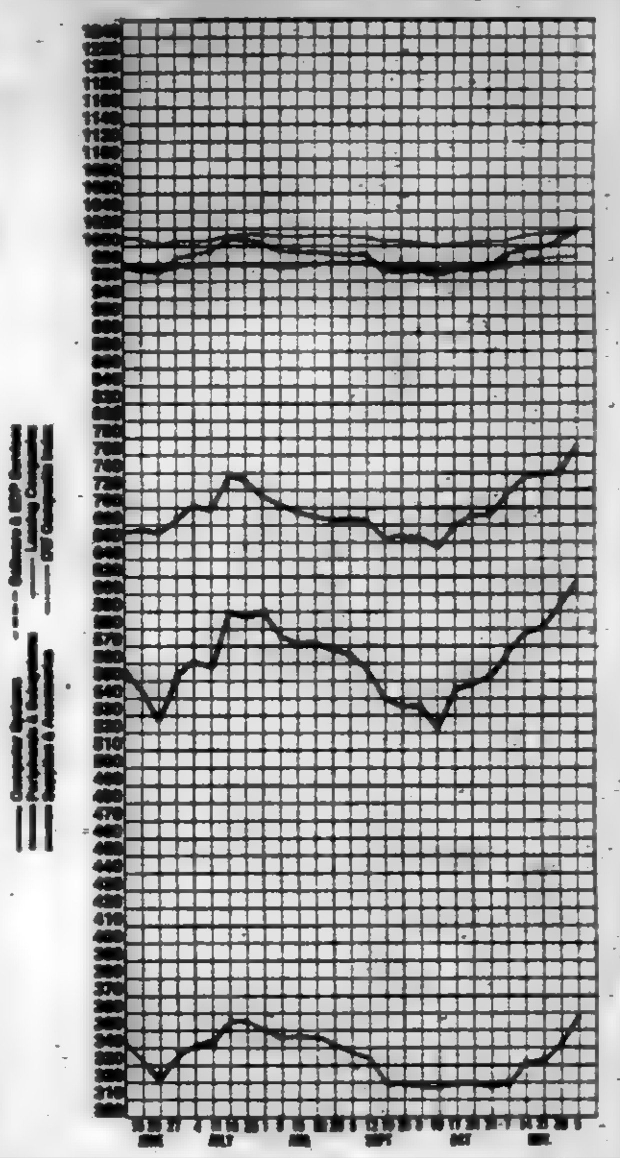

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CLOSING PRICES WEDNESDAY, DECEMBER 4, 1985

EXCH		1985 RANGE (1)	CLOSE DEC 4 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	8- 12	9 1/2	+ 1/8	+1.3
O	ALTOS COMPUTER SYST	7- 14	12 3/4	+ 3/4	+6.2
A	AMDAHL CORP	10- 18	13 1/8	+ 1/8	+1.0
O	APPLE COMPUTER INC	14- 31	20 1/2	+1 1/8	+5.8
O	APOLLO COMPUTER	8- 21	14 1/8	+1 3/4	+15.0
N	AT&T	19- 23	24	+ 5/8	+2.6
N	BURROUGHS CORP	51- 66	66 3/8	+ 7/8	+1.4
O	COMPAQ COMPUTER CP	6- 16	12 3/4	+1 3/4	+15.9
O	COMPUTER AUTOMATION	3- 9	1 3/4	- 7/8	-33.3
A	COMPUTER CONSOLES	5- 10	7 1/4	+ 3/8	+5.4
N	CONTROL DATA CORP	15- 38	18 7/8	+ 3/4	+4.1
O	CONVERGENT TECHNOL.	8- 17	11 3/4	+1 1/8	+10.5
O	CPT CORP	2- 12	2 7/8	- 1/4	-8.0
N	CRAY RESEARCH INC	23- 68	66 1/8	+1 1/4	+1.9
O	DAISY SYSTEMS CORP	15- 30	24	+4	+20.0
N	DATA GENERAL CORP	30- 70	48	+3 1/8	+7.0
N	DATAPOINT CORP	6- 22	6 1/8	0	0.0
N	DIGITAL EQUIPMENT	94-130	130 5/8	+6 1/8	+5.1
N	ECHO INC	13- 18	13 3/8	- 1/8	-1.0
O	ELECTRONIC ASSOC.	3- 8	4 7/8	0	0.0
O	FLOATING POINT SYST	13- 27	26 1/4	+1 7/8	+7.4
N	FOXBORO	28- 36	26 5/8	+ 7/8	+3.3
N	GOULD INC	20- 31	29 7/8	+2 1/8	+7.1
N	HARRIS CORP	22- 30	27	+1 1/8	+4.3
N	HEWLETT-PACKARD CO	29- 44	38 1/2	+2 1/8	+6.1
N	HONEYWELL INC	52- 72	72 1/8	+4 1/8	+6.2
N	IBM	118-142	141 7/8	+2 7/8	+2.0
O	IPL SYSTEMS INC	1- 4	1 1/2	+ 1/8	+10.0
N	ITT CORP	24- 37	34 1/2	+ 5/8	+1.8
O	M/A-COM INC	12- 20	13 5/8	+ 5/8	+4.8
O	MANAGEMENT ASSIST	2- 10	3 3/8	+ 3/8	+11.0
N	MATSUSHITA ELECTRIC	[illegible]	98 3/8	-1	-1.0
O	MENTOR GRAPHICS	20- 30	26	+3 1/4	+14.3
O	MODULAR COMPUTER SYS	5- 10	6 1/8	+ 3/8	+6.5
O	MOHAWK DATA SCI	2- 13	1 3/4	- 1/4	-12.5
N	MOTOROLA INC	29- 44	37 1/2	+1 7/8	+5.2
N	NAT'L SEMICONDUCTOR	10- 17	13 5/8	+1 1/8	+9.0
N	NBI INC	11- 21	12 1/2	- 3/8	-2.9
N	NCR	22- 36	36	+1 3/8	+4.0
N	PERKIN-ELMER	22- 30	28	+ 1/8	+0.4
O	PRIME COMPUTER INC	15- 22	22 1/2	+1 7/8	+9.0
N	SPERRY CORP	39- 55	51	+1 5/8	+3.2
O	STRATUS COMPUTER INC	8- 22	22	+ 1/4	+1.1
O	TANDEM COMPUTERS INC	14- 30	30 3/8	+1 3/4	+6.3
N	TANDY CORP	26- 40	38 3/4	+2	+5.2
O	TELEVIDEO SYSTEMS	3- 7	2 3/4	- 1/8	-4.3
O	TELXON CORP	7- 15	10 3/4	- 1/8	-1.3
N	TEXAS INSTRUMENTS	88-140	100 3/8	+8 3/4	+9.0
A	ULTIMATE CORP	9- 24	22 1/8	+2 5/8	+13.3
O	VECTOR GRAPHICS INC	0- 1	1/8	0	0.0
A	WANG LABS "B"	10- 22	19 3/4	+1 3/8	+7.0
A	WANG LABS "C"	10- 22	19 3/4	+1 3/8	+7.4
N	XEROX CORP	37- 60	59 1/8	+ 3/8	+0.6
	LEASING COMPANIES				
N	[illegible] INC	6- 34	33 1/2	+1 1/8	+3.4
N	CONTINENTAL INFO SYS	6- 15	14 3/8	0	0.0
N	FINALCO GROUP INC	3- 7	3 5/8	0	0.0
O	PHOENIX AMERICAN INC	3- 8	3 1/8	- 1/8	-3.8
N	SELECTERM INC	7- 14	7	+ 1/8	+1.7
N	U.S. LEASING	30- 43	38 3/4	+ 3/8	+1.0
	COMPONENTS				
N	ADVANCED MICRO DEV	22- 41	28 1/2	+2 3/4	+10.2
O	[illegible] SEMICONDUCTOR	6- 23	5 1/8	- 1/8	-4.3
O	ANALOG DEVICES INC	16- 28	23 5/8	+ 3/8	+5.0
A	ANALOGIC CORP	[illegible]	12 7/8	- 3/8	-2.8
O	APPLIED MAGNETICS CP	6- 36	15 1/2	+ 7/8	+6.0
O	[illegible] CORP	2- 10	3 5/8	+1 1/8	[illegible]
O	MICRO MASK INC	8- 14	8 1/8	- 1/8	-2.0
N	TERADYNE	18- 28	23 1/4	+1 1/4	+5.8

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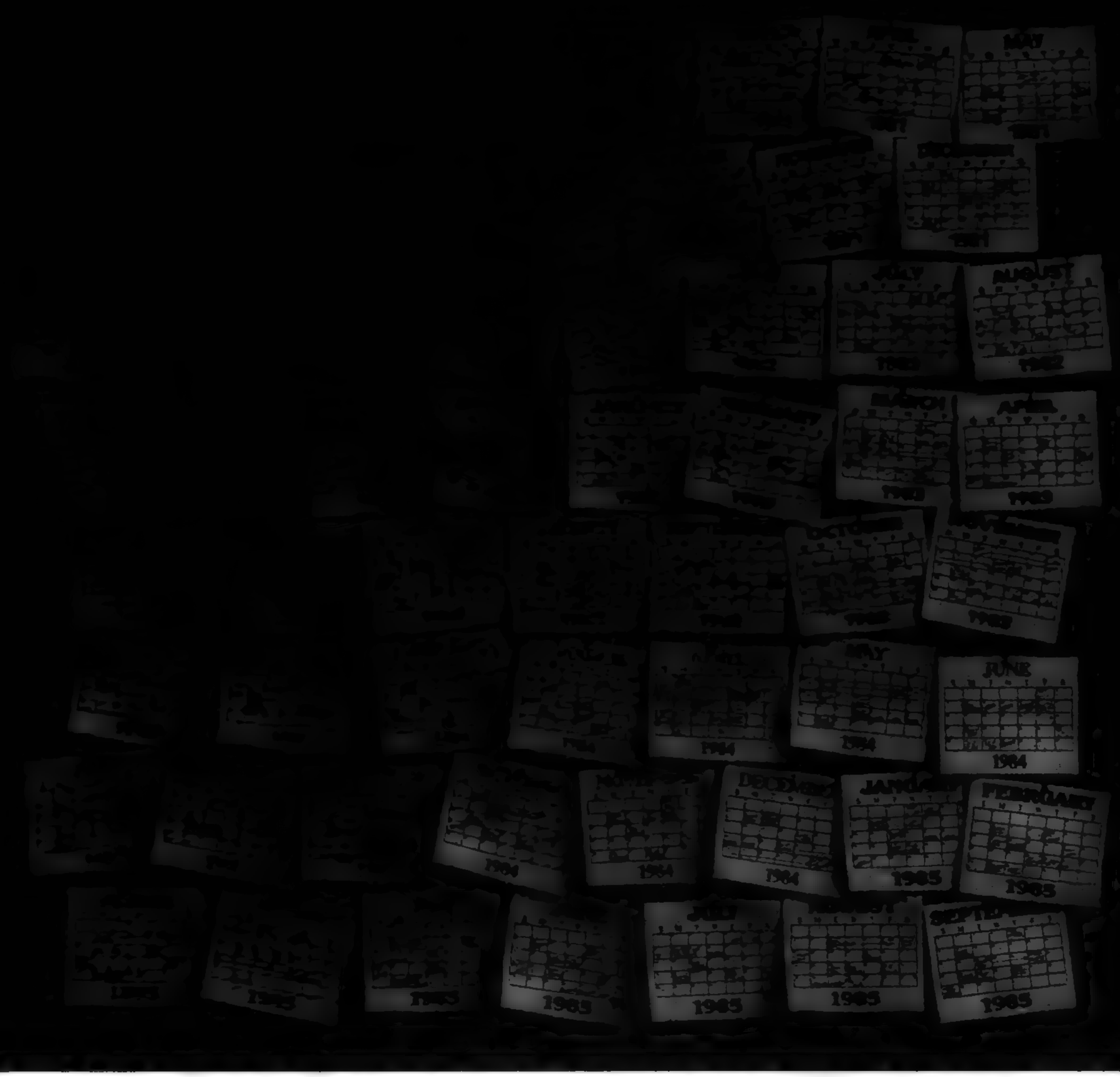
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 4	4	+ 1/4	+6.2
O	ADVANCED SYSTEMS INC	8- 20	15 1/4	+ 1/8	+0.8
N	AGS COMPUTERS INC	10- 18	17 7/8	- 7/8	-4.6
O	AMERICAN SOFTWARE	7- 12	11 1/4	+ 3/4	+7.1
O	ANACOMP INC	1- 4	3 1/8	0	0.0
O	ANALYSTS INTL CORP	8- 11	8 1/8	-1 1/8	[illegible]
O	APPLIED DATA RES	17- 60	28	+ 3/8	+1.1
O	ASHTON-TATE	8- 18	17 7/8	+ 1/4	+1.4
N	ASK COMPUTER SYSTEMS	8- 24	18 1/8	+1 1/8	+6.1
O	[illegible] CORP	1- 7	1 5/8	- 1/8	-7.1
N	AUTOMATIC DATA PROC	30- 50	46 1/2	+1 3/4	+3.9
O	COMPUTER ASSOC INT'L	16- 30	27 1/8	-1 1/4	-4.3
O	COMPUTER HORIZONS	9- 13	14 3/8	- 1/8	-0.8
O	COMPUTER NETWORK	3- 10	3	0	0.0
N	COMPUTER SCIENCES	18- 30	30 1/8	+ 1/8	+0.4
N	COMPUTER TASK GROUP	10- 25	20 3/4	-1 3/4	-7.7
O	COMPUTER USAGE	1- 2	1 1/2	- 1/8	-7.6
O	COMPUTONE SYSTEMS	4- 11	4 1/8	- 1/4	-5.7
O	COMSERV CORP	1- 8	2 7/8	+ 3/8	+15.0
O	COMSHARE	8- 12	11 3/8	+ 1/8	+1.0
O	CULLINET SOFTWARE	16- 30	16 3/4	- 1/2	-2.8
A	CYCARE SYSTEMS INC	18- 27	20	+ 1/2	+2.5
O	[illegible] SYSTEM INC	4- 13	8 1/8	+ 1/8	+1.5
N	GENERAL ELECTRIC CO	53- 68	69 7/8	+ 7/8	+1.2
N	GENL MOTORS E (EDS)	17- 47	46 3/4	+ 5/8	+1.3
N	GTE CORP	36- 46	42 5/8	+ 1/4	-0.7
O	INFORMATION SCIENCE	1- 5	3 1/8	- 1/8	-3.7
O	INFOTRON SYSTEMS CP	10- 20	13 1/2	- 1/8	-1.5
O	KEANE ASSOCIATES	9- 18	14 1/8	0	0.0
O	LOGICON	20- 41	38 3/4	-1 1/2	-3.8
O	LOTUS DEVELOPMENT CP	10- 30	23 1/2	+2 3/8	+12.2
O	MCI COMMUNICATIONS	7- 11	10 1/8	+ 1/8	+1.2
O	MGMT SCI AMER INC	8- 15	11	+ 1/8	+1.1
O	MATHEMATICAL APP GRP	2- 3	3	0	0.0
O	MICOM SYSTEMS INC	16- 42	20 3/4	+3 1/8	+17.7
O	MICROPRO INT'L CP	2- 6	2 3/8	+ 1/4	+11.7
N	NATIONAL DATA CORP	7- 17	15 3/4	+ 1/4	+1.3
O	ON-LINE SOFTWARE INT	6- 10	7 1/2	+ 1/2	+7.1
O	PANSOPHIC SYSTEMS	11- 25	20 1/2	[illegible]	[illegible]
A	PLANNING RESEARCH	9- 18	17 1/4	+ 1/8	+1.4
O	POLICY MGMT SYSTS CP	16- 30	30 3/4	+ 1/8	+1.2
O	PROGRAMMING & SYS	4- 8	7 3/8	- 1/8	-1.6
N	REYNOLDS & REYNOLDS	28- 48	47 1/8	+1 1/2	+3.2
O	SEI CORP	11- 22	22	- 3/4	-3.3
O	SHARED MEDICAL SYST	25- 37	28	- 1/2	-1.7
O	SCIENTIFIC COMPUTERS	3- 12	5 1/2	- 1/4	-4.3
O	SOFTWARE AG	11- 22	15 3/4	+ 1/2	+3.0
O	UCC CORP	10- 16	11 3/8	- 3/8	-3.0
O	[illegible]	9- 17	18 3/8	+ 3/4	+5.1
O	[illegible] SOFTWARE	17- 26	22 1/4	+1 3/4	+8.3
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	3- 8	8 1/8	+ 1/4	+3.1
O	ANDERSON JACOBSON	2- 11	2 3/8	- 1/2	-17.3
O	AST RESEARCH INC	7- 30	20 1/8	+3 3/8	+22.8
O	AUTO-TROL TECHNOLOGY	4- 13	4	0	0.0
O	[illegible] COMPUTER	2- 25	5 1/8	- 3/8	-6.8
O	[illegible] INC	5- 12	8 3/8	+ 3/8	+4.5
O	[illegible] INT'L	1- 2	1/8	+ 1/8	+100.0
O	BOLT, BERANEK & NEW	15- 30	28 5/8	+2 3/8	+10.0
O	[illegible] CORP	1- 3	7/8	0	0.0
O	CENTRONICS DATA CORP	3- 12	4 5/8	0	0.0
N	CETEC CORP	6- 10	7 1/8	+ 1/4	-3.3
A	COGNITRONICS	4- 7	3 3/8	- 1/4	-6.2
A	COMPUGRAPHIC CORP	20- 37	27 3/4	+1	+3.7
O	COMPUTER TRANSCEIVERS	1- 4	5/8	[illegible]	[illegible]
N	COMPUTERVISION CORP	14- 46	12 7/8	+2 3/8	+22.6
N	CONRAC CORP	13- 18	14 3/8	0	0.0
A	DATAPRODUCTS CORP	11- 24	15 7/8	+1 7/8	+13.3
O	DATARAM CORP	2- 9	8 3/8	- 1/8	[illegible]
O	DATA SWITCH CORP	4- 8	8	+ 3/4	+10.3
O	DATUM INC	3- 8	5 1/8	- 1/8	[illegible]
N	DECISION DATA COMPUT	5- 16	13 1/2	+1 5/8	[illegible]
O	[illegible], INC	3- 23	3 1/8	+ 1/8	[illegible]
O	EVANS & SUTHERLAND	8- 21	21	+1 3/8	[illegible]
O	[illegible] TECHNOLOGIES	3- 20	7 1/2	+ 1/8	[illegible]
O	GEN'L DATA COMM IND	8- 20	12 1/8	+ 1/4	+2.1
O	HAZELTINE CORP	3- 20	20 7/8	+2	+13.1
O	[illegible] CORP	6- 17	7 1/8	- 1/8	-3.3
O	INFORMATION INTL INC	4- 18	12 1/2	+ 1/8	+1.0
O	INTECOM INC	4- 30	3	- 1/8	-0.7
O	INTEL CORP	7- 30	20 1/2	+1 1/2	+6.2
A	LUNDY ELECTRONICS	4- 14	12 5/8	-1	-7.3
O	[illegible] CORP	3- 12	8 3/8	- 3/4	[illegible]
O	MSI DATA CORP	8- 20	7 5/8	- 1/8	-1.3
N	NASHUA CORP	15- 29	27	- 5/8	-2.2
O	NETWORK SYSTEMS CORP	20- 46	24	+1	[illegible]
N	NO AMERICAN PHILIPS	30- 42	37 5/8	- 3/8	-0.9
N	NORTHERN TELECOM LTD	1- 38	30 3/8	+ 7/8	+2.8
O	[illegible]	1- 3	1/2	0	0.0
O	PARADYNE CORP	7- 14	8 3/4	+ 3/4	+9.3
O	PENRIL CORP	7- 12	7 1/8	+ 1/8	+1.8
A	PLESSEY CO (ADR)	16- 30	20 3/4	+3 1/2	+13.7
O	PRINTRONIX INC	8- 17	13	+ 3/8	+2.8
O	QMS INC	7- 11	8 7/8	- 1/8	-1.3
O	[illegible] CORP	5- 17	3	- 1/8	-4.3
O	RECOGNITION EQUIP	6- 21	12 5/8	+1 5/8	+13.8
O	SANDERS ASSOCIATES	11- 37	35 1/2	+1 7/8	+5.4
O	SCAN-TRON CORP	6- 17	18 1/2	+ 1/4	+1.3
N	SCIENTIFIC ATLANTA	6- 16	11 3/8	+ 3/8	+3.7
O	SEAGATE TECHNOLOGY	3- 12	7	[illegible]	+21.7
N	STORAGE TECHNOLOGY	1- 3	1 7/8	+ 1/8	+7.1
O	SYKES DATATRONICS	0- 1	1/8	- 1/16	[illegible]
A	T BAR INC	8- 20	8 3/4	+ 1/8	-2.1
O	TAB PRODUCTS CO	6- 18	13 1/8	+ 7/8	+5.8
O	TANDON CORP	2- 13	4 3/8	0	0.0
N	TEC INC	7- 40	7	+ 1/8	+1.8
N	TEKTRONIX INC	50- 62	62 1/8	+ 7/8	+1.7
N	TELEX	1- 97	95 3/8	+ 1/8	+0.2
O	[illegible] SYSTEMS CP	1- 23	1 3/8	+ 1/8	+10.0
O	TIMEPLEX INC	5- 22	21	+ 3/4	+3.8
O	TITAN CORP	3- 8	8	0	0.0
O	VISUAL TECHNOLOGY	1- 10	3/8	+ 1/16	[illegible]
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	21- 31	31 3/8	+ 5/8	+2.0
N	BARRY WRIGHT	17- 30	18 3/8	+ 3/8	+2.0
N	DUPLEX PRODUCTS INC	12- 21	20 3/4	+2 3/8	+12.8
N	ENNIS BUS. FORMS	10- 23	23 1/4	+2 3/8	+13.8
N	3M COMPANY	70- 88	88	+3 1/2	+4.2
O	MOORE CORP LTD	13- 22	20 3/8	- 1/4	-1.2
N	STANDARD REGISTER	18- 40	38 1/8	+1	+2.7
N	WALLACE COMP SERVICE	20- 40	35 7/8	- 7/8	-2.3



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VOL 19
ISSUE 50
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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR DECEMBER 16, 1985 VOL. XIX, NO. 50

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Systems specialists at the nation's second largest bank balk at a move into the suburbs. **Page 8.**

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The corporate bottom line is crucial to systems capacity planning. **Page 2.**

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DEC customers are hearing about BI clustering, a scheme to group Microvax products. **Page 12.**

■

MIS/DP managers are anxiously awaiting industry networking standards but are more than willing to develop their own. **Page 14.**

■

Honeywell's small systems group will dismiss 600 employees in its second layoff of the year. **Page 81.**

■

Boeing's purchase of 5ESS digital switches is part of a move to save $150 million. **Page 37.**

■

McDonnell Douglas Computer Systems Co.'s Microdata 9000 series of minicomputers expands with two additional models. **Page 63.**

■

A Computer Corporation of America spokeswoman said last week that Crowntek, Inc. rejected a Pansophic Systems, Inc. offer to buy CCA. Pansophic recently offered an unspecified sum for Cambridge, Mass.-based CCA, which was acquired by Crowntek of Toronto last year.

■

The curtain may have fallen on the "lock-and-key" copy protection scheme announced by the Association of Data Processing Service Organizations, Inc. last January. Micro software vendors have shown few signs of support for or even interest in the approach. Lotus Development Corp., the scheme's strongest backer, last week damned it with faint praise, the most positive comment being that "it's not a dead idea."

"We got some very specific feedback from a large number of customers that this is not an appropriate way to go,"

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Big user nixes shielded wire

Twisted-pair scheme used for synchronous terminals

By John Dix

NASHVILLE — One of the nation's largest communications equipment vendors, Northern Telecom, Inc., uses telephone-type twisted-pair wire to support all the synchronous terminals in its new U.S. headquarters.

This decision, communications experts concur, should hearten users considering twisted-pair wiring as an alternative to coaxial cable.

Supporting synchronous devices with twisted-pair wire instead of coaxial cable, which can be 10 times more expensive, is a relatively new idea. The issue was brought to a head recently when IBM, the leading

See [illegible] page 10

Lotus shops for next technology

By Eric Bender

CAMBRIDGE, Mass. — Moving to accelerate product development efforts, Lotus Development Corp. disclosed plans last week to purchase the small, year-old creator of a natural language interface for Lotus' 1-2-3 package.

GNP Development Corp. of Pasadena, Calif., manufactures the Human Access Language package, originally scheduled to ship earlier this month for $295. HAL impressed attendees at last month's Comdex/Fall '85 trade show with its ability to let users access 1-2-3 functions through simple English commands.

See **LOTUS** page 4

Bank blames nightmare on software flop

By Mitch Betts

WASHINGTON, D.C. — The failure last month of the Bank of New York's automated government securities system was the result of a software design flaw that caused data to be stored incorrectly when trading reached a record high level, according to testimony before a congressional panel last week.

The chairman of the Bank of New York explained to concerned congressmen how the trading system failed and disrupted the government securities market on Nov. 21 at a cost to the bank of $5 million (CW, Dec. 2).

J. Carter Bacot, chairman and chief executive officer, said a software change in the bank's Government Securities Clearance Service system failed to provide instructions to the CPU on how to store data on securities issues when the number of issues exceeded 32,000.

"On Nov. 20, the number of issues being cleared exceeded 32,000 for the first time," Bacot testified. "Lacking adequate storage instructions for the additional data, the computer stored the data incorrectly and corrupted the data base," he continued.

The problem was discovered the next day, and eventually the software was patched; but in the meantime, the bank was unable to deliver more than $20 billion in government securities to the purchasers. To cover the overdrafts, the Federal Reserve Bank of New York extended an emergency loan of $22.6 billion to the bank.

The Bank of New York assigned two teams, 55 people in all, to work on the problem. One team developed a temporary patch — a short-term programming fix — and another team began an entire redesign of 700 programs, Bacot testified. The tem-

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CW EXCLUSIVE

MIS, Inc.: Loctite data pros set up outside shop

By Rosemary Hamilton

It could have been the typical MIS management nightmare: Staff members develop an innovative in-house software program with commercial sales potential, and at the same time they decide they do not want to work on the IBM hardware the company has chosen for its future computing needs. Seven key people decide to quit and form their own company.

However, at Loctite Corp., a specialty chemicals manufacturer in Newington, Conn., the bad dream did not happen.

The seven people did indeed leave, forming a spin-off called Info-Point Corp., headquartered in Wethersfield, Conn. With the marketing rights to a decision support software package called Focal-Point, the group is now preparing to test the waters of the software industry. Info-Point is providing consulting services to Hewlett-Packard Co. product users as well. But the new company founders retain close business and personal ties with Loctite, and all parties say the new arrangement has worked out in the best possible manner for all concerned.

The stage for this would-be horror story was set in November 1984. A six-member steering committee at Loctite corporate headquarters was in the process of selecting new hardware for the Newington facility to replace existing HP 3000 minicomputers.

Niels Schulz

David Freeman, a senior vice-president of Loctite and president of the $250 million corporation's North American division, was top management's spokesman and chairman of the committee. Freeman's hardware choice was an IBM System/38. He chose it because all of the company's offices in 15 different countries were operating on

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NEWSPAPER

MIS goals must fit firm's strategy

Capacity planners should think business, not just DP

By James Connolly

DALLAS — Corporate business plans and revenue growth must be primary considerations in planning capacity requirements for MIS systems, according to former MIS executives who have moved into corporate management positions.

Capacity planners, MIS managers and systems analysts meeting here last week at CMG'85, the international conference sponsored by the Computer Measurement Group, Inc., were warned repeatedly that corporate executives require MIS goals to fit within overall corporate strategies.

The theme was repeated by about a dozen speakers throughout the four-day conference. They warned attendees that they must understand their corporations' business plans, financial terms and user expectations if their equipment acquisition proposals, capacity projections and efficiency plans are to be seriously considered by top management.

A former computer room supervisor who is now in senior management, Ron Wright, Occidental Petroleum, Inc. vice-president for administration, noted, "I always have difficulty communicating with the capacity planners. They have to remember that I am dollar oriented and only dollar oriented. The computer is a machine, just another tool. I can see when an elapsed time drops from 0.5 to 0.4 seconds, but the importance to me is what that is going to give the stockholders. ROI [return on investment] is the only important acronym."

Another former DP manager who is now a senior vice-president, Fred Pirman of Humana Corp., encouraged the capacity planners to do their homework so they can factor into their plans predictable growths in demand, such as proven growths in sales, and to prepare as well as they can for the unpredictable, such as corporate mergers.

Pirman and Wright emphasized that communicating with financial specialists, understanding the business as a whole and talking to users, while time-consuming, are the only ways capacity planners can do their jobs right and move up the corporate ladder.

Another speaker, management consultant Anthony Abowd of Data Strategies, Inc., noted that one strike against computer managers is the tendency to change jobs, often with shifts to different industries, while top corporate managers tend to work a full career with only one or two companies in a single industry. That tendency has hampered computer managers' ability to understand the business that they serve and has created a communication gap between computer managers and corporate managers, Abowd said.

"The computer managers have the primary responsibility for closing this gap. We can't expect corporate managers to come down to our level," Abowd said.

Abowd encouraged the attendees to learn how to develop financial proposals to cost-justify their computer acquisition plans. Those plans, he added, compete with other proposals by other managers for the same corporate funds and should be presented in a way that shows the system acquisition as an investment that will pay for itself within a fixed time frame.

The 1,400 attendees also were drawn to discussions of the following issues:

- The use of expert systems, most of which remain in the prototype stage, in capacity management.
- Performance measurement in systems ranging from personal computers and minicomputers to mainframes running IBM's MVS/XA.
- Utilization of DASD and management of the expected continual annual 40% to 50% growth of that disk capacity.

DPMA opposes VDT restrictions

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) recently adopted a position against legislative restrictions on VDT use, maintaining that there is no conclusive evidence to support claims of radiation or other serious health problems from VDT use.

"DPMA believes that legislation restricting the use of VDTs or limiting exposure to them is premature and counterproductive," the statement said. It added that there is no proof that VDTs cause or contribute to stress-related problems.

The DPMA plans to use the statement as the basis for testimony before state legislatures that have VDT legislation pending, according to Joseph E. Collins, government affairs manager.

A DPMA task force concluded that "existing labor laws, marketing considerations and business economics will all work together to eliminate the vast majority of VDT health-related issues."

"We believe that VDT legislation which mandates major aspects of the VDT environment goes well beyond any demonstrated need and reduces incentives for business to find solutions mutually beneficial to both the business and its employees," the statement said.

The association said most of the verifiable health problems with VDTs are caused by ambient lighting, poor seating, bad posture, improper furniture and other ergonomic problems.

Therefore, the association said, users and vendors should cooperate to ensure the proper installation and use of VDTs at each site, and employers should provide adjustable workstations and educate and train their employees in the proper use of VDTs.

The association also urged vendors to continue their product quality control efforts to ensure the safety of their products, and it advocated continued research on VDT use.

— **Mitch Betts**

CORRECTIONS

The article "Eclipse MV additions leapfrog DEC" [CW, Nov. 25] listed incorrect maximum memories for two Data General Corp. systems.

The correct maximum memory for the MV/20000 Model 1 is 64M bytes, and for the MV/10000, the correct maximum memory is 32M bytes.

In reference to "DBMS upgrade out for VAX" [CW, Nov. 18], the VMS operating system is a product of Digital Equipment Corp.

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In a historic marriage of two electronics giants, General Electric announced its intent to purchase RCA for $6.23 billion/ 10

A clusterable DEC Microvax II may not be far away/ 12

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Ad hoc personal computer development leaves systems open to glitches and reliance on inadequate hardware. A technical review allows greater control/ 47

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An organization's security officer and its DP auditor's jobs promote a single goal: protecting the organization's assets from intrusion/ 59

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PAGE ONE ILLUSTRATION BY ALAN D. HOPKINS

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Lotus shops for next technology

From page 1

The purchase is "good news for both companies," commented Robert Lefkowitz, director of software research at Infocorp, a San Jose, Calif., market research firm.

Lotus is ideally positioned to market HAL, "which is a hot product," he said. "This will not triple the size of the Lotus spreadsheet market, but it will further solidify 1-2-3 as a leader."

Jerry Kaplan, Lotus' principal technologist, described HAL as "the first practical limited natural language application that really works, that solves problems." He said that HAL's underlying technology will be "a strategically important and commercially very valuable capability for Lotus. It represents a distinct technological advance that will be demanded by users once they're exposed to it."

Kaplan, who cofounded artificial intelligence pioneer Teknowledge, Inc. before joining forces with Lotus, commented that two other micro products with "a serious natural language component" have already shipped: Microrim, Inc.'s Clout and Symantec Corp.'s Q&A. He remarked, however, that natural language currently fits spreadsheets more easily than data base managers.

"A spreadsheet is a more contained environment than a data base; there's a relatively limited number of things you can do," he said. The spreadsheet "has a great deal of content around to interpret your suggestion, so you can be more successful with a less complete system."

'Milk the installed base'

While 1-2-3 remains the top-selling micro software product, many large corporations have been hesitant to move to the latest release, which shipped this fall. Because Lotus' strategy "seems to be to really milk the installed base," selling a HAL-based add-on would make a lot of sense, Lefkowitz commented.

However, the company has not yet settled on specific product plans, Kaplan said. "We didn't buy a piece of software; we cut a deal with the GNP folks to acquire that technology." He added, "It's in line with our strategic R&D direction."

Others involved in the acquisition suggested that one or more products may appear by midyear 1986, but that no firm schedules are in place.

GNP Development was founded in November 1984 by Bill Gross, then 26 years old and the owner of GNP Loudspeakers, Inc., a holding company for a computer store, an audio store and a loudspeaker manufacturing plant.

The start-up introduced its first product, CPA+, an accounting program that works with 1-2-3, in December. GNP Development also sells three other add-ons for 1-2-3 and Lotus' Symphony package.

Lotus did not disclose the price for the acquisition, which is expected to be finalized by February.

HAL developers to join Lotus

HAL's two principal developers — Gross and brother Larry Gross, GNP's vice-president of research and development — are expected to join Lotus as consultants while most GNP employees will be laid off. The firm currently employs approximately 16 people.

HAL was designed to work with a large vocabulary of words and phrases drawn from the way people talk about spreadsheets, according to GNP. In one example, users seeking to erase data can choose from "erase," "delete," "clear," "get rid of" and other words.

Additionally, "you can type in partial phrases in English and request that the system tell you the meaningful ways the command can be completed," Kaplan said. "That allows you to explore, in a focused fashion, the capabilities of the product."

Simplifying 1-2-3 for novice users, the software also can speed operations for experienced users. For instance, by typing "total all," users can total all columns in a worksheet much faster than they can with standard Lotus commands, "no matter how great they are at 1-2-3," Gross said.

The software also permits users to write macros in English and features a data base query facility, the ability to link spreadsheets, an Undo command and an audit feature.

HAL's capabilities "will certainly appeal to a reasonable percentage of the installed base," Lefkowitz said, although he said that the technology may not greatly assist rank novices who do not know what a spreadsheet is.

CBT courses supplement live training

By Mitch Betts

WASHINGTON, D.C. — Richard Lichvar, manager of the information center at the Federal Home Loan Mortgage Corp., is a true believer in the use of computer-based training (CBT) to help employees learn the basics of developing and using applications software.

"CBT frees up the information center staff . . . to spend less time talking about syntax and more on the applications design," Lichvar explained in a recent interview.

Computers cannot do all of the training work, he stressed. "It does take some person-to-person involvement to get users over the first hurdle — using the computer keyboard and starting the course," Lichvar said.

One-hour introduction

But with CBT, it takes a staff member about one hour to introduce the user to the computer-based course, rather than eight or more hours of steady instruction to cover an entire subject, he said.

Lichvar's employer, also known as Freddie Mac, is one of the nation's largest financial institutions. It is a private, federally chartered corporation that works in the secondary mortgage market to increase the amount of mortgage capital available to home buyers.

The Freddie Mac information center — which serves some 1,000 employees — has about 20 CBT courses on an IBM 3081 running MVS/XA. The center uses the Phoenix CBT system software from Goal Systems International, Inc. of Columbus, Ohio, to present off-the-shelf courseware and to write custom courses.

Lichvar provided several suggestions for the successful use of CBT:

- Do not assume that CBT replaces live training. "Some types of training require a human being as instructor . . . but CBT allows you to concentrate the live training on more strategic projects," Lichvar said.
- Mainframe-based CBT courses generally are higher quality than micro-based courses because the mainframe courses are more mature, having been fine-tuned over the last three to five years, he said.
- Do not overwhelm your users or staff by starting a large number of CBT courses at once.

Lichvar said he chose Phoenix because it uses fewer computer resources than its competitors and because it can present courseware written under other vendors' CBT systems, such as IBM's Interactive Instructional System and Boeing Computer Service Co.'s Scholar/Teach.

One of the custom courses developed at Freddie Mac covers the use of Easytrieve/Plus, utility software from Pansophic Systems, Inc. of Oak Brook, Ill. Lichvar said it is the only such course in the country, so he plans to license it to a courseware vendor, with the royalties earmarked to help defray the costs of the information center.

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Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed; write to Circulation Dept. for subscription information.

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CCA launches drive into programmer workstation market

Offloading mainframe burden to micros

By John Gallant

CAMBRIDGE, Mass. — Computer Corporation of America (CCA) took several strides in the fledgling programmer workstation software market last week with the introduction of a prototype workstation-based data base design system, a microcomputer version of its mainframe development environment and an enhanced release of its micro-mainframe link.

"A major problem many companies face is the overloaded mainframe," said Doug Miller, product manager for application development products with CCA, which markets the Model 204 relational DBMS. "One solution to that problem is distributed applications and data base management systems. Another important alternative is to offload applications development work. With these products, developers can download work to a workstation and only use the mainframe when necessary. That will improve productivity greatly."

DB Designer is a prototype workstation-based data base design system developed by CCA's research and systems division for the U.S. Air Force. The system, already in use within the Air Force, will not be ready for general shipment until the fourth quarter of 1986. Miller said the company has not yet decided which commercially available workstation product will be used to implement DB Designer.

According to Miller, DB Designer is currently running on a Jupiter Systems, Inc. J-12 workstation at the Rome, N.Y., Air Development Center and on a similar machine within CCA's research and systems division. On the Motorola, Inc. 68010 microprocessor-based J-12 workstation, DB Designer runs under the University of California at Berkeley's Unix Version 4.2.

Miller said CCA is hoping IBM will make clear its workstation plans or its intentions for an Intel Corp. 80386-based system in 1986, but the company may in the interim host the product on a Sun Microsystems, Inc. or Apollo Computer, Inc. workstation. Miller said the Personal Computer AT is not yet powerful enough to host the system. Pricing for the system has not yet been determined, but Miller said CCA expects DB Designer to cost between $30,000 and $50,000.

"We are announcing the product early to emphasize our strategic direction to use the micro as an extension to the mainframe," Miller said.

Integrated set of tools

According to Miller, DB Designer will provide an integrated set of evaluation, analysis and design tools for the data base creation process. The system analyzes designer-submitted requirements and automatically generates first-cut entity relationship diagrams.

Data models can be developed for either CCA's Model 204 or IBM's DB2 relational DBMS.

CCA's new PC/Workshop is an optional extension of its mainframe Workshop/204 applications development environment that allows users to build or modify applications on an IBM Personal Computer, Personal Computer XT or AT in User Language, Model 204's fourth-generation language.

PC/Workshop includes communications software, which can share the same mainframe portion as its PC/204 link. Model 204 must be running on the host, and the micro must have at least 256K bytes of memory. PC/Workshop will be available at the end of the month for $500 per micro.

According to Miller, Release 2 of PC/204 now supports uploading of files to the mainframe for processing or for archival storage. Release 2 also supports downloading of tables as well as spreadsheets from the mainframe. Release 2 of PC/204 will also be available at the end of the month at $750 per micro.

MIS, Inc.: Loctite pros set up shop

From page 1

that hardware, with the sole exception of headquarters.

If Loctite did convert according to Freeman's plan, it would mark the company's first step toward standardization. Until 1984, the company, which employs 2,500 people and produces such products as Super Glue, operated in a loosely controlled environment — at least when it came to choosing computer equipment.

Consider this setup: In 1981, headquarters replaced a 5-year-old NCR Corp. 201 that was "obsoleting itself," Freeman said, with the HP system. That brought the number of Loctite's hardware vendors to four.

The international offices and Loctite's other U.S. subsidiary, Automotive Consumer Products Corp. in Cleveland, had a hodgepodge of equipment from such vendors as Honeywell, Inc.; IBM; NCR; and HP.

After headquarters converted, these divisions went in search of higher capacity systems. However, none of them went with headquarters' choice. "They tended to formulate their own procedures," Freeman said. Each, in turn, selected the IBM System/38. By last year, headquarters was the only holdout.

"Usually you see it the other way around, with IBM at headquarters and other systems at remote locations," said Niels Schulz, former corporate MIS director of Loctite and now president of Info-Point.

In 1984, Loctite was reorganized and the two U.S. subsidiaries were merged under Loctite North America. In addition, tighter controls on such matters as capital expenditures went into effect across the board, Freeman said.

Schulz, also on the steering committee, understood Freeman's thinking. During his tenure at Loctite, Schulz had grown familiar with the problems of working in a multivendor environment. Even minor things — the varied formats in which reports arrived from the many offices — could turn into headaches.

But now Schulz had an even bigger problem. While he saw the move to System/38 at headquarters as good for the corporation, he did not see it as good for himself. Schulz liked working on HP equipment, and he wanted to keep things that way.

In November 1984, Schulz presented two ideas to the steering committee, which represented a way around the conflict — one concerned Loctite, the other concerned himself. First was his vote for the System/38, which was welcomed by Freeman. But the second idea took the senior vice-president by surprise. Schulz wanted to spin off from Loctite to form his own company. He also wanted to take with him those people in MIS who wished to join him.

> ”
>
> *'When you lose seven people, that's an awful lot of knowledge of the company going out the door.'*
>
> — **David Freeman**
> **Loctite Corp.**

As important as the desire to stick with HP equipment was to Schulz, there was another reason for hi[s] wanting to strike out on his own. Under Schulz, the MIS staff had been developing a decision support software package for the HP 3000. "There was this piece of software sitting there with market potential," Schulz said. He wanted it as part of his new company's offerings.

So the plan formed in Schulz's mind. His new company, which he would call Info-Point, could provide consulting services to companies with HP equipment. Starting off with the mother company as sole client, Info-Point could build from there. It could market the decision support package called Focal-Point. There was also a chance to become an OEM for HP.

Schulz's plan was obviously not Freeman's prescription for happiness. "Quite frankly, [Schulz] wanted to spin off with more people than I had wanted him to take," Freeman said. "And he was also a good employee that I didn't want to lose."

But a fight with Schulz would have been too damaging since the company had decided to go ahead with the System/38 conversion at headquarters. The only option was to negotiate as smooth a transition as possible. Freeman responded to Schulz's November proposal the following January. For the next month, the two hashed out the details. By May 1, the new company, with a total of seven former Loctite people, was officially in business.

Info-Point agreed to provide consulting services to Loctite on a declining basis for the HP system until December. Loctite, while retaining the rights to Focal-Point, agreed to let Info-Point market the software package. As Freeman explained, this gave Loctite the opportunity to make money on Focal-Point without any effort. "Our expertise is not computer software," he said.

As of Jan. 1, any services provided by Info-Point to Loctite will be done so on an assignment basis. This month, for instance, Info-Point will be spending approximately 25% of its time at Loctite, compared with the 100% it gave in May. The Info-Point staff pay was based on the Loctite salaries.

It appears that these details were put together in a clear-cut, simple fashion. But back at the MIS department in Newington, life was far from simple. For starters, when the Info-Point people set up shop, they left an official body count at the Loctite MIS department of only three. This small group had just two months to prepare for the scheduled arrival of the System/38.

William Carson, who had been manager of systems and programming, decided not to join Info-Point. He became MIS manager and overseer of one programmer and one programmer analyst. Carson said there were many reasons — some of them personal — for not joining the spin-off. "It felt to me that the majority of their business would be consulting, at least for a year or two. And I didn't want to be in the consulting business," Carson said.

Instead, he found himself in the business of rebuilding an MIS staff. As spring folded into summer, Carson recruited two project managers, another programmer and a programmer trainee. As of late last month, he was still in need of a programmer analyst.

In the meantime, the hardware arrived in Newington on schedule in July. The going has been slow. So far, Carson's department has transferred only the fixed asset program to the System/38. But the past months have mainly been devoted to teaching the new employees about the business of Loctite and the old employees about the System/38.

From a corporate point of view, the changes Carson's department has undergone have not been traumatic. "When you lose seven people, that's an awful lot of knowledge of the company going out the door," Freeman said. "But obviously we replaced them with IBM people. We may have gotten the best of both worlds."

But others at Loctite said they have felt the impact of all the changes. Michael Fal, who, as manager of accounting operations, calls himself an "interface between accounting and MIS," said the changes in MIS have caused problems. "Obviously the backlog of requests grew and got bogged down," he said. "Certain things that I had on my list of enhancements never got done. Unfortunately, the business didn't stop [during the transition]."

Robert Tartaglia is also an interface of sorts. As manufacturing systems administrator, Tartaglia found the past year to be "a time of confusion." It also added to his work load. "You have to spend more time with new people," he said. "It's knowing who to talk to now to get things done."

Control Data remote services joins the micro revolution

Micro-to-mainframe software key to future

By John Gallant

ATLANTA — The remote computing services industry has been accused of many things in recent years, but innovation has not been one of them.

Control Data Business Centers (CDBC), one of the leading remote computing services vendors, has lately attempted to change that and take on the mantle of innovator. Part of the Business Services Group of Minneapolis-based Control Data Corp., CDBC has decided to embrace the microcomputer revolution, which has taken its toll on key segments of the remote computing market such as time-sharing services and has pioneered the marketing of shared micro-mainframe services.

Spearheading CDBC's drive into the micro age is its Atlanta-based Product Support Center, which develops and maintains the software used by CDBC's 30 processing centers nationwide.

Micros as powerful allies

Roger Cole, general manager of the Product Support Center, said CDBC decided to look at micros as potentially powerful allies rather than foes, thus the move to micro-mainframe software offerings, which company officials candidly admit are the key to the CDBC's future.

In May, the group unveiled a micro-mainframe link jointly developed with National Management Systems, dubbed Orchestrator, that allows companies to tap into the processing power and data of the processing centers on the CDBC network via their microcomputers.

And in September, CDBC announced its Human Resource Management System (HRMS), which combines the organization's mainframe-based payroll service, the Orchestrator link and a micro-based human resources package called HR-1 developed by Mainframe Micros, Inc. Since then, CDBC claims to have signed on more than 50 HRMS clients, the majority coming from among the 15,000 companies that currently use CDBC's remote services.

"We are trying not to be bashful in addressing the changes in the remote computing industry," Cole said. "We asked our customers how to respond to the influx of micros, and with their help, we are staying in tune."

With the aid of the new product offerings, CDBC officials said the group's revenue has grown by 20% this year and sales of key services such as payroll have increased by as much as 25%; the company would not provide specific revenue figures. International Data Corp., a Framingham, Mass.-based market research firm, estimated that revenue growth in the overall remote computing market will hover at roughly 10% for the remainder of the decade.

CDBC, originally known as the Service Bureau Corp., was once owned by IBM but was sold in 1973 to CDC as part of the out-of-court settlement of an antitrust suit against IBM. Cole has been with CDBC since the IBM days. Today, he oversees a staff of more than 100 programmers and product support specialists housed in a sleek, modern building in a suburb of this Southern metropolis.

In addition to the fledgling micro-mainframe services, the Product Support Center maintains and enhances CDBC's primary applications products. They include payroll, tax filing, human resources, general ledger and financial reporting and accounts receivable and payable — in all, more than one million lines of code, Cole said.

Applications specialists man a hot line that serves technical personnel at the processing centers who, in turn, take on that role for clients.

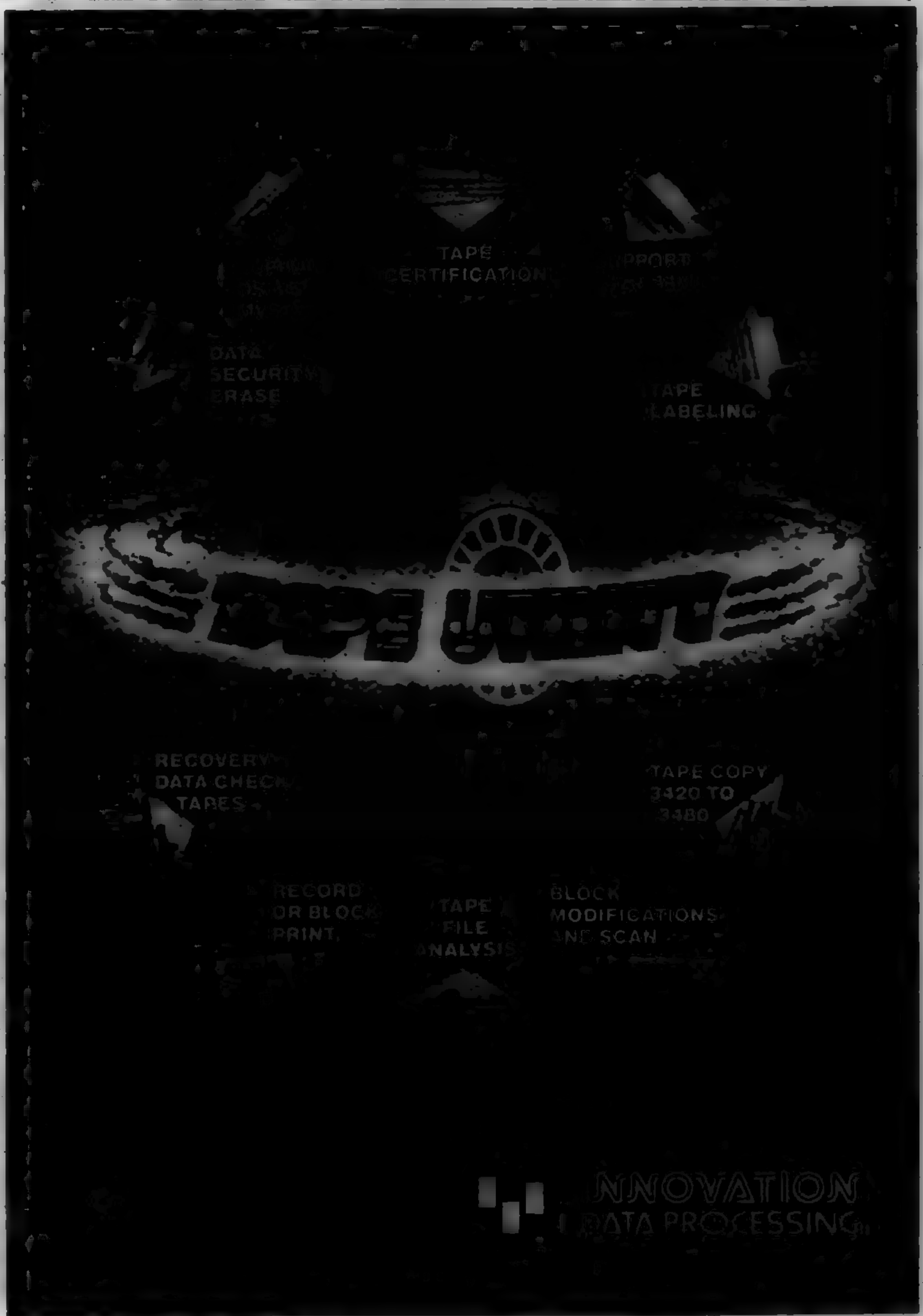
A proprietary monitoring system developed by the Product Support Center enables Cole's staff to assess whether processing centers have successfully implemented new software releases within 24 hours of their distribution. "We think providing one set of software to all our customers is a real benefit," Cole said. "Our nationwide clients wouldn't have it any other way."

But while Cole's Product Support Center is helping to move CDBC into the micro age, his group's approach to technology is decidedly dated.

Atlanta facility houses IBM 4331

The Atlanta facility houses an IBM 4331 mainframe, as do most processing centers, under VM/CMS and DOS/VSE with VSAM and two aging CDC Cyber 120 minicomputers dedicated to word processing and programmer support. While the rest of the industry argues over the merits of Cobol vs. fourth-generation languages, the Product Support Center does all its programming in assembler.

"We have a large investment in assembler software, and we have stayed with that language," Cole said. "Processing efficiency is of paramount importance. We provide software with many user-selected options, and to develop that software in anything but a lower level language would be impractical. Efficiency is also the reason we have stayed with VSAM rather than a newer data base management system."



Staff relocation provokes angry response

Some Bank of America employees would rather quit than switch

By Jeffry Beeler

SAN FRANCISCO — Systems professionals at the U.S.' second largest bank have reacted angrily to a relocation plan that would move them from their current downtown offices to a distant suburb east of San Francisco Bay.

Displeasure over the 25-mile move to Concord, Calif., designed to bring all systems development staff together at one site, has already prompted some Bank of America employees to quit for jobs at other companies elsewhere in the city. Additional staff members said they are scouring the job market for suitable openings. A third faction of the bank's systems specialists, meanwhile, limited its response — at least for the moment — to loud grumbling.

"Lots of people working there are telling the bank, 'To hell with you, we don't want to leave,' " according to a local personnel recruiter who spoke only on the condition that he remain anonymous.

The recruiter's comments were echoed by many other sources, both inside and outside the bank. The bank did not directly respond to queries about the griping.

But even Bank of America's severest detractors readily acknowledge that the relocation is by no means entirely lacking in virtues. Launched in October and scheduled to continue through 1986, the move promises to consolidate a staff of programmers, analysts and other systems specialists who have hitherto been divided among more than a dozen downtown locations. The transfer affects only the bank's development personnel, not its production people, who will stay in the organization's two data centers in San Francisco and in Los Angeles.

Moreover, by no means does the bank's systems organization universally regard the move to the new development center as an unmitigated disaster. On the contrary, most of the employees who already live on the Concord side of the bay greeted the relocation enthusiastically, according to a programmer who still works for Bank of America. Residents of the bay's eastern shore reportedly account for roughly a third of the bank's development staff.

But among the employees who live west of San Jose or on the San Francisco peninsula or in Marin County to the north, the move has engendered widespread animosity. "Most of the people who live way down the peninsula in places like Sunnyvale or Los Altos have already resigned," according to a systems analyst currently attached to the Bank America Systems Engineering (BASE) group.

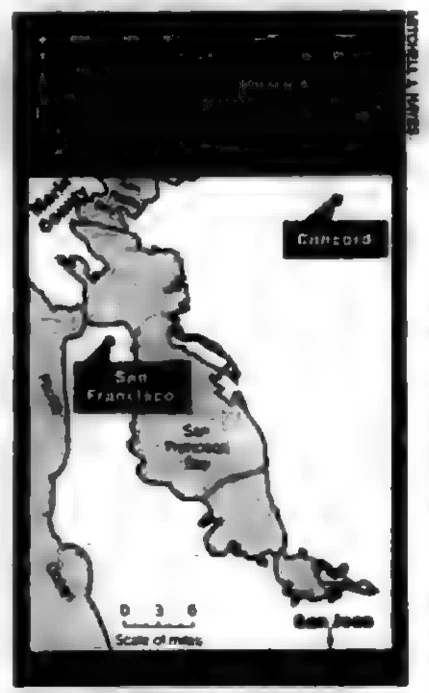
Nor is the BASE staff member alone in his observation. "A friend and former co-worker of mine," a recent Bank of America defector recalled, "quit her job recently because she didn't want to move to Concord."

Whether the dissatisfaction will lead ultimately to large-scale defections remains to be seen. "Some people threaten to leave but never work up the energy to look for another job," noted a systems professional who recently quit the bank partly out of dissatisfaction with the relocation. "Others will do something about it."

Another factor that may discourage an employee exodus is the current softness in the MIS sector of the Bay Area's job market. "If you go out looking for new positions right now, they'll be hard to find," the former Bank of America worker said.

Moreover, the bank offered each member of its systems staff an extensive package of incentives calculated to hold resignations to a minimum.

But even incentives and a weak local job market may prove inadequate to prevent Bank of America's systems professionals from quitting in droves. In fact, the organization's own internal estimates predict a loss of "several hundred" systems specialists within the next year or so, according to a local source with close ties to the bank.



Bank of America's move to a new Concord, Calif., development center will lengthen the daily commute for many of its systems employees, who previously worked in downtown San Francisco.

Asked to confirm the source's report, an official Bank of America spokeswoman downplayed the estimate as "highly speculative" and strongly hinted that any such forecast would be extremely premature.

Another source — one of several Bay Area headhunters who agreed to be interviewed in exchange for anonymity — expects the institution to lose 20% to 25% of its 3,500-member development staff because of move-related discontent. The bank spokeswoman said the estimate was excessive but conceded some personnel loss may be almost inevitable because of the move.

To make matters even worse, a disproportionately large number of the potential defectors are likely to come from the top 10% of the bank's development work force, according to yet another local DP talent recruiter.

A similar view was voiced by the ex-Bank of America systems employee. "The top-rated people generally feel they have more opportunities and are less afraid to take their chances, whereas those who aren't as highly regarded often lack confidence," the source said.

If systems employees, especially the best ones, resign in sufficient numbers, some of the bank's internal application development projects may suffer. One West Coast consultant, in fact, has estimated the price of the relocation at 92 man-years of lost development effort.

Although hundreds of bank systems employees have yet to commit themselves one way or the other, the prospects of avoiding a mass defection among their ranks appear to be slowly fading. Some, though certainly not all, of the local recruitment firms specializing in systems professionals are reporting higher-than-average volumes of inquiries from Bank of America job candidates.

In addition, the rumblings of discontent from the bank's development staff have attracted the attention of its nearby competitors, some of which have done their best to exploit the turmoil for their own advantage. Federal Reserve Bank of San Francisco, for example, recently ran a series of classified newspaper advertisements extolling the institution's downtown job openings and appealing unabashedly to systems employees uninterested in relocating.

The ads, which have been discontinued, drew a "very good response" from several of the city's prominent employers, including Bank of America, according to Terry Leja, who works in the Federal Reserve Bank's employment office. Leja, however, refused to discuss the ads further.

Much of the resistance to Bank of America's ongoing move stems, of course, from a desire to avoid rush-hour traffic and time-consuming treks to work. For many of the employees, the new development center in Concord would create a personal hardship by greatly lengthening the distance of their daily commutes.

But one source who works for BASE advanced an alternative theory for the bank's internal dissension. Many of the systems employees who are griping about the move and thinking of jumping ship are doing so out of dissatisfaction with their current jobs.

"In many cases," the source said, "the systems people with the highest level of business analysis, design and problem-solving skills are being ordered to do schlock work because the bank doesn't know what to do with them. So some of the employees I've talked to are just using the move to Concord as a convenient excuse to go look for work elsewhere."

The same source also voiced the minority opinion that Bank of America secretly welcomes many of the departures as it struggles to cut its budget and return to profitability after a $338 million quarterly loss last June.

Though not the first Bay Area business relocation, the Bank of America effort stands apart from its predecessors for at least two reasons. First, as the area's largest employer of MIS professionals, the bank is tackling relocation on an unprecedented scale. Second, the move coincides with a major internal shake-up that culminated recently with the resignation of Max Hopper as executive vice-president in charge of BASE [CW, Nov. 11].

After 16 years Project/2 still cranks along

By Mitch Betts

BALTIMORE — Utility industry executives last week celebrated the 10th anniversary of the Project/2 software users group, and several users praised the 16-year-old project management software as a mature and reliable old workhorse.

"I'm told that Project/2 is written in an archaic language. But as a user, that doesn't bother me because the software works. It just cranks along," commented Joseph S. Fowler, staff engineer for cost and schedule management systems at Northeast Utilities in Hartford, Conn.

At Baltimore Gas & Electric Co., host of the 10th Annual Project/2 Utility Users Group Conference, the software has been used for so long — 10 years — that it would be tough to change to another package, according to Fred A. Lange Jr., supervisor of the utility's scheduling unit. "We have 75 people trained in Project/2, and it would cost a lot to retrain them," he said.

"It's really not the same software after 10 years because it's been changed and enhanced so much," Lange added.

Utilities use the software from Project Software & Development, Inc. of Cambridge, Mass., for the scheduling and cost management of multibillion dollar power plant construction jobs and for critical maintenance projects.

Users interviewed at the conference said Project/2, while not perfect, has a full range of project management features (including graphics and a relational data base manager) and that Project Software & Development provides good support.

Boston Edison Co. has used Project/2 since 1977 and, like many other users, obtained the package on a three-year renewable license, according to Gerald A. Mata, senior project management engineer. Boston Edison conducts a formal review of Project/2 and its competitors each time the lease is about to expire, and each time Project/2 wins the evaluation even though it is more expensive than its imitators, he said.

"It has every feature we need and more. And you get good support when you need it, along with an established user base," he said.

Robert L. Daniels, founder and president of Project Software, said one reason for the success of Project/2 is the short-term licensing arrangement, which keeps Project Software responsive to user needs.

Now that the product is so mature, some customers are opting for 10-year licenses, he said. Project Software & Development's software has roughly 80% of the utility market, fueling the firm's growth from a $5 million to a $25 million company, Daniels said.

With the falloff in utility construction and declining sales to the remote computer services industry, Daniels said new growth is expected from the aerospace and defense industries and from the new microcomputer version of Project/2.

Sytek expands line with broadband local-area networks

Emulation capability for 30 types of terminals

By Paul Korzeniowski

MOUNTAIN VIEW, Calif. — In an attempt to move away from its dependence on the whims of IBM, Sytek, Inc. announced today two product lines that link its Localnet 20 series of broadband local-area networks to large asynchronous and synchronous computer systems.

"Users who work with a variety of systems will no longer need to have a variety of terminals cluttering their desks," claimed Jeff Tonkel, director of marketing at the company. "They'll be able to access any computer on our network by using only one terminal."

One product line, the System 3000, supplies terminal emulation capabilities for approximately 30 types of asynchronous terminals, such as the Digital Equipment Corp. VT100. The product also uses coaxial cable to attach to an IBM 3270 series controller and supports IBM 3278 or IBM 3279 terminals or personal computers equipped with those types of terminal emulation cards.

Tonkel stated that the 3000 line is geared for large corporations that have a number of disparate devices. Sytek market research estimated that half of the corporations in the U.S. fall into that category.

The second line, the System 7000, is targeted for use in true Big Blue shops for it connects a Localnet 20 to IBM controllers but does not supply support for asynchronous hosts.

Some Sytek competitors, including Ungermann Bass, Inc., offer similar types of network connections. Tonkel stated that a principal difference is that the Sytek product offered more flexibility for adding users to a network. Users can be added on either a single basis or in groups of 16. "Our competitors force companies to add only eight or 16 users at one time. That process can be a very expensive proposition," Tonkel claimed.

Sytek was the OEM that IBM chose for its PC Network. Much of Sytek's growth in the last few years has come from that contract. Sytek has stated that half of its $70 million in revenue for fiscal 1985 came from the IBM contract. Approximately 75% of Sytek's manufacturing production has been devoted to the IBM PC Network, according to Kim Myhre, an analyst at International Data Corp., a Framingham, Mass., market research firm.

However, the network has not sold as well as IBM or Sytek had anticipated, according to the analyst. Myhre estimated that Sytek has shipped IBM 140,000 PC Network kits. IBM has sent 20,000 of those kits to distributors and only 7,000 have been sold.

To compound the problem, earlier this year IBM announced a local-area network, IBM Token-Ring network, that was developed by an IBM division. With the introduction came speculation about IBM's willingness to renew its contract with Sytek.

Myhre said he thinks that Sytek is attempting to loosen its ties with IBM by more fully developing its own relatively successful product line. The company claimed that it has sold 1,000 networks, which support close to 250,000 users.

To an extent, Tonkel agreed with Myhre's assessment. "We are attempting to shift the company away from OEM sales to sales of our own products," he said.

There are six 3000 series products available: single-port controller interface unit ($895), modular controller interface unit ($1,850), single-port 3274 interface card ($695), single-port terminal interface unit ($595), modular terminal interface unit ($1,600) and single-port 3278 interface card ($395).

For the 7000 series, products and prices consist of single-port controller interface unit ($775), modular controller interface unit ($1,850), single-port 3274 interface card ($475), single-port terminal interface unit ($475), modular terminal interface unit ($1,600) and single-port 3278 interface card ($325).

TOP OF THE NEWS

NEWS from page 1

acknowledged Jim Kinlan, the director of technical marketing at Lotus.

"We did not anticipate some of the user concerns that cropped up," he said.

■

Computerland last week was released from all claims against it in the battle with Micro/Vest. Last March Micro/Vest was awarded a 20% share of the retail chain plus punitive damages as a result of a promissory note signed by Computerland founder William Millard. Now Millard and his daughter Barbara will resign from the Computerland board, and the company will be taken public at some point; the Millards and their holding company, IMS Associates, Inc., will continue to appeal the part of the decision that concerns the stock they own, but they will not be required to post a $25 million bond.

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General Electric buys RCA

Broad implications for communications

By Clinton Wilder

In a historic marriage of two electronics giants that both helped pioneer the mainframe computer market and later abandoned it, General Electric Co. last week announced its intent to purchase RCA Corp. for $6.23 billion.

The merger will form an electronics leviathan only slightly smaller than IBM. Although the future management and structure of the hybrid company were unclear at presstime, one leading analyst saw an immediate fit between GE's Information Services Co. (Geisco) and RCA's international telex and satellite links.

"The ability of RCA to offer its communications customers the data base and electronic mail of Geisco on a worldwide basis through its Globecom network is very significant," said Harvey Poppel, a mergers and acquisitions specialist with Broadview Associates in Fort Lee, N.J. "GE will also get Cylix, the packet-switching network that RCA has not pushed as aggressively as GE has pushed its Geisco services."

Some observers said they felt the merger was ironic considering GE's inconsistent moves into the telecommunications arena. "GE seemed to have difficulty deciding whether it wanted to be in that business or not," said Jack Reis, vice-president of marketing for Case Communications, Inc., a maker of network systems and products. In recent years, GE established task forces to consider entering communications segments such as satellite and microwave links but backed away each time, according to Poppel. "Many of the things that RCA brings to the table are things that GE has rejected," he said.

Poppel noted that the marriage should solidify the future of Rockville, Md.-based Geisco, which, according to rumor, GE was looking to sell. Geisco underwent a major reorganization earlier this year and laid off 400 workers [CW, June 10].

Computer Consoles cuts 200

By Clinton Wilder

ROCHESTER, N.Y. — Computer Consoles, Inc. said last week it will lay off approximately 200 people in January and reduce its work force by as many as 350 positions in the next six months.

Computer Consoles, which will report its fourth straight quarterly loss for the current quarter, will dismiss 150 of the 700 workers employed at its main facilities in Rochester. Fifty additional employees will be laid off at plants in Reston, Va., and Irvine, Calif., and 100 to 150 other jobs will be eliminated by attrition in the first half of 1986. The layoffs will affect virtually all job levels.

"We currently employ 1,450 worldwide, and 1,100 is the size we need to be to support our current revenue base and return to profitability," said spokeswoman Judy Rubien. Computer Consoles will post an operating loss of about $5.7 million in the current quarter, and its actual loss will be greater due to expenses associated with the layoffs.

The work force reduction is Computer Console's third and largest layoff of the year. The minicomputer and office systems company trimmed 50 jobs in March and another 70 in August.

Big user nixes shielded wire

From page 1

supplier of synchronous terminals, reversed its cabling policy and endorsed use of nonshielded wire for terminal support [CW, Nov. 4].

Initial movement in that direction came last year when IBM introduced the Cabling System, which supported IBM 3270 peripheral devices with less expensive shielded twisted-pair wire. In October, IBM conceded that even less expensive nonshielded twisted wire could be used in many terminal applications.

Standard twisted-pair wire, it was commonly believed, did not offer the shielding necessary to protect data signals from outside electrical interference generated by things like fluorescent lights. Furthermore, there was some concern the nonprotected wire would radiate energy when carrying high-speed, high-power signals, which could interfere with other electrical devices.

Knowing little about those concerns probably worked to the advantage of David Boehms, manager of Northern Telecom's office systems planning, who was charged with finding an alternative to coaxial cable. Boehms had 15 years of data processing experience and little to no background in engineering.

Northern Telecom, Boehms said in a recent interview, was determined to find a way around using coaxial cable in its new building. The company was in a quandary. It planned to install its own Meridian integrated voice/data product line within a year after moving into the building. That system uses twisted-pair wiring, and Northern Telecom did not want to spend roughly $170,000 to install coaxial cable to support its synchronous terminal population in the interim.

Boehms set out to experiment. Using a coaxial-to-twisted-pair adapter developed by a colleague, Boehms connected a 3270-type terminal to a controller with 1,700 feet of twisted-pair wire and tested it for a month. The link, which supported IBM's 2.34M bit/sec. Type A terminal protocol, worked fine, Boehms said.

Based on that experience and on further tests, Northern Telecom went ahead with plans to wire its seven-floor building to support 150 3270-type terminals; 160 Northern Telecom 585 devices, which are minicomputers that also provide some 3274 controller capabilities; and 70 Northern Telecom Meridian 4000 terminals, which emulate IBM 3278 displays and have individual integral digital telephones.

Today the facility has a computer room on the second floor that houses eight 29X series Northern Telecom cluster controllers, which are plug compatible with IBM 3274 controllers. These controllers are connected to a central punch-down block in the building's telecommunications room with a cable containing 600 wire pairs. That block — a board where each twisted-pair wire in the building is terminated — is connected to a wiring closet on each floor with a separate 600-pair cable.

Offices on each floor are wired to their respective wiring closets, which also contain punch-down blocks, with a six-pair wire. Of these wires, two pairs are intended for use with Northern Telecom's digital telephones — one as a telephone line and the other for power — and the other pair can be used to support 3270-type terminals. This leaves three spare pairs for other applications.

Data, voice travel in same cable

Data and voice travel down to the telecommunications room in the same cable, but not over the same wire. Once there, the pairs supporting the terminal are split off and routed to a controller across the hall. These controllers are connected to an IBM 3081 processor in Ann Arbor, Mich., via Northern Telecom's private packet network.

In ongoing tests, Boehms has used as many as five out of six wire pairs simultaneously: two to support an SL-1 telephone; two more with a Meridian 4020 integrated voice/terminal; and one for a Northern Telecom Display phone, which is a combination asynchronous terminal and analog telephone. All devices performed well.

Although Boehms has not tested bit-error rates, there have not been any noticeable problems. Users, in fact, reported that screen refresh seemed faster than when the devices were supported with coaxial cable.

Another benefit of the system is ease of relocating equipment. Like other cabling schemes, the wiring system Northern Telecom installed enables terminals to be moved as easily as telephones. After relocating the device, a wire jumper is used in the wire closet to connect it to the proper pair running down to the computer room.

Although new to the world of information processing, high-speed data on twisted-pair wire is not new, analysts said. "Telephone companies have been supporting megabit speeds over twisted pair for a long time," noted Ian Angus, president of Angus Telemanagement Group, Inc., a consulting firm in Toronto. "In normal applications, twisted pair should be adequate at distances ranging up to 2,000 to 3,000 feet."

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DEC customers expect BI grouping products next year

Microvax II cluster may impact VAX line

By Donna Raimondi

The impact of the Microvax technology on Digital Equipment Corp.'s mid-range VAX products may dramatically increase early next year when the company introduces a concept called BI clustering, which is known to users as Bus or Backplane Interconnect clustering.

DEC will not say when or whether the concept will be announced for its Microvax II, but references continue to surface.

BI would be a boon to thousands of Microvax II users in that it will probably allow the Microvax II to share resources with other VAX systems.

When questioned about the term, the company told *Computerworld* it does not comment on unannounced products.

A DEC salesman told customer Lawrence Berkeley Laboratories in Berkeley, Calif., which owns a large VAX cluster, that the BI product would be available "sometime in the future."

Attendees at the DECUS users group meeting in Anaheim, Calif., last week heard references to BI clustering at several sessions. When DEC was asked to explain the term BI, the company said they do not discuss products prior to introduction.

Three DEC users told CW that BI will be announced relatively soon. One predicted a Jan. 29 date, and two claimed that BI — along with two new processors — will be announced at the April DECUS meeting in Dallas. The users claim to have proposals that include the new product.

Expensive to configure

At present, the Microvax II is expensive to configure with enough storage space to do the kind of applications the microprocessor-based machine is capable of performing. Clustering capabilities provided by BI would allow the Microvax II user to access data on any VAX system in a cluster.

"There is no basic reason they would not be able to do clustering on the Microvax II," said Will Zachman at International Data Corp. in Framingham, Mass.

However, DEC has to position its VAX-11/750 and 11/780 before it springs a clusterable Microvax on the market.

The BI Microvax, which will probably be called a Microvax III, will reach at least into DEC's mid-range, Zachman said, killing off the market for the VAX-11/750 and probably even for the VAX-11/780. The initial Microvax products reportedly have already severely dampened demand for the VAX-11/730.

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Bank puts blame on software flop

From page 1

porary software patch enabled the bank to process $8 billion in securities late Nov. 21, but it failed at 12:30 a.m. the next day, and the full-scale redesign was completed by 2 a.m. By 12:15 p.m. Nov. 22, the system resumed full processing.

Bank documents indicated that the computer program was developed by an outside software development firm, which assisted in the software patching effort. The firm was not named in documents or testimony.

Congressional delegate Walter E. Fauntroy (D-D.C.), chairman of the U.S. House Subcommitee on Domestic Monetary Policy, criticized the bank for its high-risk strategy in trying to conduct regular business while assuming that the computer glitch would be fixed by the end of the day.

"This type of behavior, together with the size of the loan, the largest ever made through the discount window by the Federal Reserve, raises grave concerns regarding the safety, soundness and effectiveness of the payments system," he said in a statement that opened the hearing.

Chairman of the Federal Reserve Board Paul A. Volcker cautioned against overdramatizing the incident, but he pointed out that the Federal Reserve has long urged banks to shore up their computer systems.

To encourage better backup systems, Volker said, it may be necessary to establish a special penalty interest rate when exceptionally large borrowing is caused by the institution's own computer problems.

The Bank of New York's chairman, however, said the $5 million interest payment on the emergency loan was sufficient penalty. "Indeed, $5 million represents a very substantial penalty for our stockholders, officers and employees." Bacot said.

Bacot also stressed that the bank's computer system has an excellent reputation and is used as a model by some Federal Reserve Banks. Ironically, the software changes made in March were intended to make it possible for the system to handle more transactions — up to 36,000 issues.

The Bank of New York is the nation's 18th largest bank and one of the two largest clearers of government securities in the country.

DEC users sticking with 8600, looking for Microvax cluster

Microvax II cluster capabilities rumored

By Maura McEnaney

ANAHEIM, Calif. — The recent release of Digital Equipment Corp.'s VAX 8650 and the company's emphasis on clustering its systems failed to generate any great enthusiasm among users who gathered in Anaheim last week.

An estimated 10,000 people were to attend the Digital Equipment Corp. Users Seminar (DECUS) and the nearby Dexpo West '85, a show for DEC-compatible equipment vendors sponsored by Expoconsul International, Inc.

The DECUS meeting, often used by DEC for major product announcements, was rather uneventful following DEC's earlier announcement of its 8650 superminicomputer {CW, Dec. 9}.

But users attending Dexpo talked of future DEC announcements that would bring cluster capabilities down to the Microvax II. That announcement could coincide with a DECUS meeting set for April in Dallas, sources said.

Although the 8650 is said to improve upon the 8600's speed by about 44%, some 8600 users said they would stick with their current configuration, particulary because of the $125,000-conversion cost.

The University of California at Berkeley's Lawrence Berkeley Laboratory has one of the largest DEC clusters in the country. According to systems manager Edgar Whipple, the lab purchased five 8600 machines last summer.

Addressing an upgrade to the 8650s, Whipple said, "$125,000 sounds like a lot to me." When the lab previously converted its VAX-11/780s up to the 11/785, "we were dismayed at the price at first. But if they say it's going to be 50% faster, I would tend to believe them," Whipple said. Nevertheless, the laboratory is not likely to be an early user of the 8650 because it does not need the added capacity.

"I would be surprised to see us take five 8650s. I don't think it's justified yet. It may be in another couple of years, but by then there may be a few new processors out that would be more suitable," he said.

"I think that the 8650 upgrades are going to be difficult to come by for a while," said Nigel Haslock, a consultant for AGS Computers, Inc., who configured a DEC cluster for AT&T Information Systems.

He noted that the difference in price between the 8600 and the 8650 is the same as the cost of upgrading an 8600 to an 8650. "That in itself means DEC doesn't want people to stop buying 8600s," according to Haslock.

DEC's cluster architecture gives users the ability to combine existing machines to create more powerful processors, which the company claims are as powerful as IBM's largest mainframes. But, users say, DEC's software pricing policies on clusters leave a lot to be desired.

"DEC is going to have to come out with a more flexible pricing policy," said Stephen Tihor of New York University's (NYU) Academic Computing Facility. "The current system is not fair." More than 500 students and researchers now access NYU's DEC cluster, consisting of a VAX-11/780, 11/785 and two 8600 machines. The current DEC pricing structure requires software to be licensed for each machine on the cluster.

Treating software working on a cluster as a single system may be one solution to the software licensing problem, Tihor said.

"With the whole DEC philosophy of distributed computing, they are going to have to come up with a Digital licensing architecture."

■

At Dexpo West '85, product displays were headlined by expanded memory for the Microvax II, data base software and hardware peripherals.

Product introductions at the show were mostly limited to enhancements of existing product lines.

Among those introductions, Oracle Corp. announced that its relational data base management system now runs on VAX clusters. According to the company, the announcement marks the first time that Vaxcluster users can share information within a data base management system that is compatible with IBM'S DB2 and SQL/DS systems.

The license price for Vaxcluster support is licensed for each Oracle-resident VAX in the cluster and ranges from $24,000 to $96,000.

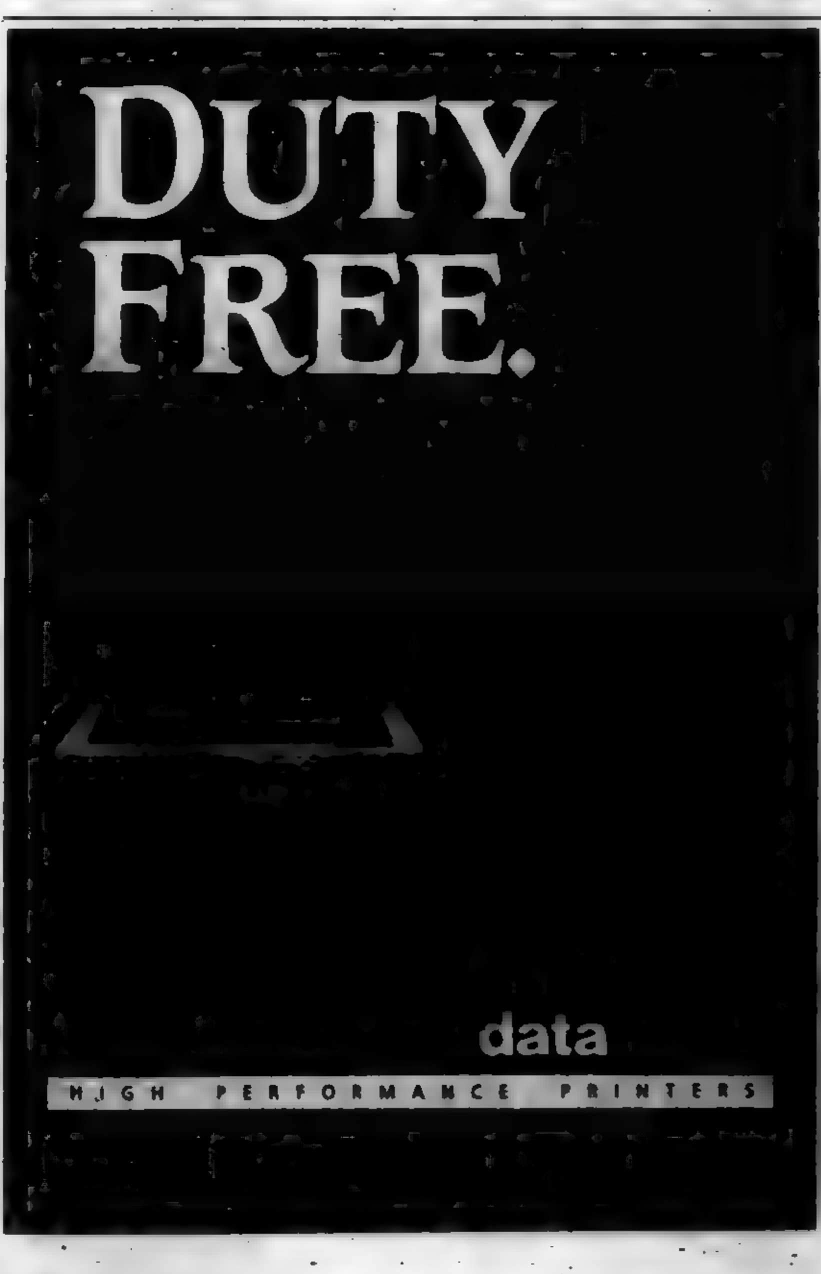
Chip industry indicator looking up

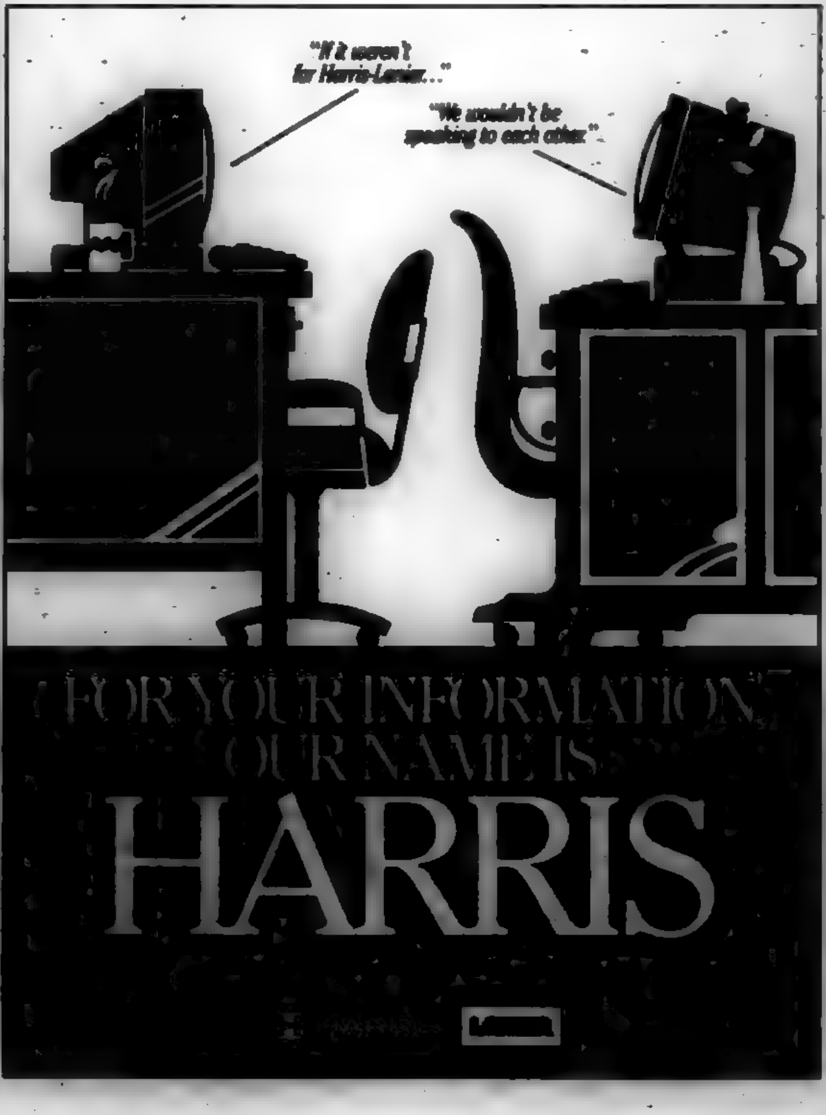
SAN JOSE, Calif. — The hard-hit chip industry received another ray of hope last week when the Semiconductor Industry Association (SIA) announced that its leading indicator for November reached its highest point in more than a year.

The SIA's book-to-bill ratio hit 0.90, meaning vendors in the U.S., Japan and Canada received $90 in new orders for every $100 worth of semiconductors shipped. After hovering around 0.75 for most of the year, the ratio rose to 0.82 in October.

For the three-month period ended Dec. 1, the industry's average of $535.1 million in orders per month represented a 6% increase from the three months ended Nov. 1. But the current order rate remained 21% below the same period in 1984.

— Clinton Wilder

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MIS, DP managers make do in absence of net standards

Local-area networks fill communications gap as industry waits

By Peggy Watt

DALLAS — Corporate MIS and DP managers are anxiously awaiting industry networking standards but are more than willing to develop their own with third-party options, according to several attendees of a managers' seminar last week.

During a conference for MIS/DP managers sponsored by Future Computing, Inc., attendees said networking their microcomputers and other systems is a major concern, and in some cases, they are developing their own standards. But managers made it clear they are still looking for the industry to establish those standards.

"Companies will fill the standards vacuum if the industry doesn't set them, particularly with local-area networks," said Karl Kendall, manager for personal computer support at Metropolitan Life Insurance Co.'s New York information center.

Companies are interested in communications at several levels, the managers stressed. Viable micro-to-mainframe communications is the aspect of interest to Dot Autrey, second vice-president of Lomas & Nettleton Financial Co.'s information resource center.

"What we really need is a slick interface. I'd like to see more vendors addressing this important service," she said.

The network wish list offered by Billy Dusek, vice-president of the Federal Reserve Bank of Dallas, included electronic mail and document distribution capability, file sharing, peripheral device sharing and "any-to-any" communications.

His institution's system juggles most of those needs with 180 terminals and 137 personal computers hooked up to an IBM 3084.

"It doesn't work as cleanly as I'd like. We're using all IBM devices, and even they don't always talk to each other."

Eyeing local-area nets

Metropolitan Life's Kendall said his organization is examining several local-area networks now, with an eye toward integrating most of the 1,400 personal computers it will have installed by the end of this year. The company also expects almost to double that personal computer population to 2,200 by the end of 1986.

"We haven't got a good answer there, but we certainly have a very strong need," he said. He said the company expects to design some of its programs in order to cope with particular productivity needs, standards and costs. He is examining code generation on a personal computer workstation connected to a host.

"We're using PCs from the standpoint that they are our productivity tool," he added. "The software isn't perfect, but it lays the groundwork for the future.

The users themselves are taking the opportunity to voice their preferences at Metropolitan Life, Kendall said. The organization formally created a "partnership in quality" between the information center and departmental support personnel to help with evaluations and plans.

But the end users are not absolutely calling the shots.

"Control is the absolute key to integration. If we're ever going to put it together, somebody's got to have control," said Charles Feld, vice-president of management services for Frito-Lay, Inc. People may have and voice their software or hardware preferences, but "you can buy whatever you want. You're just not going to get any support" from MIS.

Representatives of several other companies said they, too, did not prohibit purchase of software not on the approved list, but that support was spotty. "MIS needs to take a leadership role," said Randall Pietzer, assistant vice-president for information systems at Southwestern Life Insurance Co., of Dallas.

Future Computing President Egil Juliussen said he has found different parts of a firm will have different strategies, that the all-encompassing information center that handles computing, communications and other technological office supply needs does not exist yet in most firms.

For efficient payback, some firms, such as Frito-Lay, have opted to buy a base terminal and plug in their own enhancements from third parties, including add-on cards, memory, even additional drives. "By the end of a decade, putting a PC on a desk and tying it into the network is going to be as common as installing a telephone," Feld said.

Juliussen said the microcomputer will become the workstation of choice, since the personal computer workstation can handle most functions of dumb terminals as are needed to communicate with host or other systems or perform stand-alone tasks. To no one's surprise, he also predicted the IBM Personal Computer based on an Intel Corp. 8088 family — probably incarnated in the 80286 or 80386-powered system in the next decade — will remain entrenched in the corporate office.

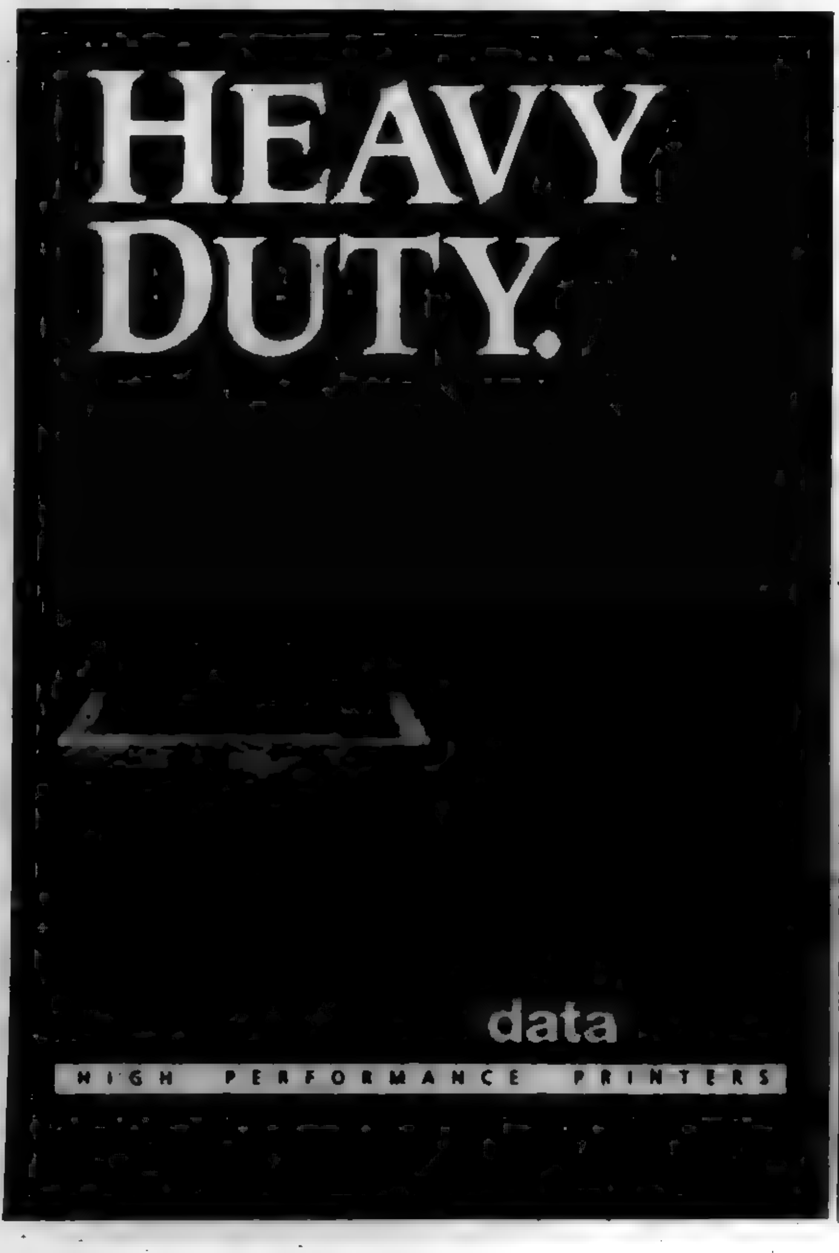
But users also like their Apple Computer, Inc. Macintoshes. Even Future Computing prepared its program's graphics with a Mac.

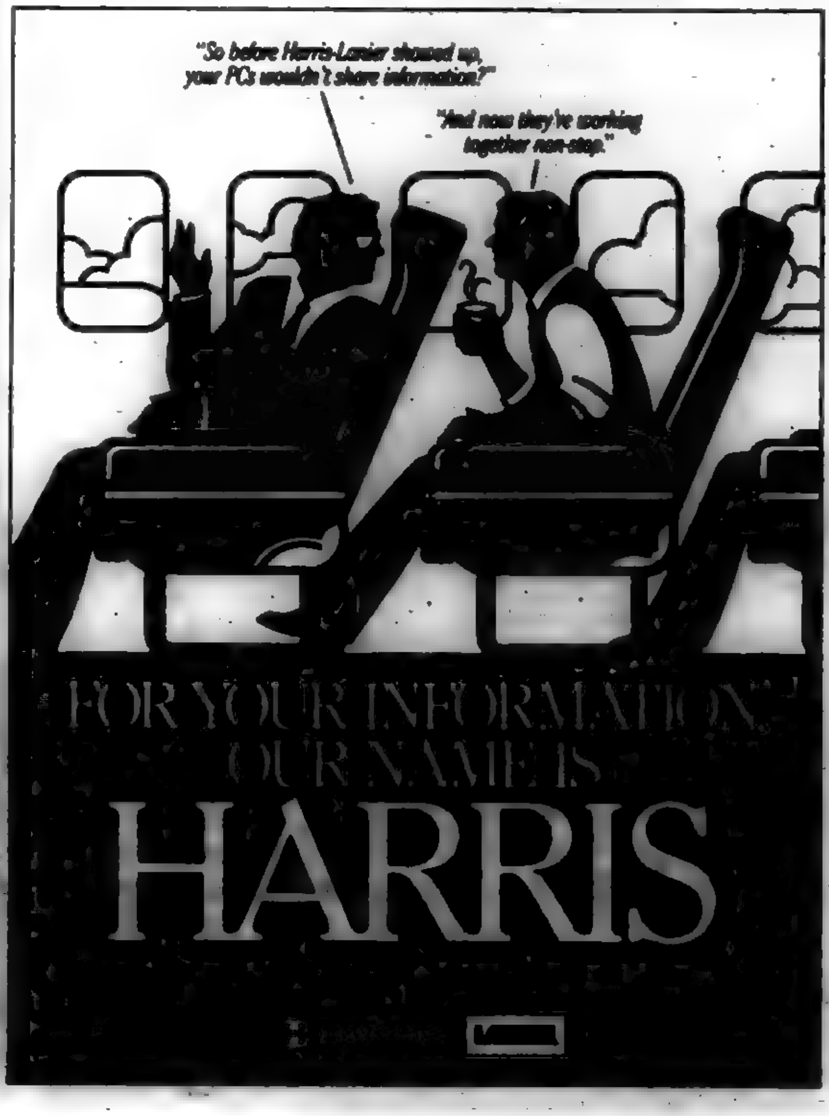
Attendees nodded and related stories of around-the-clock use of the Macintosh in their own offices.

Metropolitan Life's information center's three Macintoshes among 14 micros are "in the highest demand," Kendall said.

But, Juliussen cautioned, even the slick interface is not enough to cause upheaval in the personal computer-entrenched corporation.

"A new interface must offer functionality and compatibility to prompt a switch," he said. "If it's incompatible, it must be five to 10 times better to get somebody to switch."





"So before Harris-Lanier showed up, your PCs wouldn't share information?"
"And now they're working together non-stop."
FOR YOUR INFORMATION, OUR NAME IS HARRIS

West Germany reexamines private-line data regulations

By Bryan Wilkins

WASHINGTON, D.C. — West German telecommunications regulators, who have clamped strict controls on foreign firms' ability to use private lines in transborder data shipments — affecting U.S. firms such as banks and computer services firms — have signaled their intention to reexamine their policies in talks with U.S. negotiators.

A high-level U.S. delegation returning from West Germany last week said West German restrictions on the installation of open-ended leased private lines that connect to foreign points will continue but reported that the West Germans proposed a flat-rate private-line tariff that is less restrictive.

The ban by the German Bundespost, West Germany's postal and telephone authority, on the installation of leased private lines unless they terminate in a computer has hampered U.S. firms from entering the West German market.

Smaller data processing service firms are especially affected by this ban, according to Philip Onstad, a member of the U.S. delegation and a representative in the Washington, D.C., office of Control Data Corp.

Onstad said last week that West German Post Minister Christian Schwarz-Schilling told U.S. negotiators who traveled to West Germany on a fact-finding mission that the Bundespost was willing to consider approval of a new type of leased-line tariff in which charges would be based on the amount of time the line circuit was used.

From the U.S. perspective, this move by the West Germans was a positive development. "In the past, the Germans have been adamant on restricting private installations unless they ended in a computer, which was affecting U.S. firms greatly," Onstad said.

The second part of the tariff proposed by the West Germans would permit the connection of the private line to other types of terminal equipment, including the public telephone network, electronic mail and public data networks. This feature was responsible for the optimism expressed by the U.S. delegation on its return.

WORLD DIGEST

Computerworld News Service

FRANKFURT — The foremost West German electronics industry association is working to encourage European manufacturers to support General Motors Corp.'s Manufacturing Automation Protocol (MAP), a means by which factory automation equipment from various vendors can communicate.

The Frankfurt-based Zentralverband der Elektrotechnischen Industrie e.V. announced late last week the creation of a MAP committee and stressed the importance of defining standards for computer integrated manufacturing.

NIJMEGEN, Netherlands — The Dutch public telephone network took the first step toward completion of its Integrated Services Digital Network late last month when the network's first five digital switches were installed. The switches, to be operational before the end of the year, were supplied by AT&T and Philips Telecommunications N.V.

The Dutch Postal Telephone and Telegraph already uses two L. M. Ericsson digital switches for international telephone routing and for special services. Earlier this year, it chose APT, an AT&T and Philips joint venture, as the main supplier for the digitalization of its network.

TURIN, Italy — Digital Equipment Corp., which recently announced a joint venture with Comau S.p.A. of Italy's Fiat group, said this week that other alliances with European firms are also in the works.

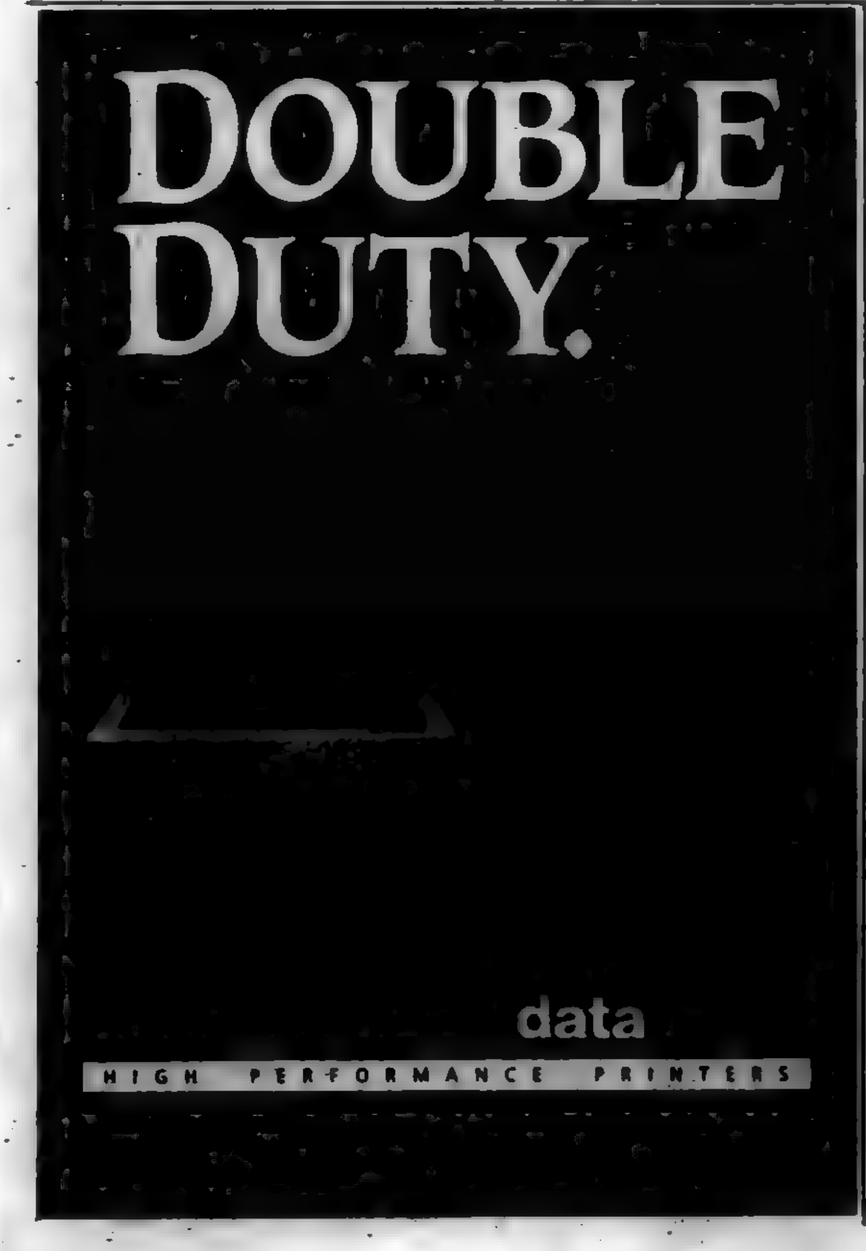
Digital Equipment S.p.A. and Comau last week announced the creation of Software E Systemi per l'Automazione Manufatturiera, which will develop integrated automation systems for Europe's medium-size manufacturing companies.

FRANKFURT — Wang Laboratories, Inc.'s West German subsidiary, Wang-Deutschland GmbH, said last week that it had earned $81.2 million in the past fiscal year but still suffered an overall loss largely because of the strength of the dollar. It did not specify the amount of the loss.

According to the subsidiary's managing director, Dieter Bazzista, the company will return to profitability this year.

PEKING — The Chinese government is said to be considering limits on semiconductor imports because a chip glut in China is hurting domestic producers, the *China Economic Daily* reported this week. According to that newspaper, the total number of semiconductors available for sale in China is expected to reach 135 million units by the year's end, up 82 million from last year.

China's 1985 domestic semiconductor demand, however, has been estimated at no more than 170 million chips, with domestic production accounting for 52 million units, said the Chinese Ministry of Electronic Industry.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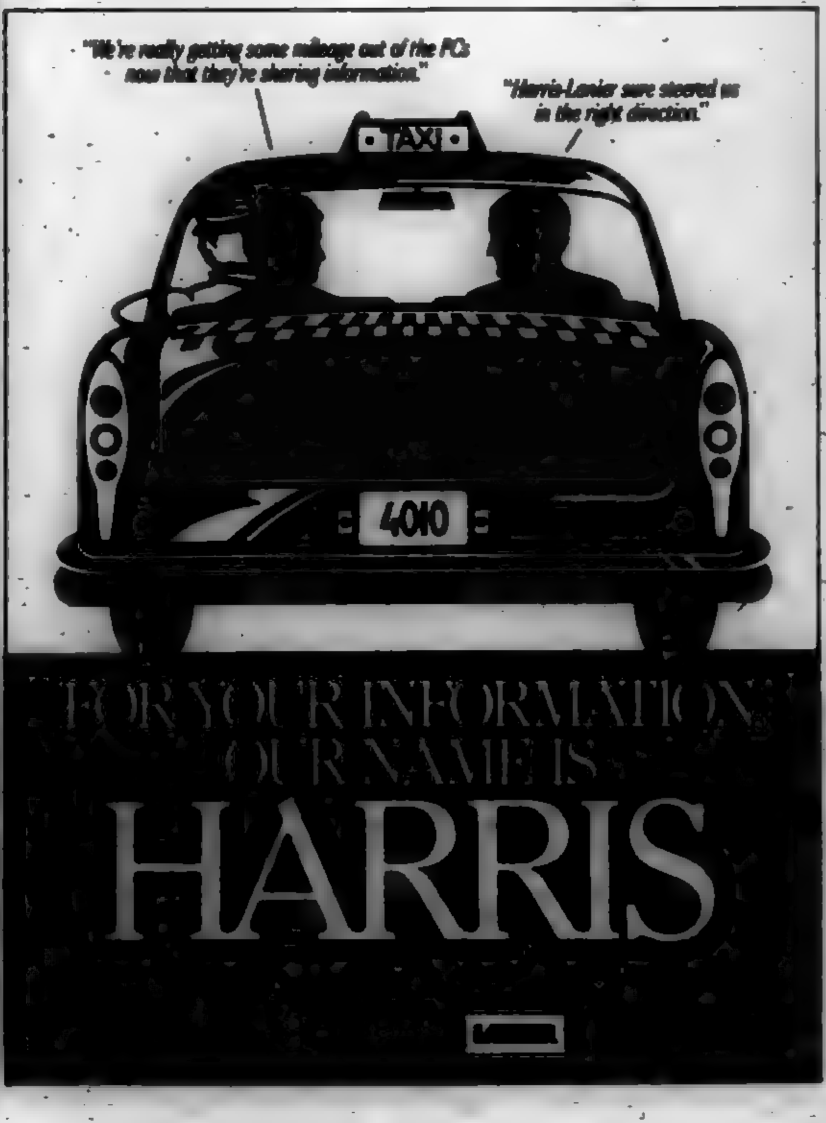

"We're really getting some mileage out of the PCs now that they're sharing information."
"Harris-Lanier sure steered us in the right direction."
TAXI
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VIEWPOINT

EDITORIAL

Making a wish list

It's that time of year again when folks gather around the fire, lift a glass, give quiet thanks for the foregoing year — and wish for those things they would like to be different *next* year. For DP/MIS managers, the following might be some of the hopes and dreams for 1986:

- A way to turn the backlog into a Yule log and watch it burn to a crisp.
- An easy-to-use workstation that can access a network via software.
- Fourth-generation languages that are more than relational data bases with utility tools tacked on.
- A simple, plug-in wiring scheme.
- Key vendors deciding on some broad communications standards.
- On the other hand, standards for *anything*.
- Truly natural natural language.
- Truly intelligent artificial intelligence.
- A clean, simple and inexpensive way to hook into IBM's maze of protocols in the office — from Systems Network Architecture to LU6.2.
- Managers and professionals who actually use the neglected micros sitting on their desks.
- Some method for managing distributed processing other than throwing darts at an organizational chart.
- Funds to send all end users to computer camp next summer.
- A crystal ball capable of telling which vendors will still be in business five years from now.
- Federal trade laws that reflect concern for computer users instead of industry lobbyists.
- Some way to stop IBM representatives from behaving like International Business Mannequins.
- Technology cycles that last at least as long as the products on which they run.
- Documentation that describes what software actually does, not what vendors hope it will do.
- Disappearance of turnkey systems that take longer to implement than they did to build.
- A group of users who realize that it takes more than one seminar to know how to run an MIS department.
- A return to 1956 and an uneventful Christmas with Perry Como, Doris Day and the company's only computer.

Notes & observations

VDTs and the question of their potential health hazards are back in the news. The newest survey provides yet more inconclusive data on the effects of VDTs on those who work with them, and the Data Processing Management Association is taking a hard line against legislation now pending in several states that would regulate employees' exposure to VDTs (see story page 2). Although legislation is probably the least effective remedy if there actually are health risks in continued VDT exposure, we believe that professional organizations have a responsibility to continue probing for answers. The DPMA, instead, appears to be more interested in stopping the questions. That is not responsible.

LETTERS TO THE EDITOR

DP staff layoffs just a Band-Aid for upper level mismanagement

The article "DP personnel new victims of corporate cuts" [CW, Nov. 18] reported layoffs of DP personnel by a few of the large New York-area companies because upper management decided their DP shops were top heavy with excess personnel.

The editorial "Don't cut here" [CW, Nov. 18] warned that upper management needs to be made aware of the danger to the company's survival caused by the cutting of data processing department operations.

All these conditions result from one basic cause that has plagued data processing during the last 25 years. That cause is mismanagement.

The mistakes being made are repeated because the upper level executives responsible for those mistakes and the managers selected to fill DP slots have buried their heads in the sand by refusing to admit and recognize that serious shortcomings exist throughout the ranks of data processing management.

Firings, the lack of perception of the DP role and the feeling that too little is being done by the DP department result from the failure to face facts about data processing.

Unfortunately, the data processing field will continue to deteriorate as long as certain principles and suggestions remain ignored by "professional" DP managers, or those who call themselves that, and by the executives responsible for the poor selection of managers in the first place.

No more than 5% of all data processing installations are being managed in a professional manner. That percentage will not be improved as long as essential factors for successful DP management are ignored.

The signals being sent out through the DP industry during the last year and a half indicate that strong mismanagement rules the data processing world. The signals of mismanagement that executives and DP managers hoped would disappear by ignoring them have instead accumulated to the point of exasperation.

So now they believe that the cutting of staff — which is just a Band-Aid — will correct these problems. What is really needed are professional managers in data processing.

John Callahan
Arlington, Texas

Performance not only a question of language in design of data bases

Articles recently published in *Computerworld* have called into question the performance of production applications programmed in fourth-generation languages. The articles implied that if the application had been written in Cobol, performance would have been satisfactory; that fourth-generation languages are not cost-effective; and that fourth-generation languages cannot replace third-generation programming tools such as Cobol. The conclusions and the implications are both largely incorrect,

Part of the problem, as was suggested in the Product Spotlight "Language barrier: The fourth generation at work" [CW, Nov. 11], is terminology. Because the term "fourth generation" is used to describe anything from a simple language for ad hoc queries by untrained end users to an entire tool kit that enables data processing professionals to build complex, high-volume, recovery-sensitive, transaction-processing applications, there is little wonder that confusion exists.

What is important is to understand the task at hand and to select the appropriate tool, or tools, for the job.

What must also be considered is that Cobol by itself is simply not suitable to address either the needs of the end-user community or the productivity requirements of the MIS department. In the latter environment, it has to be supplemented by an array of development tools, such as command-level CICS or map-generators.

That is why organizations are justifying a fourth-generation approach and realizing the benefits of greater programmer productivity, increased high quality in application function, reduced maintenance and training costs and valuable prototyping capabilities.

The speed with which an application can be developed is a very important criterion, but the accuracy with which the program logic is developed has an equally significant benefit.

For these reasons, the somewhat heavier resource requirements that such products have can be accepted by those responsible for implementing systems.

There are occasions when Cobol is still neces-

See PERFORMANCE page 23

For more letters, turn to page 18

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VIEWPOINT

Office automation: the next generation

By Ralf Ellis

READER'S PLATFORM

The latest glamour product in a long line of a high-tech innovations is the integrated voice/data workstation. This product is being touted as the answer to the office automation problem — how to get more office workers to use computer products. The pressure to increase usage comes not only from vendors of these products but also from forward-thinking management in user organizations.

But, you say, office workers are using computer products. They have been using data terminals and word processors for years, and now personal computers have taken their place alongside them. The penetration in business the last few years has been phenomenal, and today there are approximately five million workstations in use.

So who is using them, and what are they doing? First of all, personal computers are sitting on nontraditional computer users' desks, being used by people who don't know how to write programs and by many who don't even know how to type.

But these users quickly mastered the use of tools such as spreadsheets and word processors. The personal computers are used mostly for constructing financial models, typing documents and accessing host computers.

Now that sales have slowed a bit, the buyers of this technology are beginning to ask questions about use, cost-effectiveness and the long-term influence on corporate information processing. Also, doubts have been raised about the applicability of personal computers in the upper echelons of big business. After all, there aren't that many senior executives or managers, relatively speaking, that use personal computers productively in their daily work.

It is precisely because of this lack of acceptance that the industry has extrapolated the need for the next generation of office products. The problem is that there are widely divergent views of what these products should do, how they should do it and what they should cost.

The variety of vendor responses indicates some measure of confusion as to what is needed and how these needs should be satisfied. Just what problem are we trying to solve anyway?

Office work consists of a set of tasks. These tasks range from answering the phone to performing calculations. Let's face it, the office is an unstructured, unsystematic environment. The problem is to find a way to improve the efficiency of the white-collar workplace by increasing productivity.

Such improvements can come through document preparation and dissemination, arranging meetings, accessing information and so on. The time that is saved can then be used to improve decision making and to increase the volume of work performance.

The office marketplace is easily misunderstood by computer vendors. Products are largely designed and developed by hardware and software engineers. These people do not work in an office; they work in a laboratory. Office workers perform many tasks of which programmers and engineers are unaware.

Traditional thinking does not respond well to problems that are unsystematic or unstructured. Traditional products will not do the job either. The personal computer can be classified as traditional because its heritage is computational and is but a subset of the office automation solution, as is word processing.

The personal computer fails mainly because it is not integrated, does not allow speedy transition between functions, does not incorporate voice functions and is not easy to learn and use. After all, the office workers that will use these products are not computer aficionados. To them, the computer is a tool, not a preoccupation.

Executives are commonly mentioned as primary candidates for integrated voice/data workstations because voice communications plays such a prominent role in their daily work. But focusing on the executive is a mistake because it neglects some basic facts about the corporate environment.

Executives do not work alone and, in fact, are among the most supported individuals in large enterprises. They work with secretaries and administrative assistants, staff professionals and managers who report to them each day. In fact, the executive is part of an office work group, and this group is the market the integrated voice/data workstation must address.

It is a difficult market to satisfy because it requires a much more global approach than the individual workstation market. It is no longer enough to provide word processing and spreadsheets. Vendors will not be able to get away with hyping old products. A few of the following things will be required:

- A technology leap with architectures that allow true integration of voice and data in a reliable and maintainable way.
- Integrated software that is easy to learn and use and that allows rapid transition between functions and the use of common data across all functions.
- Supporting software that adds significant value to the procedures they replace.

The users are talking about and are waiting for these products. When these devices appear, with the right price and performance characteristics, the market will accept them with open arms.

Ellis is founder and president of [illegible], a Winter Park, Fla., manufacturer of executive workstations.

Standardizing the industry

Open approach could halt high-tech slump

By Scott McNealy

High technology's high fliers have finally landed in Silicon Valley. Companies are laying off, factories are shutting down and quarterly profits have turned into mounting losses. Japan, the economy, venture capitalists and a host of others get blamed.

The computer industry, however, has not adequately owned up to the portion of the problem that is its own making. Without such critical self-appraisal, the high-tech recession won't be readily turned around. Learning the lessons and rectifying the mistakes, however, can put the industry back on the trajectory of growth that has been fueling much of the recent U.S. economic renaissance.

The biggest issue the industry must confront is the desparate need to standardize. From the buyers of multimillion-dollar supercomputers down to the small-business executive trying to learn to use a personal computer, all levels of customers are sick and tired of a situation in which one part of their system can't talk to another, and new technology makes obsolete what went before.

READER'S PLATFORM

”

Customers are suffering from a severe case of technology indigestion.

To be blunt, customers are suffering from a severe case of technology indigestion. Orders for new products are likely to continue tapering off until manufacturers show a real willingness to relieve that ailment.

For years we have heard high-tech companies argue that the industry is too new or experimental to standardize. At best, that attitude reflects a narrow engineering focus willing to sacrifice the customer's convenience and budget for the last word in bells and whistles. At worst, the refusal to accept standards is a cover for pure greed.

By using proprietary systems rather than standardized ones, some companies are consciously trying to lock their customers into brand loyalty. They oversell the promise of their companies, hoping customers will never catch on to the trick being played on them.

A responsible manufacturer in today's environment needs to concentrate on the "on ramps" and "off ramps" of the product. Will it be compatible with what the customer already owns? Will the customer have to learn a whole new set of procedures for efficient operation? Will tomorrow's advances in technology be easy to integrate with what is being offered today?

The best way to be sure of a "yes" answer to those questions — and to instill customer confidence — is to design products around accepted industrywide standards at all the interfaces where one technology will need to talk to another. The AT&T Unix operating system is one example of such a standard that can be shared by all classes of computer equipment from supercomputer to desktop.

In every niche of information processing, superior standards have indeed evolved. They may not be perfect, but that's not the point. If you wanted to be a technology purist, you could blame the standards used today to generate electricity or broadcast television signals.

The task then, is for the computing industry to listen for the standards that customers are demanding and to accept an open approach to systems building. Customers must be assured that they can easily incorporate products of their choosing from many different vendors as well as from tomorrow's products — all with minimum disruption to their large existing investments in technology. Otherwise, most of them will continue to sit and wait until things become better — and the industry will continue to stagnate in the meantime, losing more ground to foreign competition.

Acceptance of the "open systems" approach, however, requires a break with the mind-set of the recent entrepreneurial revolution. Most entrepreneurs want their companies to be nothing short of the next IBM. They insist upon their proprietary systems in the vain hope that, like IBM, their way of doing things will become the world's standard and will bring them untold billions in profits.

Dreaming of building an IBM-size company is inappropriate at this stage of the game. The time has come to take the blinders off, to look around at what everyone else in the industry is doing and to look forward to the future. Instead of trying to be the engine, companies should focus on the part they are best suited to play — even if it's only a spoke on a wheel.

The computer industry has tried to lead the customer around by the nose for too long. It has ignored customer appeals for standards and easy integration of technology, concentrating instead on its own shortsighted marketing strategies.

For an industry in deepening stages of slowdown and shakeout, the time has come to stop blaming broad macroeconomic forces we cannot control. Our focus ought to be closer to home on the problems we can solve. In that context, it is high time the whole industry began listening more closely to what customers are saying, and it should make sure they get what they want. That process alone will go a long way toward combating the current high-tech slump.

McNealy is chairman of Sun Microsystems, Inc., a Mountain View, Calif., manufacturer of workstations for technical professionals.

The relational DBMS debate rages on . . .

Codd blames vendors of data bases for confusion over relational theory

John Cullinane's letter to the editor [CW, Oct. 28] has publicly exposed the continuing hostility of Cullinet Software, Inc. management to the relational DBMS approach — and thereby has given many in the field of data base management systems cause to wonder how relational the product IDMS/R can be. Is the "R" merely creativity in advertising in place of creativity applied to the quality of the product? It is time for Cullinet to take a clear-cut stand that is consistent with the realities of its products and to stop trying to mislead the public.

There are several things wrong with Cullinane's response to my two-part article, "Is your DBMS really relational?" [CW, Oct. 14 and 21]. Over the past 10 years or so, Cullinet has placed all of its eggs in the Codasyl basket — in spite of the resounding defeats the Codasyl Data Base Task Group suffered in other public debates since then. After several years of significant growth and profits resulting from this Codasyl-oriented policy, Cullinet finds itself in the unenviable position of being unable to support the rather sudden and substantial change in the DBMS market, namely a decided preference on the part of buyers for DBMS that are authentically relational.

Cullinane's assertion that my article is really intended to defend the IBM dual data base strategy is not only totally incorrect, but it is also laughable because on several occasions I have publicly stated that this duality is neither in IBM's interest nor in its customers' interest. This strategy is rather like declaring assembler language and Cobol or PL/I to be equally strategic.

A second reason I have openly opposed this strategy is that, even if there were any sound reason to support it, competitiors of IBM in the DBMS field such as Cullinet take advantage of it by asserting that, in contrast to IBM, their customers need only one data base management system.

Now that the marketplace has suddenly turned in favor of the relational approach, Cullinet finds itself in a highly ambiguous and inconsistent position. It wants to convince potential customers that its product IDMS/R fully supports the approach.

However, there is a lot more to relational technology than merely supporting tables and adding the letter "R" to the name of the product. Therefore, it is not easy for a vendor to portray the impression of mastering relational technology if it has not.

Cullinane's remarks about performance are equally ludicrous and depend entirely on a conveniently incorrect quotation from my article. Tests have shown that at least one relational DBMS product — and very likely two from distinct vendors — can outperform both IDMS and IDMS/R. Now, at this early stage in the development of relational DBMS products, it is all too easy for a vendor to produce a relational DBMS that performs poorly.

This does not mean that poor performance is a necessary consequence of choosing the relational approach — a myth that Cullinane appears anxious to perpetuate. It does mean, however, that it is necessary for a DBMS vendor's technical people to study the hundreds of technical papers that have been published on this subject and to do at least some research and prototyping themselves.

I have encountered all of the executive-style criticism before. When executives experience a favorable run of profitable years, and this has been the case with Cullinet, they convince themselves that the good fortune is entirely because of their executive skills. Thus, Cullinet executives have chosen to ignore the relational research and development of the past 15 years or more.

A letter to the editor from Lee Greenfeld [CW, Nov. 4] displays an attitude toward theory that is unfortunately all too common in this field of software developments. Instead of examining a theory to determine if it has practical application, anything with a theoretical flavor is assumed to have no practical value.

I suspect that the land surveyors in ancient Greece were hotly opposed to the plane geometry that Euclid introduced because it threatened to convert their black art into a more systematic and rigorous enterprise. It is the assumption by practitioners that anything theoretical cannot be practical that keeps the field of software development from becoming a branch of engineering based on solid principles. It is fortunate for us today that Euclid's work survived and even now finds great use.

Let me assure you that each feature of the relational model was included in the model only if it had clear practical value. Further, as every IBM Guide users group member can confirm, the collection of requests made to IBM by early users of DB2 was strongly correlated with the features of the relational model not implemented in the first release of DB2.

RELATIONAL DATA BASE
SOFTWARE -AND-
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DEALERSHIP
AND NOW I SUPPOSE YOU'RE GOING TO TELL ME THIS ISN'T REALLY A ROLLS-ROYCE!

One final point: I have never taken the position that, if a DBMS is not fully relational, it cannot be considered to be relational at all. It sounds as though this purpose would be simply to avoid doing work that is necessary in today's market. The whole purpose of my article was to show the extremity of the differences in support for the relational model provided by DBMS products from different vendors — products claimed to be relational data base management systems — and to help the public sort out this confusion by providing a relatively easy way of evaluating how relational these products are.

It may help your readers to understand why I went to the trouble of developing the article if I contrast the relational approach to data base management with the fourth-generation language flag, which many vendors are now flying.

There is no fourth-generation language definition worth its salt, let alone any theoretical foundation. James Martin's purported definition fails to mention what capabilites a fourth-generation language should have — it is quite inadequate to say that it must express tasks 10 times more concisely than Cobol. A mere change in Cobol syntax could probably accomplish that goal, and incidentally, the language APL would qualify as a fourth-generation language.

Thus, any vendor can claim to provide a product that supports a fourth-generation language, and there is a no basis for checking or challenging such a claim. With the relational approach, however, the relational model can be used, is being used and will continue to be used to check vendor claims. This action will protect all the work that has gone into the relational approach from being undermined by vendors' inadequate implementations and extravagant claims.

E. F. Codd
President
The Relational Institute

When making systems investments, users choose reliability over speed

John Cullinane's letter to the editor [CW, Oct. 28] on a highly interesting two-part article by E. F. Codd, "Is your DBMS really relational?" [CW, Oct. 14 and 21] is a bit worrying to me because it seems that Cullinane is familiar neither with customer requirements nor with data base technology.

The data technology part he explained by admitting that Codd's article is "about the silliest" he has read. He only forgets that Codd's article is about relational data technology, and I hope Cullinane will realise that there is a slight difference between the relational concept and networking.

Cullinane is trying to corrupt Codd's article — and rules — by saying it is "analogous to building an airplane according to an aeronautical engineer's design specifications, and once completed, he finds it will not fly."

The analogy is excellent; there is only one part that is wrong: the conclusion. Data base technology is really "flying." There is no question about that. Cullinane is talking, or trying to talk, about speed.

I leave that point for others to decide, but I think the airplane analogy may be worth elaboration for just a moment. I do think most passengers appreciate airplanes that are safe and reliable and reach their targets. And most think it's better late than never.

So speed is not the only vital point here. What's important is to be part of a technology that is present and will be present in the future, thereby protecting the large investments users are putting in data base systems today. In that context, we should read Codd's article. I give credit to *Computerworld* for printing it.

Rolf Lind
Oslo, Norway

Theory vs. reality: the same goal from two different perspectives

It seems the recent argument in *Computerworld* over relational data base systems is once again a demonstration of the differences between a theoretical and a practical viewpoint.

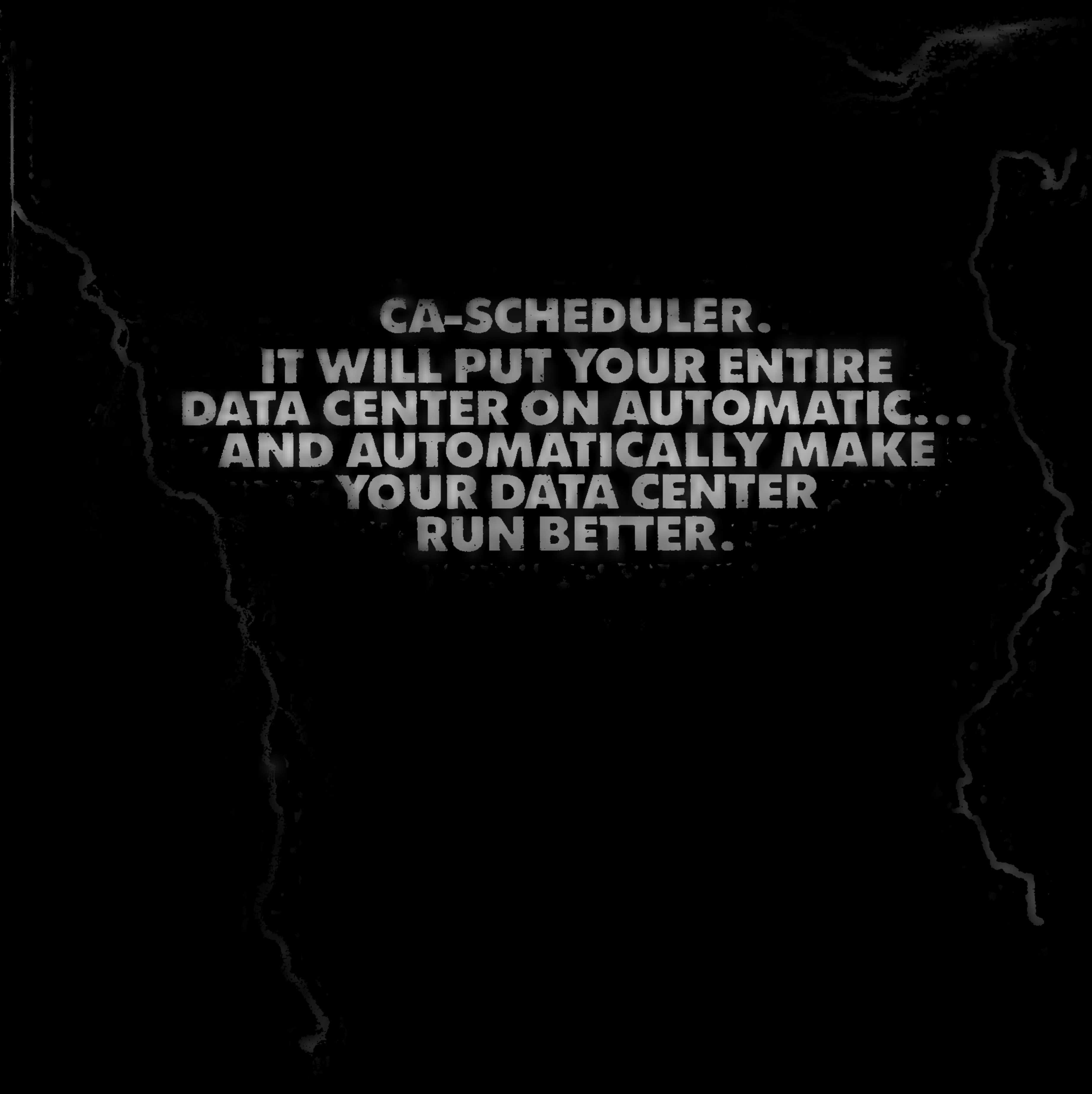
First, E. F. Codd presented 12 rules and other features of a fully relational DBMS in his two-part article "Is your DBMS really relational?" [CW, Oct.14 and 21]. It is clear that there is no better authority on this subject than Codd; hence we can easily accept his article as a means of comparing a vendor's DBMS with the fully relational model.

From the other viewpoint, John Cullinane is a proven leader in the DBMS field. Judging by the growth of Cullinet Software, Inc. during the last 15 years, we can safely assume his products have been accepted by industry as valuable tools that can help solve corporate software requirements in acceptable time frames. The Cullinet DBMS is expanding its capabilities to include the relational approach but at the same time keeping the performance formula that has made it so successful.

Both viewpoints are working toward the same goal, to satisfy corporate needs, but from opposite directions. One has an excellent model and must implement a DBMS with appropriate performance considerations, the other must adapt its performance DBMS to fit the model if it wishes to be considered fully relational.

Finally, when consultants such as Joan Boroff make statements in her letter to the editor that "90% to 97% of all applications can be supported by the transaction processing capabilities of today's authentic relational DBMS" [CW, Nov. 18], we should all be aware of two major concerns. First, from what source are such statistics gathered? And second, the main goal for corporate users is for all of their applications to be supported by the same DBMS at the same time with aceptable performance measurements. No relational DBMS has proven to industry that it can do this.

David Richardson
Greenville, S.C.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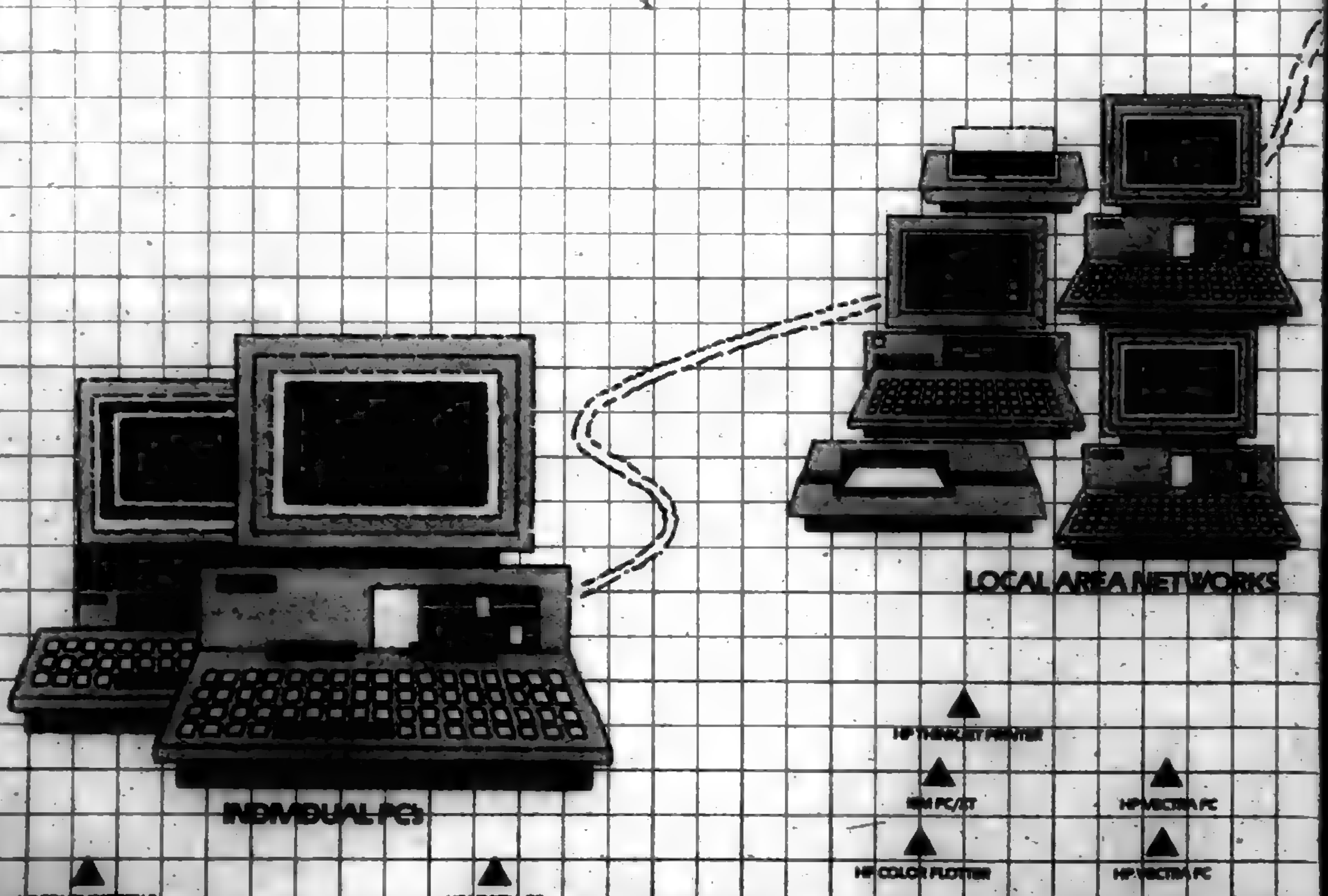

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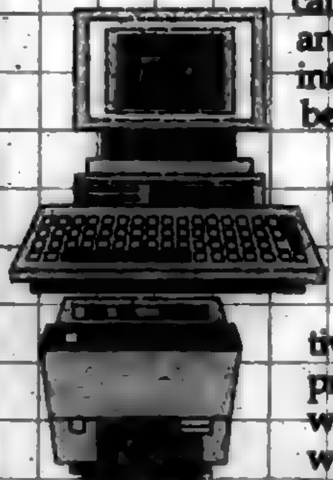

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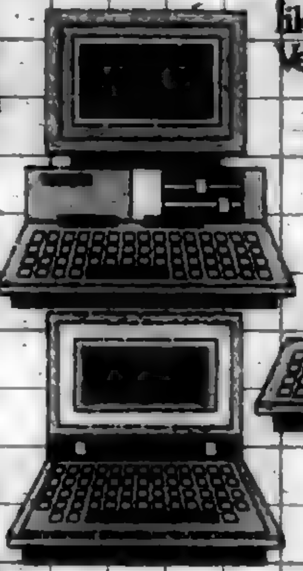

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Performance not only question of language

From page 16

sary. In the same way that assembly language was used for performance-critical functions years ago, a combination of Cobol and the fourth-generation language should be used for certain very high-volume applications that support a large number of terminals and that require very fast response time. Also, many fourth-generation languages do not support batch processing nor can they be easily justified for the implementation of batch applications that have rigid turnaround constraints.

The role of a good data base design to support the application requirements must be considered: Performance is not merely a question of language.

The requirements of the business application must come first, where balancing trade-offs between production and development costs is a means to that end. Blaming a fourth-generation language for the failure of an application to perform acceptably is like blaming the computer: It is too often a convenient oversimplification.

The acceptance of fourth-generation languages for addressing production applications is growing fast. The only area where lower level programming tools get better marks than fourth-generation languages is in faster execution in carefully constructed performance-critical applications.

In the future, high-productivity fourth-generation languages will be used to build high-performance production applications, but Cobol and PL/I will stay where they are today. Because of the overwhelming productivity benefits it offers, the time for a judicious adoption of the new generation is the present.

Martin A. Goetz
President
Applied Data Research, Inc.
Princeton, N.J.

Multisession software: MVS misconceived, SNA missing

As any MVS systems programmer knows, the MVS restriction concerning address space page faults that is described in "Multiple-session software emulates a messy desk" [CW, Nov. 18] is applicable only to those products that were not designed for multiple tasks. Unfortunately for many CICS users, the preferred CICS environment is currently a product in which normal application transactions, competing with passed-through session traffic, will impact both activities in the exact manner for which the article criticizes central switching products.

Similarly, in the preferred TSO environment, the article dismisses passed-through session overhead while neglecting to discuss the potentially large impact upon TSO swapping and overall system performance from keeping the entire TSO address space resident while nonpreferred applications are being accessed.

Unmeasurable overhead, together with the increasing user requirements for multiple-session capabilities, creates some potentially serious exposures for an approach based upon the preferred premise — 75% to 25% — that it won't be used very much. Our own studies indicate that the point at which TSO passed-through overhead exceeds that of a properly designed single address space is closer to a 95% to 5% split.

A more conspicuous absence in the article is the lack of any discussion about the network considerations related to session switching — not even a mention of IBM's Systems Network Architecture (SNA).

Probably the most significant point that the article makes is an inadvertent one: There are no shortcuts in the implementation or the evaluation of a truly usable multiple-session product. A great deal of MVS and SNA expertise, as well as extensive testing and benchmarking, are necessary to distinguish premises and promotional literature from performance. Users will verify that the distributed switching product will provide a wide range of multiple-session and session management benefits with none of the MVS performance or SNA traffic problems of either the preferred or central switch products described by the author.

Albion J. Fitzgerald
Network Products Director
Telemetrix, Inc.
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SOFTWARE & SERVICES

SOFTLINE
Thomas O'Flaherty

IBM's LU6.2 coming of age

The computer industry is only now beginning to understand the implications of IBM's LU6.2, also known as Advanced Program-to-Program Communications. IBM's statement of direction fitting LU6.2 into the Systems Network Architecture (SNA) universe was made three years ago. But the pieces are just beginning to fall into place.

When implemented, LU6.2 allows intelligent devices and programs operating on these devices to establish direct peer-to-peer communications, bypassing the host as required. This is in contrast to current practice, which requires host control over an SNA network. Host control exists because a basic assumption of SNA was that there would be two classes of devices: hosts, with powerful processors and large amounts of storage; and terminals, with trivial amounts of local processing and storage.

This view of the world never left much room for minicomputers. At the time of SNA's birth, IBM did not have a strong market position in medium-size computers. The Personal Computer has changed a great many things, including IBM's views on what is an appropriate relationship among devices in a network.

LU6.2 recognizes that processing — and, consequently, storage — may take place at many points, and these processing points should be able to make

See IBM'S page 32

O'Flaherty is a principal at Information Service Strategies in Hackensack, N.J., and a regular contributor to Softline.

TI looks ahead with Focus

Programming language improves productivity

By John Desmond

DALLAS — Information Builders, Inc.'s Focus fourth-generation language is as useful as data is scattered at Texas Instruments, Inc.

The Information Systems and Services department of TI, which relies heavily on Focus, has encountered some minor flaws in the product. But, overall, Focus has offered a vast productivity improvement over Cobol.

TI has seen productivity gains of 10:1 to 100:1 in programming with Focus vs. Cobol for end-user ad hoc reporting and querying. "It's really quite overwhelming," TI Information Center Manager Glenn Fischer said of the gain.

TI has taken steps to allow Focus users access to the company's many data bases, distributed throughout departments. Information center staff members have defined 150 of the corporation's major production data bases to Focus. "Our Management Systems [central DP] brothers have assisted us in getting those set up so the masses can use them like crazy," Fischer said.

A reporting application that takes an hour or two to develop in Focus would literally take months to turn around in Cobol, he said. "Focus is particularly good at taking data from multiple systems and data bases and producing reports combining that data. To do that in Cobol is a real pain."

TI's experience with the market-leading fourth-generation language belies criticism that such products are used only for toy applications. TI installed Focus in early 1983 as an end-user tool. "Focus is not a Cobol replacement for operational systems. It is used extensively for prototyp-

See TI page 26

SOFTWARE NOTES

CGA's Top Secret to change hands

The $25 million package. CGA Software Products Group, Inc., vendor of Top Secret, the most widely used security software for the IBM MVS environment, has agreed to sell the package to Computer Associates International, Inc. for $25 million. A Computer Associates spokeswoman said the Jericho, N.Y.-based company will acquire existing Top Secret license agreements from CGA and will employ an unspecified number of CGA employees associated with the product. Top Secret is currently installed in more than 800 DP shops worldwide. The spokeswoman said closing of the transaction is subject to the satisfaction of several unspecified conditions. The move was seen as strength-

See NOTES page 28

DNS releases editing package

By Paul Korzeniowski

ST. LOUIS — Data Networking Services, Inc. (DNS) has announced DNS Editor, a package billed as a replacement for IBM's TSO/ISPF.

A spokesman said its DNS Editor was designed for a virtual environment and supports up to 25 IBM MVS users per address space or 200 IBM MVS/XA users for each address space. DNS Editor features support for IBM JES/HASP jobs, IBM ISPF-compatible screens, a complete line editor and interfaces to packages such as Pansophic Systems, Inc.'s Panvalet. The spokesman claimed the product performs significantly better than TSO/ISPF.

The package's editing capabilities include entry and updating of information stored in partitioned data sets, locating text strings, deleting and displaying lines, on-line help, windows, logical tabbing and

See DNS page 26

INSIDE

An automated system development methodology for DEC VAX computers is unveiled by Index Technology Corp./28

The National Bureau of Standards completes a prototype program to link incompatible tools for CAD/29

NEW THIS WEEK

- Burroughs announces Diebold emulation package for RT750
- Sperry offers Suprema maintenance system

For more on these and other new products, see pp. 63-79.

INSTANT ANALYSIS

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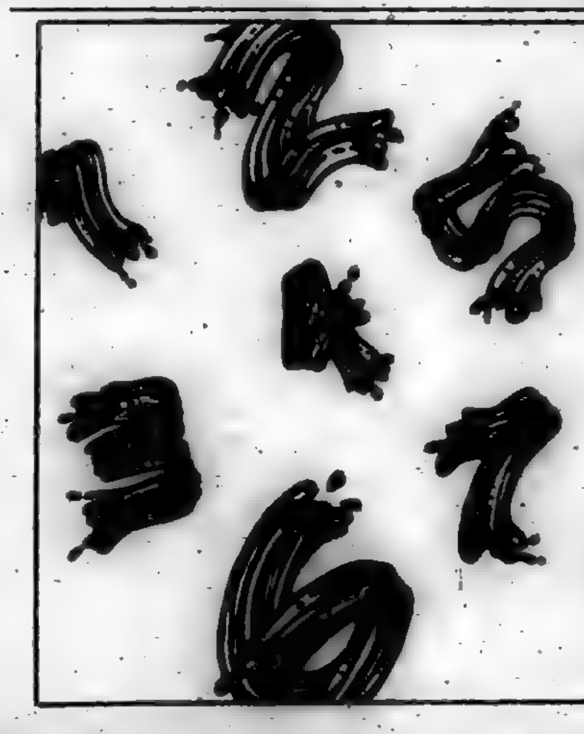
— **Dennis Yablonsky**
president, Cincom Systems, Inc.
on IBM software pricing strategies



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System development tool out for DEC VAX

Aids programmers, systems analysts

By Paul Korzeniowski

CAMBRIDGE, Mass. — Index Technology Corp. has announced a version of Excelerator, its automated system development methodology, for Digital Equipment Corp. VAX computers. The package, XL/Design Integrator, was designed to aid programmers and systems analysts in the design and maintenance of applications.

XL/Design Integrator supplies a subset of Excelerator functions. The package's data dictionary stores data structures, record definitions, element descriptions, process logic, screen definitions, record layouts, system design diagrams and supporting documentation.

The product's Entity list enables analysts to create, save and compare lists of items stored in the dictionary. Lists can be created using selection criteria such as dictionary audit attributes.

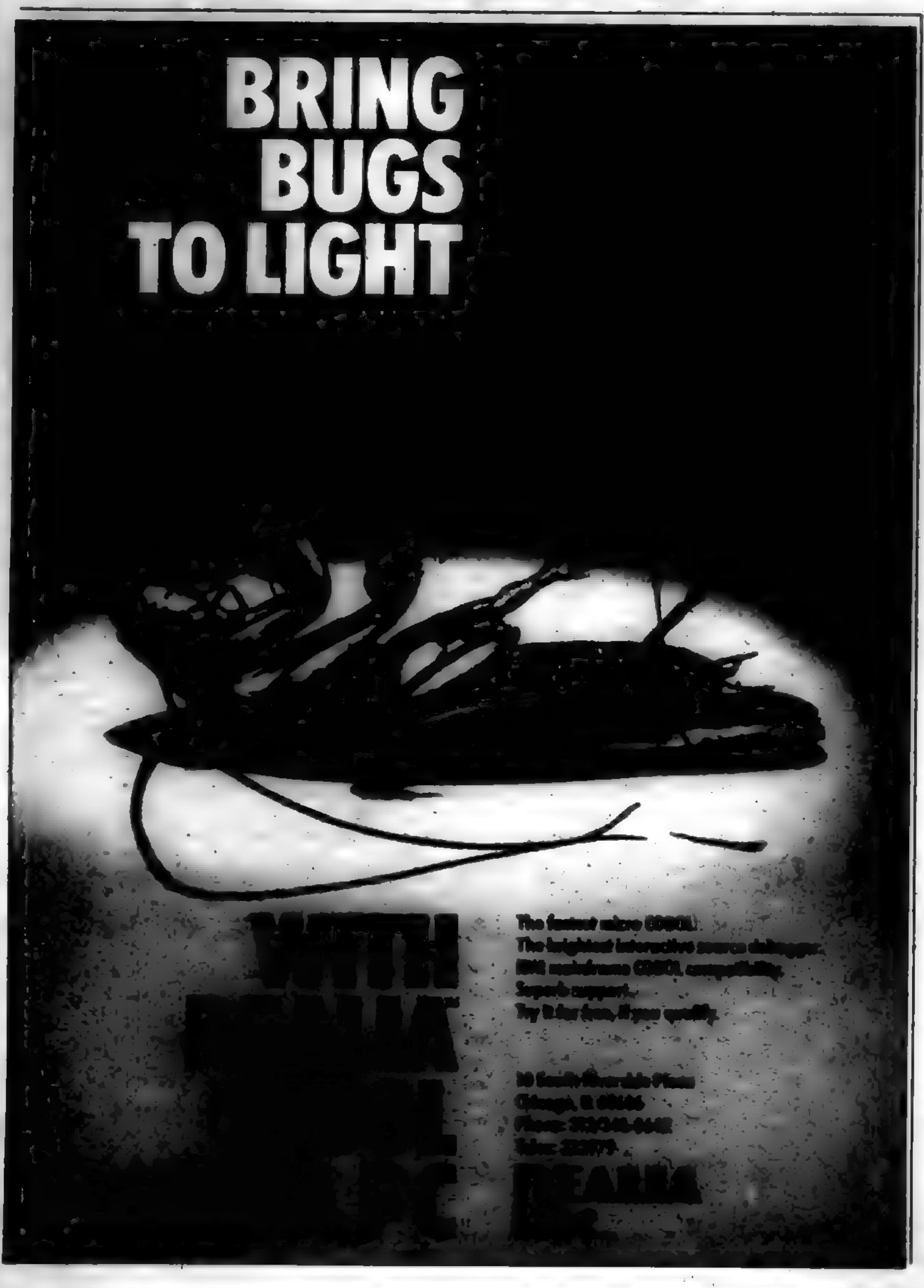
XL/Design Integrator can produce graphics analysis reports. For example, its Level-to-Level Balancing report verifies data flow by comparing a graph and its lower levels, and its Explosion creates a hierarchical table of contents up to nine levels deep.

A Verification report lists every illegal connection and any unconnected object in a data flow diagram. Other reports illustrate which files use the same access key, which records are used in a given data flow diagram and which users are responsible for which entities.

The product is able to import and export Excelerator files so that designs can be shared by members of the application team.

XL/Design Integrator operates on any VAX system that runs DEC's VMS 4.1 operating system. The full Excelerator system runs on the IBM Personal Computer line.

License fees for XL/Design Integrator range from $10,000 to $35,000.



DNS releases editing package

From page 25

copying blocks of code. The product includes an audit trail for all global partitioned data set and procedure library changes.

System programming tools include access to data sets and a console display. The package displays on-line free DASD space.

DNS Editor supplies security features such as control over access to data sets, volume or job.

DNS Editor runs under IBM's DOS, OS/VSI and MVS operating systems and can be used with IBM 3270 series terminals Models 2, 3 and 4.

The software costs $15,000.

TI looks ahead with Focus

From page 25

ing and for department-level systems," Fischer said.

TI's central DP is based on IBM 3030 and 3080 mainframes. Departmental processing is handled by nearly 50 IBM 4341 mainframes. The company also has 17,000 TI Professional Computers, 15,000 of which are connected to its worldwide IBM Systems Network Architecture net.

Focus users access both live data and copies of data, but are not allowed to update production data. "None of the horrible things that people thought were going to happen if we let users in our data bases have happened. Users are not bent on destroying the corporate files. We've found that they behave very responsibly," Fischer said.

The performance of Focus reporting applications is comparable to that of similar programs written in Cobol. "You can extract a single page of data with an IMS Cobol-written transaction faster than you can with any kind of Focus TSO transaction, but a Cobol report typically gets put out to a printer. With Focus, it's convenient to put out the report on-line or in batch mode," Fischer said.

Before a major application is put into production at TI, it is often prototyped in Focus and tested. "All or part of the prototype is usually converted to Cobol," Fischer said. Decisions are based on whether the application's complexity and processing demands are appropriate for Focus.

TI's implementation of Focus does not allow concurrent updating of the data base, although Information Builders does offer that capability through an optional product. "We found it to be unsatisfactory in our environment," Fischer said of the option. "You've got to have MVS console operators starting and stopping tasks, and turning stuff off and on and jacking around with the software. That is not our operating environment. Things have to run on automatic pilot here," Fischer said.

Because TI is such a heavy user of Focus, the firm occasionally uncovers bugs in the product. When such a glitch is found, TI reports it to Information Builders, which usually fixes it in a future release of the product, Fischer said.

This is no way to manage a network.

It takes more than wishful thinking to keep a network up and running. Particularly if you're working with more than one vendor and coordinating resources in many locations. Just by adding users, small problems can turn into big ones and, before you know it, your network's down from here to Hong Kong.

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Machine tool link near

Aids shop in CAD, code generation

By Bryan Wilkins

GAITHERSBURG, Md. — The National Bureau of Standards (NBS) has completed a prototype software program that links incompatible hardware and software systems to perform computer-aided design (CAD) and automatic real-time code generation for the machine tool industry.

The prototype, developed at NBS' Automated Manufacturing Research Facility (AMRF), is aimed at production shops where numerically controlled metal-cutting machines produce small parts used in other machines. These shops have traditionally relied on manual labor and have been the among the slowest sectors to introduce automation into the workplace, NBS said.

According to Charles R. McLean, the software system architect for the prototype, no interface standards for computer-driven numerically controlled machines currently exist. "The industry has chosen to develop proprietary interfaces, and users have been disavantaged," he said.

McLean, however, reported that major U.S. manufacturers of computer-controlled machine tools are becoming interested in supporting essential standard interfaces.

In a display of the AMRF prototype, McLean drew on a CAD workstation a design of a metal part to be milled by a machine. The design was then automatically translated into code that could run on a numerical control machine on the shop floor, which then instructed a milling machine to select various drills and to cut a brass block into a shape reflecting the CAD design.

The time taken to complete the job was approximately 20 to 25 minutes, which compares with traditional manually operated machine times of a day or longer.

Ernest Ambler, director of NBS, said it is "critical that U.S. industry now invest in the technology" that NBS has been developing.

The AMRF said its research is aimed at shops where production runs are for orders of 50 parts on average.

Notes: Ada in the news

From page 25

ening Computer Associates' position as a supplier of MVS data center tools.

■

A Personal Computer first. Alsys, Inc. is boasting the first ever prevalidation of an Ada cross-compiler for the IBM Personal Computer AT. Prevalidation is the final step before formal validation of an Ada compiler by the U.S. Department of Defense. The cross-compiler compiles Ada code on a Digital Equipment Corp. VAX, with the code running on the IBM Personal Computer AT. Described as the forerunner of native AT compilers, the cross-compiler is scheduled for shipment in the first quarter of 1986.

■

Other Ada news. Systems Designers Software, Inc. has entered into a cooperative engineering and marketing agreement with Tektronix, Inc.'s Software Development Products Division. As a result, System Designers Ada-Plus 1750A cross-compiler can be paired with the Tektronix 1750A Software Integration System. The combination will allow users to write and download Ada code to any hardware implementation of the Mil-Std 1750A system.

■

VAR you go. Cincom Systems, Inc. has set up a value-added reseller program for its Mantis fourth-generation language. A spokesman said the program will allow developers to bring applications to market more quickly using Mantis. Mantis programs are said to be portable between IBM mainframes, Digital Equipment Corp. VAXs and Wang Laboratories, Inc. VS systems.

■

Hand-in-hand. Digital Equipment Corp. and Software International Corp. penned a cooperative marketing agreement to provide applications tailored for DEC's VAX systems and its All-In-One office system. The deal centers on Software International's Peak Performance line of financial and human resources software.

■

The American way. Software AG and American Management Systems, Inc. (AMS) concluded a joint marketing and OEM agreement through which AMS will market versions of its applications for Software AG's Adabas data base management system and will provide DBMS components for those applications. The agreement covers AMS' government, educational and oil and gas finance systems.

■

TI for AI. Texas Instruments, Inc.'s Data Systems Group is now in the knowledge engineering consulting services business. The Data Systems Group's consulting is aimed at helping organizations develop expert systems. The group has already completed knowledge engineering programs for government and defense agencies, as well as for private firms. The Austin, Texas-based group says it will charge roughly $650 per man-day plus expenses for its services.

■

Short and sweet. Digital Equipment Corp. penned a cooperative marketing agreement with West Lafayette, Ind.-based Pritsker & Associates, Inc. that will allow DEC to market three Pritsker manufacturing simulation packages for its VAX processors. The packages include Slam II, a simulation language; MAP/1, a simulator for the design and operation of manufacturing systems; and Tess, an integrated simulation system with graphics and animation capabilities.

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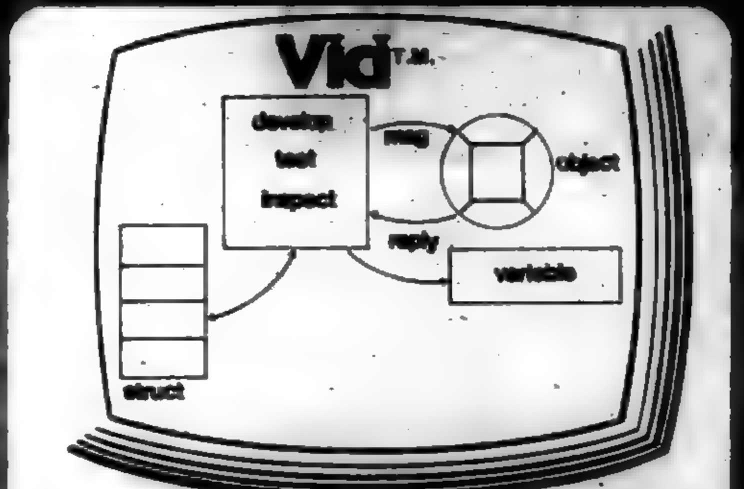

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Straight talk about software companies.

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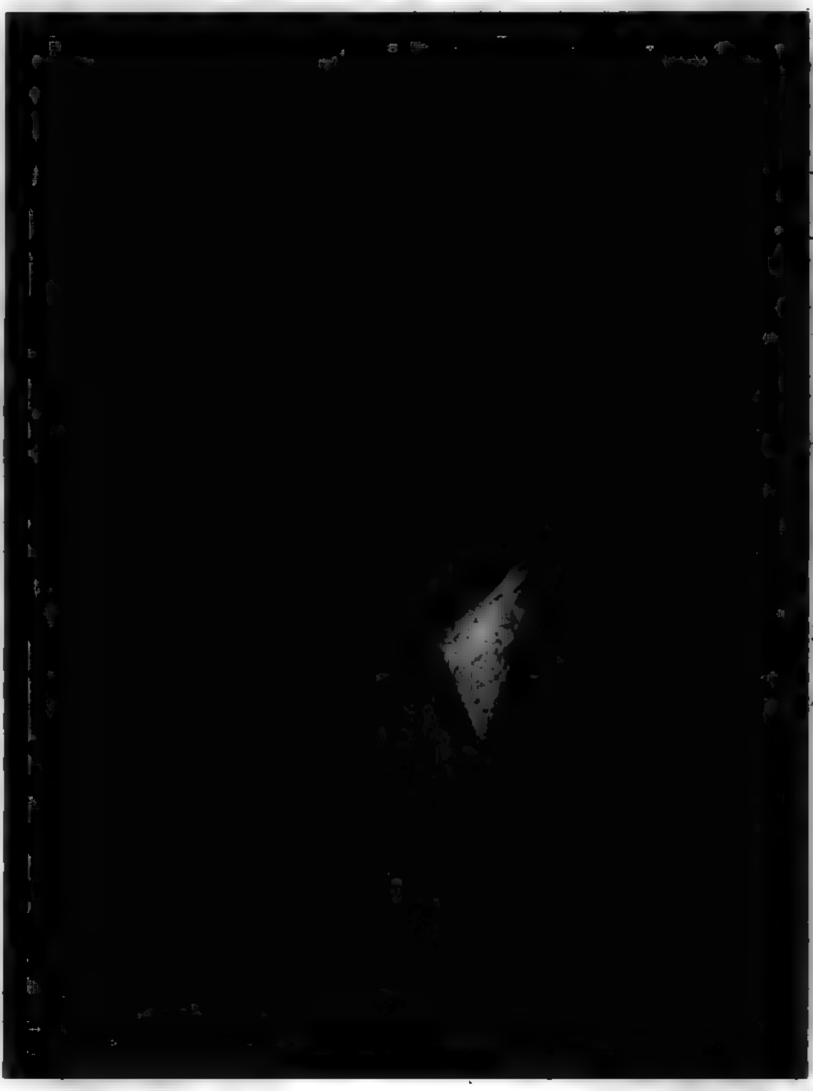


When Cullinet Software was founded in 1968, it was one of the first companies created to specialize exclusively in computer software products. We felt it was time to stop re-inventing the computer software wheel.

But remember, this was 1968—the era of hardware myopia. There were some who said we could never succeed.

Others had tried and failed. "Why," it was asked, "would Cullinet succeed?"

First, we had the belief that there is no substitute for superior products. When Cullinet introduced IDMS, it pioneered the concept of integration via an active dictionary-driven database management system. And we've achieved many other technical firsts since then:

The first back-end database machine prototype and distributed database system; the first, and only, teleprocessing monitor built for IBM computers in the last ten years; the first online Applications Development System (ADS/OnLine) for complex, high-volume applications; the first, and only, 4th-Generation Applications Software; the first transparent integration of personal computers with mainframe systems; the first implementation and full integration of database, applications, and information center/PC software, and much more.

More importantly, we also brought to the industry a standard of excellence and financial maturity. And a financial stability that is a matter of public record. A stability that enabled us to become the first computer software products company to be listed on the New York Stock Exchange, and to be cited for many of our achievements in growth and management by leaders from the business and financial communities.

As proud as we are of all these accomplishments, however, we are proudest of the special relationship that exists between ourselves and our customers. Cullinet has brought to the software industry a characteristic common to all successful companies: we are "user-driven." We understand clearly that we are in business to serve the needs of our customers. And this understanding shapes everything we do.

It is this emphasis on customer requirements and satisfaction that has resulted—year after year, in survey after survey—in Cullinet's top ranking in the categories of vendor support, documentation, training, and overall user satisfaction.

We have built an uncommon loyalty among our users because they understand that we truly care about them. It's that simple.

John J. Cullinane
Chairman of the Board

These are five of the reasons why Cullinet is the leader and most respected company in the computer software industry.

1. Number One in Industry Sales

INDEPENDENT SOFTWARE VENDORS
Software News' Top 50 Independent Software Vendors

CULLINET SOFTWARE, Westwood, MA	$144,000
LOTUS DEVELOPMENT CORP., Cambridge, MA	140,000
MICROSOFT, Bellevue, WA	[illegible]
MANAGEMENT SCIENCE AMERICA (MSA), Atlanta, GA	[illegible]
APPLIED DATA RESEARCH INC. (ADR), Princeton, NJ	[illegible]
COMPUTER ASSOCIATES INTERNATIONAL (CAI), Jericho, NY	81,000
INFORMATION GENERAL, Woodland Hills, CA	74,000
DUN & BRADSTREET (D&B), Wilton, CT	70,000
UCCEL CORP., Dallas, TX	[illegible]

1984 U.S. Revenues ($000)

While Cullinet never expected or sought to become the largest software company in the world, it still is a significant accomplishment.

Source: Software News

2. Number One in DBMS Sales

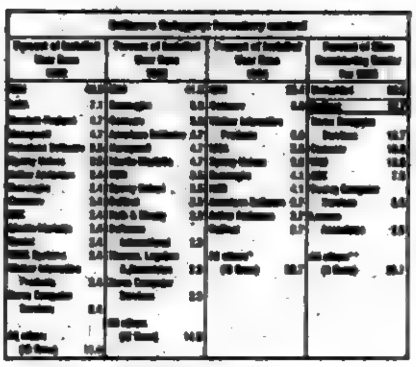
Intentions to Buy DBMS

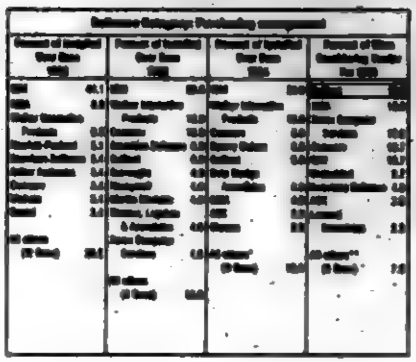
	1983	1984	1985 (YTD)
CULLINET	173	206	148
IBM (IMS)	147	180	79
ADR	76	130	64
IBM (DB2)	2	47	80
IBM (DL/I)	158	140	49
IBM (SQL)	81	110	48
SAG	91	100	46
CINCOM	38	72	17
CCA	17	21	11

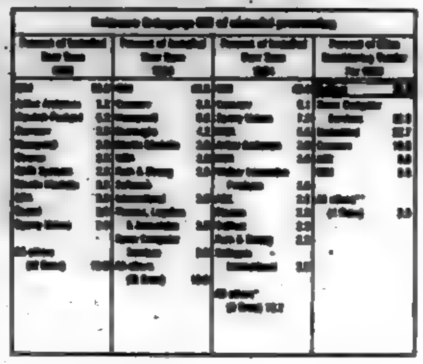
Buying preference for IDMS/R is increasing because as more buyers become more knowledgeable in database technology, they recognise the technical advantages of IDMS/R over competing products.

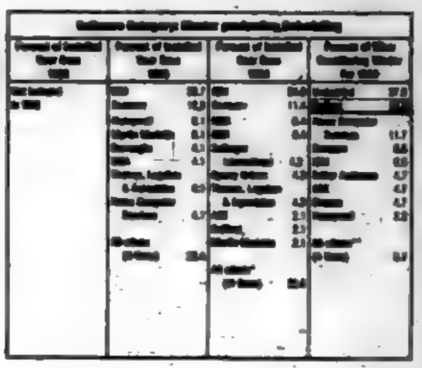
Source: Computer Intelligence Corporation

3. Number One in Manufacturing Applications





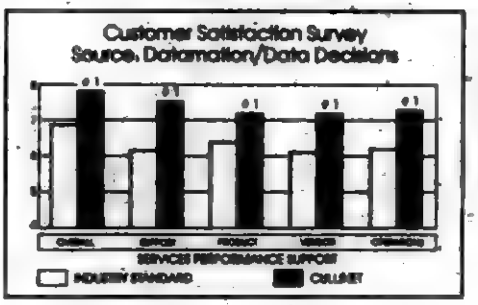




Source: Software News

Buyer surveys show convincing proof that Cullinet's 4th Generation manufacturing applications are the way of the future.

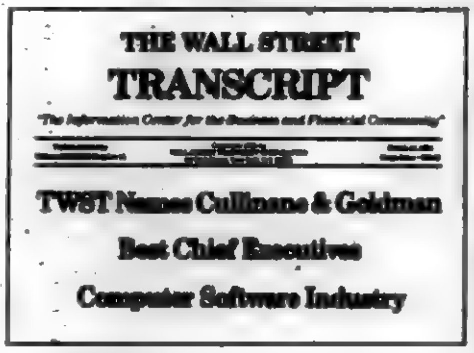
4. Number One in User Satisfaction



When it comes to vendor support, Cullinet is rated Number One year after year in every category.

Source: Datamation/
Data Decisions

5. Number One in Management



THE WALL STREET
TRANSCRIPT
"The Information Center for the Business and Financial Community"

TWST Names Cullinane & Goldman
Best Chief Executives
Computer Software Industry

Cullinet management has been consistently singled out by the computer and financial industries as the best. John Cullinane, Cullinet chairman, was named CEO of the Year in 1982 and Co-CEO of the Year sharing honors with Cullinet president Robert Goldman in 1984 and 1985.

Source: The Wall Street Transcript

The Leader in Information Systems Software

Cullinet

© 1985 Cullinet Software, Inc., Westwood, MA [illegible]

IBM's LU6.2 coming of age

From page 25

direct connections where desired. This attitude has much of the flavor of distributed data processing (DDP), a concept that became popular in the late 1970s. But the technology had not yet arrived to support the concept of DDP. In a sense, LU6.2 is distributed processing come of age.

But even with millions of micros being put to use each day and a powerful and mature SNA in place, peer-to-peer communications is still several years away.

Is this too pessimistic? After all, IBM has powerful business motivation for getting LU6.2 widely implemented as quickly as possible. Successful implementations of LU6.2 will chew up hardware (and software) at least as fast as the rate at which micros were sold in the early 1980s. IBM's tepid financial performance in 1985 means that it has to find ways of moving iron faster.

LU6.2 acceptance would be delayed

However, IBM needs successful implementations. Unsuccessful LU6.2 experiences would not only slow down LU6.2 use, but they would probably add years of delay to acceptance of the concept, and a key IBM strategy would have its credibility placed in question.

IBM's caution is understandable in view of both the business and technical risks involved. The technical changes required on IBM's part are important. Changing the architectural assumptions within SNA is analogous to, say, renovating a hotel from its steel framework outward. It is not impossible, but it is extremely challenging if another objective is to maintain current levels of hotel occupancy.

Changing host systems software to operate as a peer is tricky. VTAM and Network Control Program (NCP) assume that they are in charge — terminals can ask but cannot demand. Changing VTAM and NCP are significant activities that will require significant amounts of time.

These changes, daunting as they are, represent just a sample of the modifications that are necessary at the operating system level. Perhaps even more intellectually challenging are the changes required in data management.

Data is often changed as a result of peer-to-peer communications. However, such data changes will often affect other points in the network in addition to those directly involved. How will the data elements involved be identified? How will other points in the network be informed of the changes that have taken place? How can these data-related events be synchronized so that logical actions are based on the most recent data?

These kinds of activities are now managed by host-based data base management systems. Will there still be host-based DBMS in an LU6.2 environment? If so, they will certainly not look like the mainframe DBMS of the past 15 years.

These are just some of the technology issues. The larger issue is how long it will take systems designers to adapt to the new peer-to-peer environment. There will be at least two major areas of adaptation required: physical data structures and locations and segmentation of data and related processing.

It is ironic that for the past dozen years so much stress has been put on developing logical data relationships. Data base designers have been taught rigorously to ignore the physical structure of a data base since this would lock them into a limited set of solutions. However, in a distributed environment, one cannot get away from the fact that data will, at the least, be physically separated and duplicated.

Physical design will be a curse

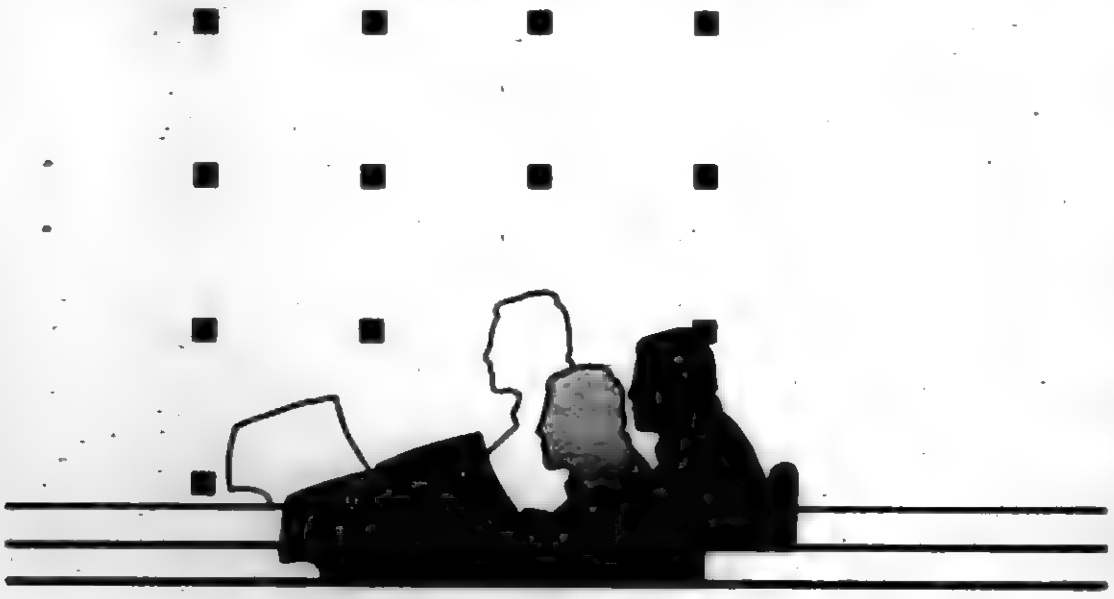
Physical location will have to be taken into account. However, physically oriented design in the new peer-to-peer environment will cause all of the problems that physical design of single data bases caused in the 1970s. While physical design will be a curse, it is one that will not be easily avoided.

The issue of data segmentation is an even more difficult issue since it is mainly conceptual. How should data be divided between data owners, or at least data keepers — a vital distinction? The question of data ownership has been struggled with for years in many organizations, usually without a clear-cut decision.

Physically distributed data bases will bring matters to a head, both from a data design standpoint and from a political standpoint. Data designers generally make poor politicians and vice versa.

What will happen to current applications? They will be no better adapted to the world of LU6.2 than systems software. A new generation of applications will emerge but at great cost, since initially, few people will know how to build them. There will be at least as many delays as on the systems software side.

The road to LU6.2 will more than likely be a bumpy one. IBM will be taking a relatively long time to solve its problems. That may give the rest of the interested parties — vendors, MIS planners and end users — sufficient time to plan for this new environment.



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MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

All quiet on the micro front

Once again it is December, time to close the books on another year of microcomputing.

In some ways, nothing has changed. Everyone is still wondering if we'll see multitasking and extended-memory MS-DOS from Microsoft Corp. next year or the year after. Retail prices on personal computers are wobbling downward, and Apple Computer, Inc. keeps dropping those semiofficial hints about what's coming for the Macintosh in January.

There doesn't seem to be any great mystery about the next Mac attack: an upgrade with a megabyte of internal memory, a Small Computer Systems Interface port, a revised read-only memory BIOS supporting hierarchical files and a higher density floppy disk drive, along with an enhanced Laserwriter printer. But there doesn't seem to be great excitement about the debuts either, even among the Mac faithful.

Plummeting price tags show the bitterness of the battle on the street: Customer costs for a Mac have been slashed roughly $1,000 during the past year, while IBM Personal Computers and the like have slipped only about $300.

A year ago, Lotus Development Corp. had just taken the wraps off its Jazz integrated package, and there was much talk that the package would dance the Mac into corporate America's heart. It didn't quite work out that way, perhaps because Jazz didn't ship until last spring — almost a year and a half after the Mac rollout.

Microsoft's Excel, unleashed on the world two months ago, drew similar attention. Like Jazz, it quickly made the Softsel Computer Products, Inc. Hot List but has not reached superstardom.

Whether or not these packages ever really make the big time, they both show the ground still being gained in software design, and they make Lotus' 1-2-3 look long in the tooth. (Last week Lotus gave one sign it may agree with

See ALL page 36

Info centers wear many hats

End-user support runs gamut of services

By Eddy Goldberg

BOSTON — In day-to-day practice, running an information center can take the patience of a first-grade teacher, the computer expertise of a DP manager, the business acumen of a banker and the political cunning of a Machiavelli.

This is a rough consensus of viewpoints from information center directors at John Hancock Mutual Life Insurance Co., Honeywell, Inc., Bank of New England NA and their peers, who gathered to discuss the topic "Information Center Experiences: What's Worked, What Hasn't" at a monthly meeting of the Society for Management of Professional Computing (SMPC).

In the most general sense, information centers aim to serve and support end users. More specifically, the functions performed by information center employees encompass training and education, setting hardware and software standards, maintaining a library of computer-related information, developing user applications, forming users groups, servicing and maintaining equipment and justifying their department's existence to management.

Jim Howard, a consultant in John Hancock's information center in Boston, called his group an "end-user computing service" and, like many others at the meeting, questioned "information center" as a description of what the group does.

His staff of 12 serves 1,500 end users, primarily in desktop applications off IBM mainframes, and provides high-level consulting on data processing to the user community. Howard says his shop is set up like a classic IBM information center, but it does not support personal computers. Those are handled by the office automation group at John Hancock, so the two groups sometimes find themselves in competition.

Danielle Barr, vice-president of corporate systems at the Bank of New England, said the Microcomputer Center was formed 3½ years ago as part of the firm's Information Resource Center "to control PC proliferation." There were about a dozen personal computers then; today they number about 330. She feels her primary

See INFO page 36

INSIDE

Office Solutions upgrades the Officewriter word processing package/35

Data Physician, a package designed to find and remove software "viruses," debuts from Digital Dispatch/35

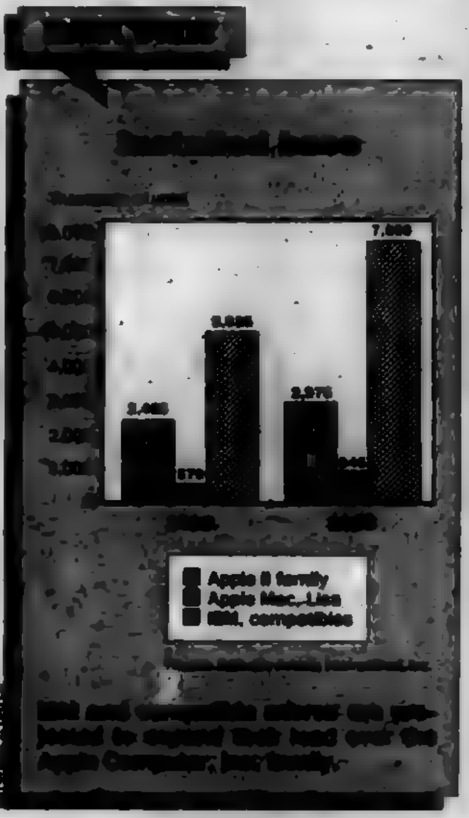
NEW THIS WEEK

- Omnicomp Graphics introduces the Totalcad system
- Datapoint announces the Starport multiuser data processing system
- For more on these and other new products, see pp. 63-79.

INSTANT ANALYSIS

"The industry has been very slow to recognize how quickly people become power users."

— Richard Rabins, president of Alpha Software



IBM and compatible micros are projected to expand their lead over the Apple Computer, Inc. family.

Prototype unit handles speech

By Rosemary Hamilton

NEWTON, Mass. — Dragon Systems, Inc. unveiled an experimental prototype of a speech recognition system said to represent a major technical improvement because it runs on low-cost hardware and offers advanced natural language capabilities.

Dragon's prototype is software designed to run on the IBM Personal Computer AT. Eventually, the product will be sold as an attachment for the computer, said Janet Baker, president of Dragon.

Although Baker would not describe the exact makeup of the future product, she predicted it will be commercially available in approximately 18 months, selling for about $3,000.

Dragon, which now is working with one vendor that may market the product, intends to continue as a research firm and has no plans to market the system itself, she said.

See PROTOTYPE page 35

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Now that the world relies on computers it needs a computer it can rely on.

Software cures micro "virus"

Digital Dispatch tool locates destructive code

By Donna Raimondi

MINNEAPOLIS — The beginning of flu season seems like an appropriate time for Digital Dispatch, Inc. to announce a "virus detection and removal" package for the IBM Personal Computer and compatible systems.

The Data Physician software is said to locate and help remove "worms" — bits of self-replicating code written with mischievous intent and capable of infecting and destroying everything on a disk or even on a network.

The $49.95 package also allows users to develop their own viruses for test purposes, said Eric Hansen, vice-president of software development. Data Physician includes a training tool kit that allows data security personnel to develop and test disaster recovery procedures against an actual harmless computer virus that they create, Hansen said.

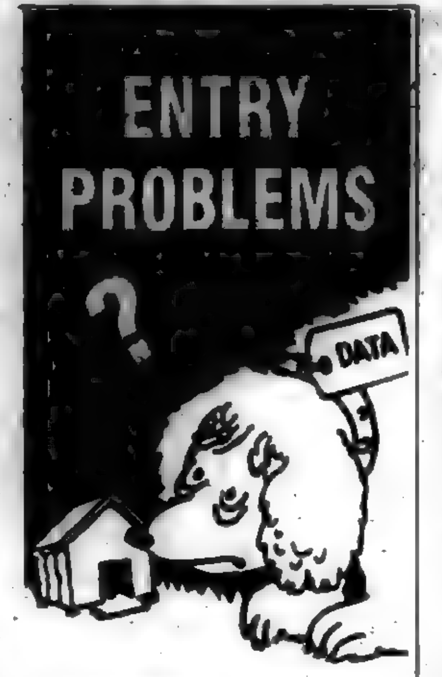
Viruses can be downloaded from a public domain bulletin board onto a users program, he said. That virus can then be transmitted to any other disk a user puts on his system until a certain date or condition is reached when all the viruses go to work to erase all the files on the disk. A virus acts on one computer, and viruses that spread via networks to a number of computers are called worms.

'Destructive potential is enormous'

"The destructive potential of just one person writing a single virus is enormous," Hansen said, "given the dependence that modern business, financial networks and society itself has on computer systems."

Data Physician may be a product before its time, Hansen admitted, although he has heard of one case in which a West Coast company lost a considerable amount of data from its IBM mainframe. He developed the current package because the West Coast company's midwestern division wanted to prevent the accident from recurring.

Data Physician is not copy protected. The package requires IBM's PC-DOS 2 or above and 128K bytes of random-access memory.



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VIKING
Software Services

Office Solutions enhances Officewriter for IBM micros

By Eric Bender

MADISON, Wis. — Office Solutions, Inc. has enhanced its Officewriter word processing package for IBM Personal Computers with a keyboard macro facility, mathematical functions and additional editing features. The company also has introduced a network version and an add-on package for merging text with graphics and has disclosed some details on volume purchase policies.

Officewriter 4's macro facility will permit users to store a series of keystrokes and replay them with a single keystroke or reassign function keys. The mathematical functions allow the creation of rows and columns of numbers, which can be totaled horizontally or vertically, the company said. Among new editing features are delete within insert and destructive backspace capabilities.

Office Solutions is also bundled in its 80,000-word Officespeller spelling checker with Officewriter 4, which will be available next month for $445.

Also shipping in January, the Officewriter Network Version will support the IBM PC Network, as well as 3Com Corp. and Novell, Inc. networks. The package also will be fully compatible with the IBM Token-Ring network, according to Office Solutions President Jan Eddy.

The Network Version supports document locking and lets each user access up to four local or remote network printers. The software also permits users to access documents in different directories and to create their own default settings and custom dictionaries. A three-user network pack costs $995, with additional workstations priced at $245 each.

Officegraphics, a $145 package available in January, was designed to let users import graphics created with packages such as Lotus Development Corp.'s 1-2-3 or Graphic Communications, Inc.'s Graphwriter. Once captured, the images can be clipped, rotated, expanded or reduced.

Users can toggle back and forth

Because Officewriter is shown in the Personal Computer's text mode, merged text and graphics cannot be displayed simultaneously on the screen, but users can easily toggle back and forth between modes to see what they can print, according to Jim Crist, marketing vice-president.

Additionally, Office Solutions introduced two specialized dictionaries, Officespeller/Legal and Officespeller/Medical, each available for $95.

Finally, the company outlined a volume-purchasing program for customers that buy more than 50 units over the course of a year and site license agreements, which begin with a minimum of 200 copies and permit copying up to a specified number of units. All arrangements include a role for a designated local dealer, Office Solutions emphasized.

Prototype unit handles speech

From page 33

Currently available are a number of speech recognition systems, which range in price from a low of a few hundred dollars to a high of $8,000, Baker noted. They are sold by a number of vendors — with IBM, Texas Instruments, Inc. and Kurzweil Applied Intelligence Corp. the front-runners — and they vary widely in capabilities, with vocabularies ranging from 50 words to upward of 1,000 words, she said. According to Baker, Dragon's prototype, which recognizes 2,000 words, is the only AT-based system that uses natural language techniques.

No artificial command control needed

While the term natural language has many interpretations, Baker suggested that it means that "you can dictate anything you want without artificial command control, and it will come up in printed form."

She claimed that the only comparable system is a prototype demonstrated last year by IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y., "It could recognize 5,000 words in near real time, but that was on $1.5 million worth of computer equipment. We have showed the technical feasibility of doing it on a desktop computer."

Baker said Dragon's system could recognize more than 2,000 words if it ran with a more powerful processor, such as the Intel Corp. 80386 microprocessor, instead of the 80286 on which it currently operates. However, the company has not publicly demonstrated this capability.

Like most commercially available systems, the Dragon prototype must be trained to recognize a user's vocabulary. Dragon has designed software with which the user can "teach" the AT the words he most often uses. Once this information is stored in memory, the computer can then match spoken words with those it has learned. The system can understand up to 30 words per minute.

In October, the company announced it had licensed other speech recognition proprietary software to IBM, which has incorporated it into three recently announced products. These were the IBM Personal Computer Voice Communication Option, the IBM Voice-Activated Keyboard Utility program and the IBM Personal Computer Voice Communications Application Program.

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Info center approaches

From page 33

responsibility is "to get the right tools to the people who need them."

Another problem Barr faced was maintenance. When confronted with the high cost of a service contract to repair and maintain her firm's computer equipment, she discovered it would be more inexpensive to hire a full-time employee.

She found a typewriter repairman within the company who was interested in the position. He was trained by her equipment vendors for what she considers a very low cost. The result was not only a 60% cost saving but also faster response time, better preventive maintenance and more uptime.

Honeywell center

Kathy Kilduff manages Honeywell's Information Technology Center in Waltham, Mass., and supports 1,300 employees. The center, which is part of the company's Corporate Information Management Group, began operations in June 1984, Kilduff said.

She said the center has saved Honeywell at least $60,000 in its first year of operation, plus the value-added, intangible benefits of more confident, productive and creative workers. Kilduff described her approach as 5% talk and 95% hands-on and said she feels the secret to success is first to break down the fear factor and then build up trust. "My biggest job is to listen," she said.

At Norton Co., which manufactures abrasives products, Janice Smith, supervisor of the information center, faces the problems entailed in moving smokestack industry workers into the electronic age. The company is introducing a shop floor control project in two divisions.

Smith said there are two critical questions to remember when asking men who have worked on industrial machines for 20 or 30 years to learn to use a keyboard to make real-time, on-line decisions: Can they adjust to the technology? And, if so, are they willing to make the transition?

In her experience, many people who have implemented computer systems wish in hindsight that they had spent more time educating the users. "Shouldn't you spend at least as much time in educating and training the people who will work on the system as you do in planning that system?" Smith asked.

However, training users on Lotus Development Corp.'s 1-2-3 in an accounting firm and training factory floor workers to use Micropro International Corp.'s Wordstar demand very different approaches.

And while one SMPC member said it was virtually impossible to mandate hardware or software standards in his company, another shuddered at the mere possibility of allowing end users to choose their own equipment. In short, members said, there are no easy formulas for running an information center — just a number of creative solutions to difficult problems.

All quiet on micro front

From page 33

that last assessment, as it announced plans to buy GNP Development Corp., whose Human Access Language front-end software for 1-2-3 has impressed many early viewers.)

Among other software applications, none of the promising, not-quite-vertical categories like graphics and project management has yet emerged as a big winner.

On the hardware side

A year ago on the hardware side, the shift toward Intel Corp. 80286-based systems was just getting under way. While early IBM Personal Computer AT customers were still trying to isolate the problems with the hard disk drive and experimenting to find what software ran on the new machine, IBM announced that it was unable to meet demand for the hard-disk model and would reschedule customer deliveries.

Those ramp-up problems have faded into history, and overall sales of AT-class systems haven't met expectations.

Of course, overall sales of all classes of personal computers haven't been great. Everyone but Compaq Computer Corp. seems to be hitting a brick wall, and Compaq is getting close enough to count the bricks.

Despite the slowdown, however, industry speculation continues as feverishly as ever, regularly climbing the heights of absurdity. If newspapers covered politics the way the trade press covers systems software, we would be constantly reading about events in the second term of President George Bush.

But we've all grown used to that kind of hyperventilation, and if it disappeared, the world would be a duller place.

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COMMUNICATIONS

WIRE TAP
Daniel Minoli

What's No. 1, voice or data?

It has been the intent of this column in the last year to address how to design the best possible data communications network in the most cost-effective way. Pragmatic issues were presented to stimulate the practitioner's mind and enrich his repertoire of intellectual tools to attack the challenging opportunities of communications.

We summarize here the year's material to crystallize the underlying theme.

Early in the year, the need and methodologies for a global backup of the communications network were presented. An entire company's viability and serviceability may well depend on communications. This is not always recognized. Witness the fact that in many organizations communications is still subordinated to computer systems. In this environment, communications receives less attention than DP, or it gets attention filtered through the eyes of DP. MIS directors typically report fairly high up in an organization, while communications people may not.

In many cases, the total cost of communications already exceeds the MIS budget; it makes sense in these cases not to subordinate communications to computer systems. The cost of communications will continue to rise. A few years ago, a typical installation might have involved a multimillion-dollar CPU and a few thousand dollars of com-

See WHAT'S page 42

Minoli is a member of the Bell Communications Research (Bellcore) network architecture planning group. Opinions in this column are strictly the author's and do not represent the view of Bellcore.

Boeing spends $100 million to revamp private network

By Peggy Watt

SEATTLE — Boeing Co. announced earlier this month that it will buy five 5ESS digital switches and an undetermined number of System 85 private branch exchanges from AT&T Information Systems as part of a multimillion-dollar modernization of its communications system, which will eventually bypass much of the public network.

The contract is worth an estimated $100 million, including the cost of facility construction and work by other suppliers at smaller Boeing facilities, and it is due to be completed by early 1988. Primary sites for the new equipment will be Boeing offices in Seattle; Wichita, Kan.; Vienna, Va.; and Philadelphia, according to a company spokeswoman.

The company estimates it can save $150 million in the next 10 years by shouldering more of its communications needs — as allowed under a divested national telephone system — according to the company's telecommunications services modernization task force formed in 1983. Maintenance will be under contract with suppliers, and the project is overseen by Boeing Computer Services Co. in Bellevue, Wash.

Boeing will remain a big customer of local operating companies — including Pacific Northwest Bell Telephone Co. in the Seattle area — for local service outside company facilities, said Eryk Asman, program manager of Boeing's telephone service modernization program.

He said some new equipment will replace operating companies' Centrex systems at field and branch offices, which will be served by smaller switches under contracts with Intecom Co., GTE Corp., South Central Telephone Co., Pacific Northwest Bell and Southwestern Bell Telephone Co. More than 90 field offices will be affected by the contract.

See BOEING page 38

Micom introduces Instanet 6000

Firm looks to medium-size switch to crack new market

By Paul Korzeniowski

SIMI VALLEY, Calif. — Micom Systems, Inc., one of the leading suppliers of low-end data switches, is attempting to enter new markets with its Instanet 6000 series of data switches.

The latest addition to that series, Instanet 6600, was designed for large communications networks and supports more than 2,016 channels. The switch uses standard telephone wiring and connectors and is able to support data transmission speeds up to 19.2K bit/sec. It can be used as a hub in a data network that enables users to contend for computer ports or other resouces or as a fallback switch to connect users to alternate hosts when primary facilities are unavailable.

Micom claimed that its range of interface options is among the broadest in the industry. The company supports four classes of plug-in interface modules, including local RS-232 interfaces that support four separate channels; a 50-conductor telephone company connector; local multiplexers that can support as many as 128 devices over two twisted-pair wires; gateways to IBM Synchronous Data Link Control or Binary Synchronous Communications network environments as well as X.25 packet-switched nets; and integral data concentrators that statistically multiplex remote clusters of terminals or sets of computer ports over a single phone line.

Users can access resources by asking for them by name. Connection dialogue can be tailored by the system manager.

System administrators can configure

See MICOM page 42

INSIDE

Hayes Microcomputer Products plans to publish a synchronous communications application interface/42

NEW THIS WEEK

- Case Communications introduces its Grapevine local net
- DEC announces an Ethernet local-area network management tool
- For more on these and other new products, see pp. 63-79.

INSTANT ANALYSIS

"Today, General Motors works with less than 1,000 vision applications. In 10 years, we will have approximately 44,000."

— Robert J. Eaton, vice-president at General Motors

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ Why not Cullinet, ADR or Focus? There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ Why not just go with DB2 or SQL/DS? A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

■ What about Goldengate, dBase III, Symphony or Framework? PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS

Waterway telephone due to ship

JEFFERSONVILLE, Ind. — The realm of telecommunications recently expanded beyond cars and airplanes, many of which are now equipped with telephones, to boats.

Waterway Communications System, Inc. has demonstrated and begun construction of a telecommunications system that, when completed, will provide service to 4,000 miles of inland waterways, including the Mississippi, Ohio and Illinois rivers, as well as the Gulf Intracoastal Waterway, parts of tributaries and some of the Gulf of Mexico.

Compared with the use of standard VHF sideband radio, the Watercom radio system uses radio frequencies dedicated to marine communications systems, which improves sound quality and eliminates call delays, the company claimed.

Vessel telephones are priced at $7,000 each, the vendor said.

The telephones communicate with one of 54 shore stations spaced along the banks of the waterways served, enabling users to place or receive calls, Waterway Communications said.

Users pay a monthly subscription fee, and they are charged per minute of connect time.

Rates are competitive with conventional marine communications fees, according to the vendor.

— John Dix

Boeing to revamp net

From page 37

Some 65,000 telephones throughout the company will also be replaced with more than 70,000 single-line, electronic instruments. The purchase is also part of a long-term effort by Boeing to move toward an integrated services digital network.

While economics is a major reason for the change, the uncertainty of local telephone companies' capabilities in the future in a competitive communications market is another concern, Asman said.

"We have always been alert to opportunities of taking on new technology," Asman said. In the 1960s, Boeing installed a microwave transmission system in its Seattle-area offices for data communications access to remote computers when the local telephone company could not provide the service thoroughly and quickly enough for Boeing's needs.

"The microwave has been upgraded substantially since then" and is used for local videoconferencing as well, he added. "Divestiture prompted us to look at our entire telephone service."

Provide specialized services

Building its own network lets Boeing provide dedicated data lines and other specialized services that not all local telephone companies can offer in quantity, said Marty Hill, telecommunications services manager.

"Under today's scenario, the operating companies have difficulty offering enhanced services on machines in the public switched network," he said.

The company is also eyeing its long-distance service options. Hill said Boeing has already relied on least-cost routing through several services since the 1960s.

"We've traditionally been a multivendor, private-network user," Asman said. "Just like anybody else, we're shopping around all the time."

Boeing called for bids on the bulk of its services modernization project in March 1984 and announced last January that negotiations were under way with AT&T.

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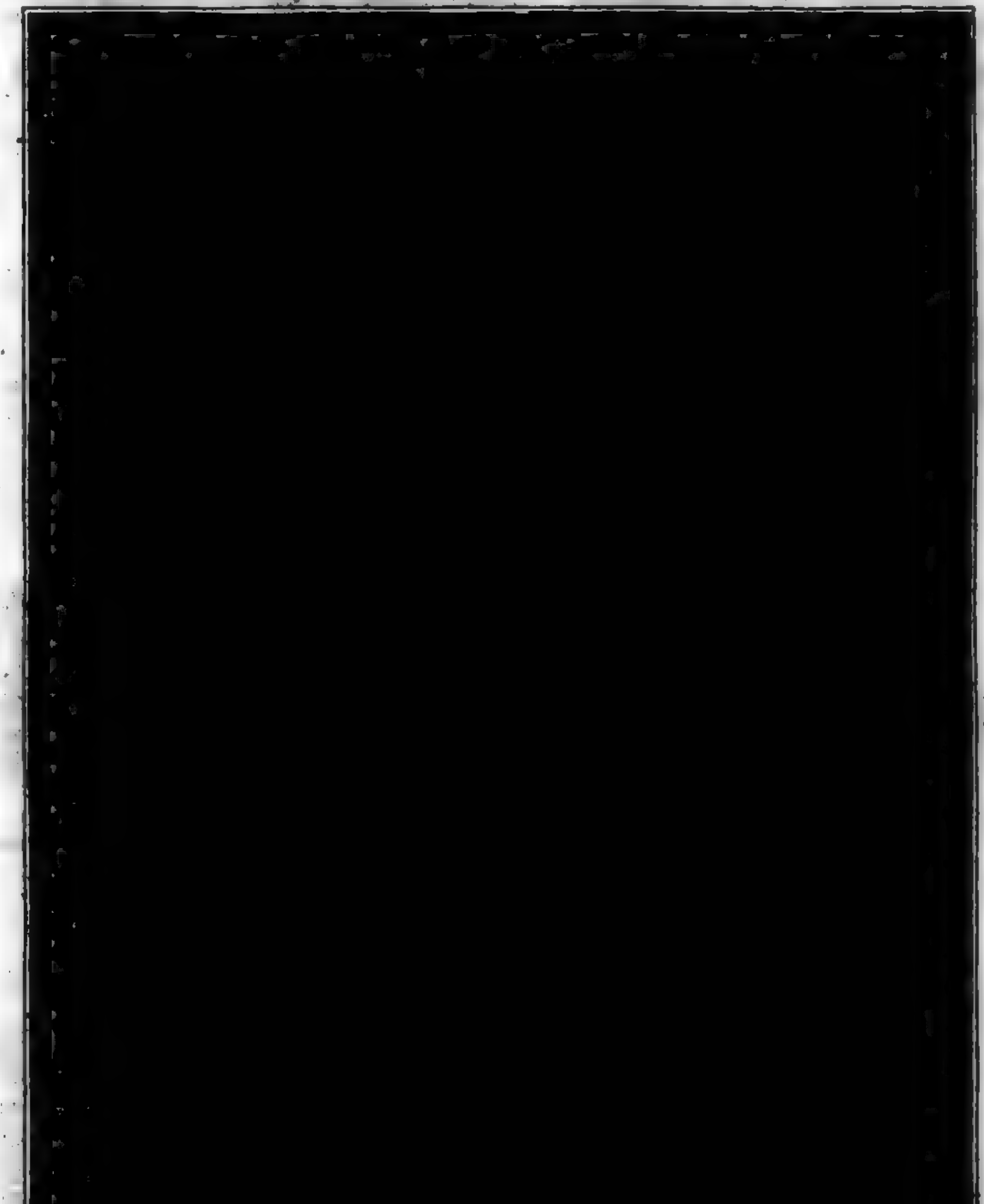

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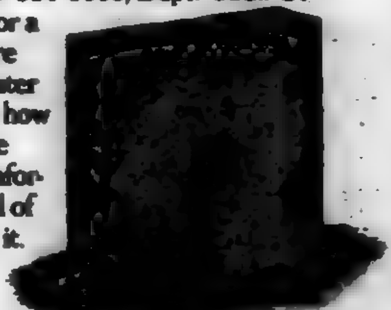

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FROM MICRORIM

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Hayes plans synchronous interface standard

HSI to address lack of accepted interface for software developers

By Eric Bender

NORCROSS, Ga. — Hayes Microcomputer Products, Inc. recently announced plans to publish an application interface designed to isolate synchronous communications applications from the differences among various communications hardware setups.

Available next month, the Hayes Synchronous Interface (HSI) "addresses the need for a recognized, accepted interface that software developers can use to provide compatible synchronous application programs," said Dennis Hayes, president of the firm.

Unlike the case in personal computer asynchronous communications, where developers can write to the standard represented by the IBM Asynchronous Interface Adapter board, there is no accepted standard for synchronous communications, Hayes said.

"That's a headache for developers; they spend hundreds of hours writing hardware-specific versions," Hayes said.

He claimed that early response from communications application software firms has been "more positive than we thought it would be; it kind of surprised us."

Compatible with applications

Applications that conform to HSI will be compatible with any hardware device for which an HSI driver is available, a company spokesman said.

The Hayes Synchronous Driver, which provides HSI support routines for the company's communications products, will be licensed to developers for an annual $100 fee, according to the spokesman.

"We invite other hardware manufacturers to provide drivers for their products," Hayes said.

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So we approached Lattice, Inc. and asked if we could implement a version of the Lattice C compiler for IBM mainframes. With Lattice, Inc.'s agreement, development began and progressed rapidly.

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Features of the Lattice C compiler for the 370 include:

- Generation of reentrant object code. Reentrancy allows many users to share the same code. Reentrancy is not an easy feature to achieve on the 370, especially if you use non-constant external variables, but we did it.
- Optimization of the generated code. We know the 370 instruction set and the various 370 operating environments. We have over 100 staff years of compiler language systems experience on our development team.
- Generated code executable in both 24-bit and 31-bit addressing modes. You can run compiled programs above the 16 megabyte line in MVS/XA.
- Generated code identical for OS and CMS operating systems. You can move modules between MVS and CMS without even recompiling.
- Complete libraries. We have implemented all the library routines described by Kernighan and Ritchie (the informal C standard), and all the library routines supported by Lattice (except operating system dependent routines), plus extensions for dealing with 370 operating environments directly. Especially significant is our byte-addressable Unix®-style I/O access method.
- Built-in functions. Many of the traditional string handling functions are available as built-in functions, generating in-line machine code rather than function calls. Your call to move a string can result in just one MVC instruction rather than a function call and a loop.

In addition to mainframe software development, you can also use our new cross-compiler to develop PC software on your IBM mainframe. With our cross-compiler, you can compile Lattice C programs on your mainframe and generate object code ready to download to your PC.

With the cross-compiler, we also offer PLINK86™ and PLIB86™ by Phoenix Software Associates Ltd. The Phoenix link editor and library management facility can bind several compiled programs on the mainframe and download immediately executable modules to your PC.

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Micom unwraps Instanet 6000

From page 37

and control the switch through a system administrator port. An auxiliary port supplies a time- and date-stamped audit trail of all switching activity, including port contention, failure to connect, the reason for the failure, contention queuing and any attempted security violation.

The price for a base switch without interfaces starts at $9,000. Interface prices range from $245 to $650 for four-channel, local-interface modules; $650 to $1,500 for local multiplexers that support four to 28 channels; $2,500 to $4,200 for data concentrators; and $3,600 to $5,400 for IBM gateway modules. The price for upgrading a Micro 600, the company's low-end private branch exchange, to the Instanet 6600 starts at $7,000.

What's No. 1, voice or data?

From page 37

munications gear. Today a typical installation may involve CPUs worth several million dollars and multimillion-dollar communications bills. The scale may soon flip all the way to communications.

Communications is more of a decentralized than distributed discipline. Because of the size, there are more chances of waste, redundancy, billing errors and malfunction. A director in charge of the CPU center has a well-defined responsibility confined to a well-marked four-wall room; the director of communications has a wide-open field, spanning continents, foreign governments, nonstandard equipment and Third World vendors.

This is why, in a typical establishment, the systems end of the house is more relaxed, leisurely and organized, compared with the communications end, where people fight problems on several continents and deal with as many as 200 vendors.

In the information age, communications has become as important as DP, and organizations ought to acknowledge that fact.

There is a key factor that is at times overlooked, ignored or underestimated in some organizations, particularly where communications is subordinate to systems: It is that voice communications can typically require 10 to 20 times the budget of data communications. For example, an organization with $1 million a year in data communications costs can easily find itself spending $10 million to $20 million a year in voice equipment and transmission.

DP professionals often are not adequately qualified to handle the subtleties of telecommunications unless they take a career detour for a few years into the voice arena.

In some organizations where subordination exists, the director spends a large percentage of time following the data issues and very little time following the voice issues — where the potential for the largest savings is achieved.

SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

Niches: Hope for chip mart

With adjectives such as "depressed" and "troubled" regularly being applied to the semiconductor industry, it may seem inconceivable that people would be looking to jump into that business.

But there may be room for start-ups and established semiconductor companies looking for new markets. The best hope for those companies is that they don't get greedy and knock heads with giants like Intel Corp. and Motorola, Inc. in the general-purpose microprocessor field. The theory that a small company can grab a niche in the semicustom or application-specific market lies behind a number of new firms, some of which found venture capital even as the semiconductor market crashed about them in 1984.

One such company is Crystal Semiconductor Corp. of Austin, Texas, an organization that plans to announce and ship samples of its first products in January — 14 months after receiving initial funding in October 1984. The firm drew its management and engineering talent from a variety of major chip companies. President James H. Clardy had been with Texas Instruments, Inc. and Harris Corp., and Vice-President for Marketing T. Allan Hamilton moved over from Intel, while other executives and key investors were drawn from Mostek Corp. and Bell Laboratories.

"It was an odd time to start a company," Hamilton said of the 1984 funding. But he noted that while the semiconductor industry "had just fallen off a cliff," the investors were people who had experience in and understood the semiconductor industry.

The industry slump, with the accompanying layoffs, actually benefited Crystal. Hamilton said, "I don't like to benefit from someone else's misfortune, but traditionally big companies have their security. It is something that precludes a lot of really smart guys from

See NICHES page 46

CSPI ties to Microvax II

DEC technology allows move to stand-alone Maxim

By James Connolly

BILLERICA, Mass. — Development of a pair of vector processors by CSP, Inc. (CSPI) was made possible not by the vendor's own technological breakthroughs but by Digital Equipment Corp.'s development of the Microvax II, according to CSPI officials who announced their 32-bit and 64-bit vector processors last week.

"We'd like to say it was a technological breakthrough on our part, but it wasn't. We've been waiting to marry our own technology to something like the Microvax for a couple of years," said CSPI President Sam Ochlis in announcing CSPI's Maxim/32 and Maxim/64 vector processors. He said it was the Microvax II that allowed CSPI, working under an OEM agreement with DEC, to move into the stand-alone vector processing market. The 16-year-old company previously had marketed add-on vector processors for various superminicomputers.

The Maxim/32 and Maxim/64 are aimed at the scientific and engineering markets.

Ochlis said the coupling of CSPI's array processing technology and the Microvax in a single cabinet or pedestal lets a user do vector or array processing and run general office automation or administrative applications. "The scientific computer user gains another dimension by using the new Maxim. In the real world of scientific computing, users have a lot more to do than merely crunch numbers. For example, a recent study of design engineers' work habits determined that they spend only about one-third of their time actually designing and/or using their dedicated computers," Ochlis said.

> ***'Users have a lot more to do than merely crunch numbers.'***
>
> **— Sam Ochlis, CSP, Inc.**

He claimed that a common problem with running extensive arithmetic computations on a nondedicated superminicomputer limits other users' access to that system.

The single-precision Maxim/32 is based on CSPI's Mini-Map array processor family. A basic configuration includes a 32-bit floating-point array processor, 1M byte of data memory, a 5¼-in. chassis backplane, development software, a Fortran compiler and a Microvax II with 5M bytes of random-access memory, a 91M-byte streaming tape drive, a 71M-byte Winchester disk

See CSPI page 46

Start-up broadens processor base

By Peggy Watt

OREM, Utah — Icon Systems and Software, Inc., a year-old start-up supported by part-owner Sanyo Electric Co. of Japan, quadrupled its product line just as its first supermicro system was shipped.

Citing a whipsaw effect wrought by the wavering exchange rate between the yen and the dollar, Icon officials announced an expansion of their MPS 020 line to offer a step configuration below their previous dual-processor system to keep the lower range priced at less than $20,000.

The Sanyo/Icon MPS 020 line is based on the 32-bit Motorola, Inc. 68020 CPU with an Intel Corp. 80286 chip for compatibility with the IBM Personal Computer AT. It also has a disk cache processor and Motorola 68881 floating-point processor. It is said to support up to 3 million instructions per second. It supports three operating systems: AT&T Unix System V, University of California at Berkeley Unix 4.2 and Microsoft Corp. MS-DOS, and emulates IBM's 370 operating environment. Icon officials announced the Pick Systems Pick operating system will soon be available for the line. All configurations also have four communications ports.

The high-end MPS 030-23 (previously called the MPS 020-2) is a 32-user supermicro based on two Motorola 68020 microprocessors, with 1G byte of virtual memory address space, disk cache memory, two 20M-byte hard disk drives, a 20M-byte streaming tape backup system and an optional floating-point coprocessor. The system was scheduled to ship in November and was to be priced at less than $20,000, according to Andrew H. Olson, director of corporate development. The fluctuating monetary exchange rate prompted Icon officers to boost that configuration's price

See START-UP page 46

INSIDE

Canon U.S.A. unwraps a laser graphics printer/44

Xerox releases an in-house ion deposition printer/44

NEW THIS WEEK

- McDonnell Douglas offers two new minicomputer systems
- Sony introduces a writable optical disk system
- For more on these and other new products, see pp. 63-79.

INSTANT ANALYSIS

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Xerox unwraps large volume, ion-deposition print system

Aimed at central data centers

By Donna Raimondi

ROCHESTER, N.Y. — A printing system for centralized data centers was unwrapped recently by Xerox Corp.

The printers are targeted at uses that require large volume but not necessarily publishing quality, spokesman Mike Howes said. He gave examples such as inventory lists and internal reports that are everyday tasks for a printer but that do not require laser printer quality.

The Xerox 4060 computer printing system's ion-deposition engine is manufactured by Delphax Co. in Westwood, Mass., a company in which Xerox owns a 50% equity interest.

The system is said to print at speeds up to 60 page/min. and can handle an average printing volume of about 500,000 pages per month, the vendor said. The printer operates on-line to an IBM or plug-compatible host mainframe computer by emulating IBM 3811, 3211 or 4245 printers. It prints on standard 16- to 24-lb, 8½- by 11-in. cut-sheet paper with a print resolution of 240 by 240 dot/in.

The $70,000 base system includes a 10M-byte rigid disk and an integral offsetting output stacker and large-capacity sheet feeders that are manufactured by Delphax.

The controller module includes a menu-driven operator display terminal and keyboard; a 10M-byte rigid disk drive for internal storage of fonts, electronic forms and job descriptions; and a 5¼-in. flexible disk drive for alternate font, form and job description loading.

Also included are interfaces to IBM 3811, 3211 and 4245 channels.

Options include a 40M-byte rigid disk drive that costs $1,995 and expanded storage for up to 16 fonts.

Three software options that cost $4,995 each include a Xerox-designed forms description language called PC-FDL that allows users to create and compile forms on a Xerox 6065 personal computer or on an IBM Personal Computer with a rigid disk. It then allows users to load forms on the 4060's flexible disk drive for printing.

A second software option, the Xerox Print Manager, resides on the host computer and interfaces the 4060 to IBM's MVS/JES2 environment. The third option, Xerox's Host-FDL, enables forms creation and compilation on an IBM mainframe operating in the MVS/JES2 environment.

Canon equips laser printer with graphics

LAKE SUCCESS, N.Y. — Canon USA, Inc. has released a laser beam printer with graphics capabilities. The LBP-8 A2, with a top speed of eight page/min., comes with either an 8-bit parallel or an RS-232C interface and costs $4,300.

The printer, a follow-on product to the $3,000 LBP-8 A1 that was made for word processing-type applications, is in response to users' demands for more sophisticated graphics capabilities, a spokesman said. The system is useful for short-run, low-volume in-house publishing tasks such as manuals, he added.

Equipped with 1M byte of random-access memory, the LBP-8 A2 is said to allow 300 by 300 dot/in. raster graphics on a 8½- by 11-in. page. Its built-in Canon Virtual Device Metafile software provides vector graphics output, the vendor said.

The system is equipped with Canon's LBP-CX engine that employs a semiconductor laser and replaceable toner cartridges.

Niches: Hope for chip mart

From page 43

taking a flier on a smaller venture capital-funded start-up company. As it turned out, big companies aren't so secure, as evidenced by the layoffs that many of them have seen.

So, a lot of these guys have taken the opportunity to look outside. As a result we've been able to pick up some people we probably wouldn't have if the industry was booming."

In Crystal's case the niche market and the people they wanted to hire dealt with high-performance analog integrated circuits — what the company calls its Smart Analog circuits.

Hamilton claimed that there are only about 250 analog design engineers in the world and that his company has hired 20 of these experts.

Crystal, which will use contracted foundries rather than develop its own fabrication facilities in the near future, envisions its digitally enhanced analog circuits being used in data acquisition subsystems and in telecommunications systems. Hamilton said the product families will address telecommunications, data communications, industrial automation, instrumentation and the custom semiconductor market.

Crystal and a handful of similar companies are targeting specific markets with a specific type of chip. Although most of the key people have their roots in the large, multipurpose semiconductor companies, Crystal, for example, shows no outward sign of going after those big outfits.

"I came from Intel, and I would hate to take on Intel in the microprocessor game, because that is where they eat. Every resource they have is there for ensuring their microprocessor superiority or at least penetration in numbers of units sold. So, it is pretty tough to take Intel on in that game," Hamilton noted. "I think everybody has continued to carve out reasonable niches, and there will continue to be niches. Even those niches today are increasing in size to where you can have a very viable company based on a niche."

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FEDERAL EXPRESS
WHY FOOL AROUND WITH ANYONE ELSE?

CSPI ties to Microvax II

From page 43

drive and DEC's MicroVMS operating system. The CPU memory is expandable to 9M bytes, and the array processor data memory is expandable to 12M bytes. The base configuration costs $65,000.

The double-precision Maxim/64 is based on CSPI's full-size Map family. A basic configuration includes the same Microvax package as used in the Maxim/32, a 16-slot chassis with four expansion slots, a 64-bit floating-point array processor, 16M bytes of data memory and 1M byte of program memory. The basic configuration costs $165,000.

CSPI, which claims an installed base of more than 2,000 units for its larger processors, reported that both Maxim packages are scheduled to be available in 90 days.

Start-up firm broadens base

From page 43

tag to $24,750 and to offer three new, upgradable systems below it.

The Icon MPS 020-20 will be the equivalent of an IBM Personal Computer AT compatible, supporting eight users, with a 20M-byte hard disk drive and 20M-byte streaming tape backup system. It will cost about $12,500 with a Sanyo monitor.

The 020-21 model will build on the base model and include a 1M-byte disk cache memory with dual processor. It will sell for $16,000.

A step below the high-end model is the MPS 020-22, an AT&T Unix system priced at $21,000.

Icon also recently reached an agreement in principle with PC America to distribute the Sanyo/Icon product line throughout the U.S., with several other agreements still pending, Olson said.

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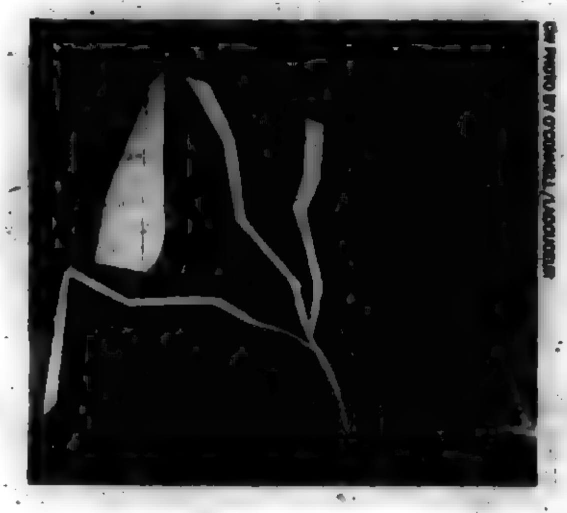

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Technical review exposes weaknesses of micro systems

Ad hoc personal computer development leaves corporate systems vulnerable to scheduling glitches, faulty logic flow and undue reliance on inadequate hardware. A complete technical review yields greater overall control.

By Farid Naib

More than one hundred trucks and truckers of a major consumer products firm sit idle. The reason? Not economic depression, not a lack of orders to fill — the culprit is an overextended personal computer-based data base system.

At another major corporation, employees worked until 4 a.m. one day last year. Once again, the culprit was a personal computer-based accounting system producing reports that stood in the critical path of the monthly book closing.

One of the great advantages of personal-computers fosters one of their great weaknesses. Personal computer-based systems are so simple to use and operate that they often come into use in corporations without any formal studies on the viability and integrity of the system.

Jack Musgrove, operations director of PA Computers and Telecommunications, says, "The challenge in using the personal computer is to make sure that it is integrated into the overall system architecture. One of the main dangers in ad hoc personal computer development is that the data integrity inherent in modern information systems may be compromised."

Alan Cowan, information systems manager of PA Consulting Services UK, adds, "Personal computers are only one way of putting computer power on a user's desk. It must not be assumed that a personal computer always represents the most cost-effective option. Indeed, a personal computer may introduce more problems than it solves if it has not been specified with a clear understanding of the business needs to be addressed."

One way of ensuring a good fit is to conduct a technical review of the major personal computer-based systems within a corporation. A technical review involves examining a system's components, its function, the degree to which it fills end-user needs and its importance to the firm.

Typically, the review is conducted by a member of the DP or MIS department who is knowledgeable about the personal computer-based system in the firm or who has expertise in the personal computer market generally. An individual in charge of personal computer support would be an excellent reviewer. Any staff member contemplating this type of review needs a good familiarity with third-party, as well as proprietary, equipment and software. Generally, end users do not conduct technical reviews.

The successful review

As a part of the review, users make suggestions for improving the system, which are then subject to evaluation. The suggestions are often quite cost-effective and practical. For instance, in the case involving the corporation's accounting system, a $200 surge supressor might have prevented the problem.

The successful technical review will answer three sets of questions. The first set examines what the system does and how. Basically, this provides an overview of the

---

Farid Naib is an independent consultant based in Philadelphia. He is co-owner of FX Systems, Inc., a foreign exchange risk management software house.

system from a functional and technical standpoint.

The next set of questions has to do with the identification of potential problems or areas of concern. These questions will be guided by the findings of the first set of questions.

The final set of questions takes the form of "What can we do to improve the system?" Suggestions should be made as to how to improve the system, with detailed information on how each suggestion would improve the sytsem.

How does one conduct a technical review? While every system requires special consideration, one can determine a rough blueprint. The blueprint of one successful procedure, involving five steps, follows.

The big picture

The first step in conducting a technical review is to look at the personal computer-based system as a whole and ascertain what function the system performs, how it is related to other functions within a firm and how important it is to the overall operations of the firm.

> ”
>
> *Let the system's users see the analysis and make comments. Try and get the input of people who rely on the system. Solicit any management help you can find. The broadest possible range of opinions can only help, as dissimilar points of view often shed more light on the system manager's task.*

The manager conducting the technical review then can write a description of the system and what would happen to the firm if it were inoperative for one minute, 10 minutes, one hour, one day and one week. Stop the time series at the point the firm would go bankrupt without the system.

Once the description and resulting problems are down on paper, let the system's users see the analysis and make comments. Try and get the input of people who rely on the system. Solicit any management help available. The broadest possible range of opinions can only help, as often dissimilar points of view shed more light on the system manager's task.

For example, consider a hypothetical personal computer-based distribution system. Asking only the warehouse employees about system efficiency might solicit this sort of response: "Well, the customers always have an extra supply of parts, so if we're a day late, it won't hurt much." However, a marketing person at the same company might respond, "Being a day late would severely damage our hard-earned reputation for reliability and give our competitors an opening right into our market."

The result of this stage of investigation should accurately describe the system's importance to the firm and the relationships the system has with other systems.

System architecture

The next step in the technical review is to create a flowchart of the functional operation of the system. Every input and output possibility should be listed as the reviewer outlines the system architecture.

Three areas must be considered: hardware, software and personnel. Usually, each carries equal weight in the system's successful operation.

Someone particularly knowledgeable about personal computer hardware should conduct a physical examination of the system, if possible. Otherwise, system components can be overlooked, when their physical condition in fact may have real impact on the system as a whole. For instance, what is reported as an operational printer-to-personal-computer parallel cable could turn out to have frayed ends and duct-taped insulation, reducing its value and reliability in terms of the review.

Hardware remains the easiest category to examine. Reviewers must consider the CPU, expansion cards, printers, plotters, communications equipment (modems), local-area networks, cables and so on. Any service policies fall into this category of the review, as do any backup systems.

Next, list all the software packages used in the system. Once again, a knowledgeable person should compile this information, since an application system's software list often leaves out important components. The reviewer should note the version number of each purchased product and check to see if the registration card of each package has been posted, as software publishers often send updates.

For software contracted or developed in-house, check for technical documentation, including source code. Also note where different software packages interface in the system. If, for example, the company uses an Ashton-Tate Dbase III application system in conjunction with a third-party sort routine, the interdependence will be important to flowcharting.

The reviewer should examine the various procedures for turning on the system and for backing up the data. It is remarkable and a bit horrifying how many systems are not backed up on a regular basis. Too many distraught users have lost

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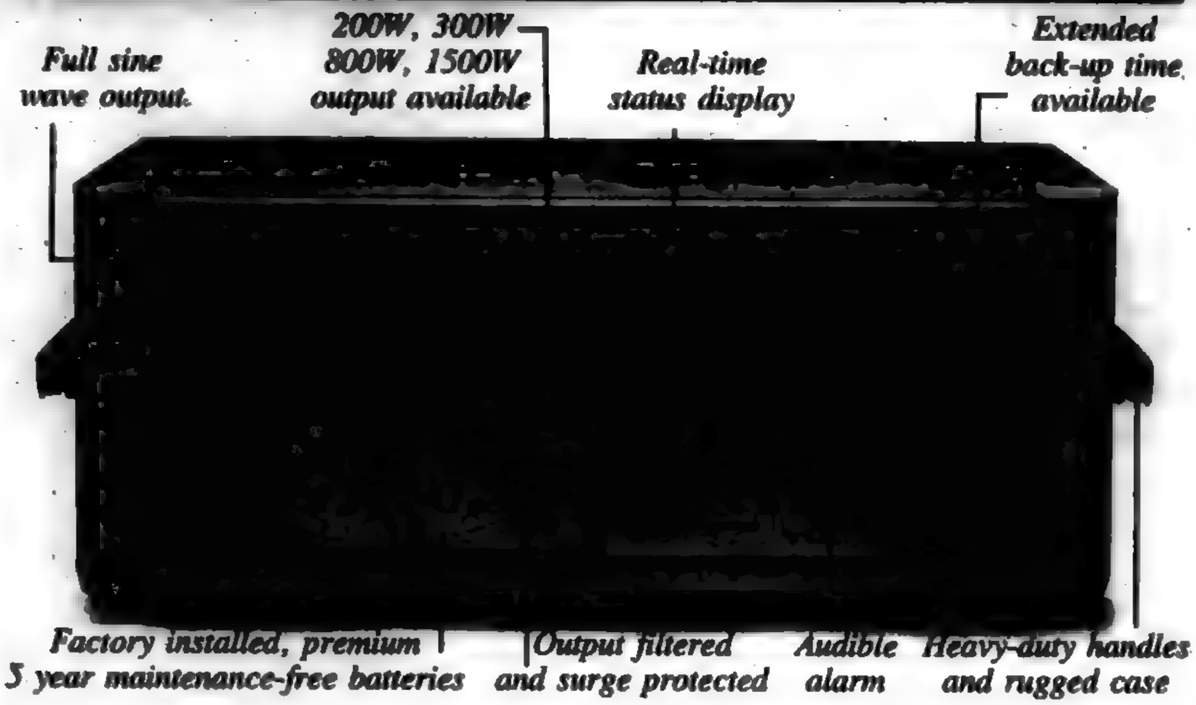
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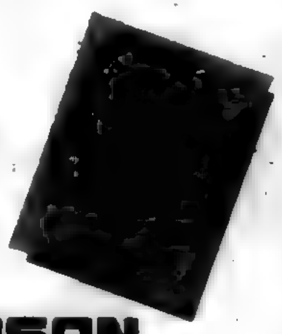

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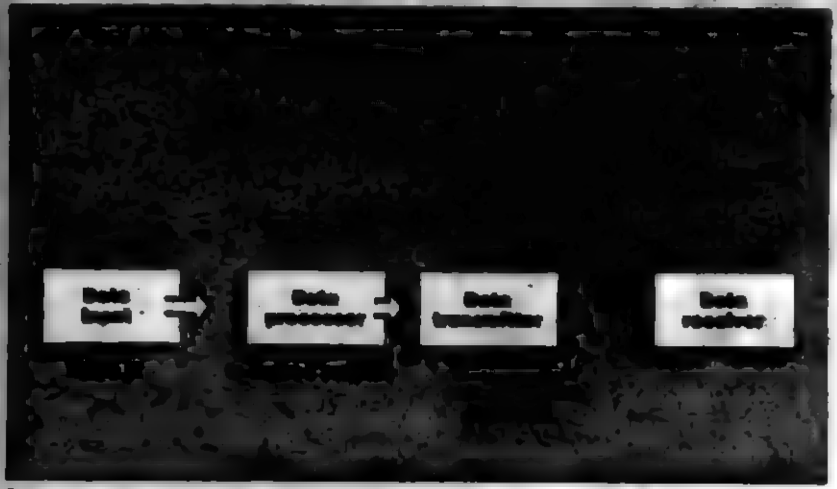


Figure 1: Mapping out each system component in the logic flow brings to light system bottlenecks and critical components.

their non-backed-up data. System users should be interviewed informally, both to determine how often these established procedures occur and to ascertain each end-user's degree of computer literacy.

Handling downtime

An important question to ask at this time is what the operators should do if the system becomes inoperative. Are there recovery systems in place? Whom do the operators contact?

For example, if an operator reports any problems to the supervisor, who subsequently reports them to the MIS department, then simply locating the supervisor becomes a critical part of correcting the problem. A better plan might be for the operator to contact both the supervisor and the department on his own.

Another thing to consider is what procedures are used for unusual situations. For example, consider an inventory system. What happens if a shipment is received in several lots or is short?

A related issue is the problem determination guideline. For example, can the operator tell if a problem lies in software or hardware and, if so, in what piece? A problem determination sheet might point to a device time-out error as a problem in a printer to which the operator could then attend.

Following this investigative procedure, the reviewer should document the system logic flow. The resulting document will aid in both analyzing and supporting the system.

The part that each hardware and software component plays should be noted (Figure 1). Then, the existing backup and recovery procedures should be examined to determine how much work has been done to the system to date.

For all practical purposes, this concludes the investigative portion of the technical review. The collected data now must be analyzed.

Evaluation criteria

Following the analytical work, the review requires evaluation criteria. The evaluation criteria consist of a list of those things that the system must or should provide. Typically, criteria would include the following:

■ Reliability. Ideally, the system must always be up and running. Individual firms must determine how critical uptime is to their operations on a minute-by-minute, hourly or daily basis.

■ Speed. Systems that lie in the critical path of the firm's operations should be as fast as possible.

■ Expandibility/flexibility. New demands will be placed on the system from time to time. At some point, the system may need additional capacity, or users may need to add new fields. The system should be structured to allow for these upgrades.

■ Ease of use. If the system supports a large number of end users, users unfamiliar with the system or users that are not computer literate, the firm may require ease of use to be included as an evaluation criteria.

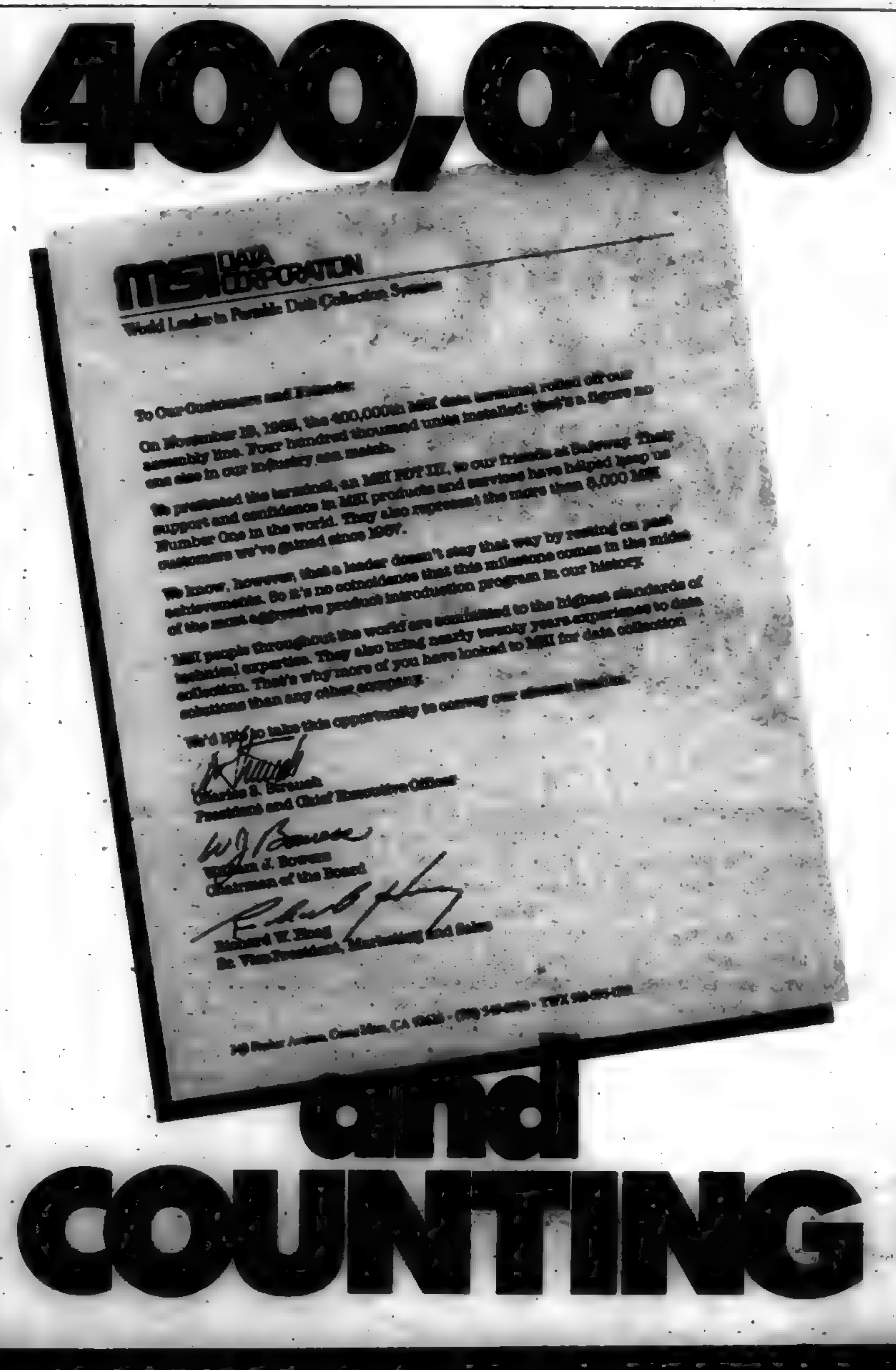
■ System security. The confidential nature of the information may make system security a concern.

This is by no means an all-inclusive list; rather, it should be used as a guide to determining relevant evaluation criteria.

Closely linked to determining the evaluation criteria is the step of identifying the potential problem areas. The review should pinpoint those problems that would explicitly affect one or more of the evaluation criteria. For example, a very slow data base sort identified as a problem area probably affects a speed concern. Or, the existence of unscrambled data files might well affect system security.

No attempt should be made to rectify these areas at this point in the review. Instead, they should be addressed in the next step.

At this point, the reviewer can start to consider ways to improve the system. The review has already generated a number of documents: system components list, flowcharts or logic flow diagrams; a problem determination sheet; a list of evaluation criteria; and a list of potential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problem areas. A review of the documents at this point will be helpful in getting the appropriate feel for the system prior to the suggestion-making stage.

After reviewing the material, the reviewer can accept suggestions for improving or modifying the system. At this point, no analysis of the feasibility or desirability of implementing the suggestions should be made. Wait to perform this analysis until after completing the suggestions.

To aid in this future evaluation, use a common format for all suggestions. The key components of the format are as follows:

- **Suggestion.** A brief description of the suggestion and what it does.
- **Areas impacted.** The areas of concern addressed by the suggestion.
- **Reason:** A description of how or why the suggestion affects each of the areas of concern addressed by the suggestion.
- **Detail.** Technical details regarding implementation of the suggestion.

> ”
>
> *There is no hard-and-fast guideline to determining in what areas suggestions should and will be made.*

There is no hard-and-fast guideline to determining in what areas suggestions should and will be made. However, it is possible to make a list of the likely areas, such as the following:

Take advantage of new technology. For instance, basing system communications on a 1,200 bit/sec. modem in a company concerned with speed would make the use of a 2,400 bit/sec. modem a valid suggestion. Or relying on Dbase II when the company's capacity is a concern would make using Dbase III a valid suggestion.

Examine software version numbers. It may be that recent enhancements in a software package will help the system in one way or another.

For example, a system written several years ago in Lifeboat Associates' Lattice C could perhaps be recompiled under a new version of Lattice to take advantage of a math coprocessor chip, helping to improve system speed.

Look at the various inputs into the system. For example, don't forget to consider such possibilities as an uninterruptable power supply if system reliability is a concern. In the same vein, if data-security is a concern, such as for a military subcontractor, consider the possibility of shielding the personal computer against radio frequency emissions. If files are being downloaded from a mainframe to the personal computer, check the record length to determine if the optimum block size is being used.

Make sure that any efforts directed at such things as power integrity are carried out fully. For example, if a system's power supply is fitted with a surge protector, make sure that the modem, if there is one, is also equipped with a protector. Or, if system redundancy is used as a backup method, make sure that the redundancy extends to all key components.

Do not ignore simplification possibilities or downplay suggestions that are very easy to implement. For example, a system with two personal computers that must transfer data offers several connection alternatives. The local-area network now in place could be replaced by a much

[illegible]

By priority level	
[illegible]	[illegible]
Medium level	Suggestions in this category improve the system being reviewed in some way; however, the improvement does not merit immediate attention.
[illegible]	[illegible]
Potential medium level	These suggestions should be further evaluated. If an evaluation proves favorable, the suggestion should be moved to the medium level.
[illegible]	[illegible]
By difficulty of implementation	
[illegible]	[illegible]
Medium	These suggestions involve more time, but do not require a major reimplementation of the system.
[illegible]	[illegible]

Figure 2: End-user suggestions must be evaluated before implementation.

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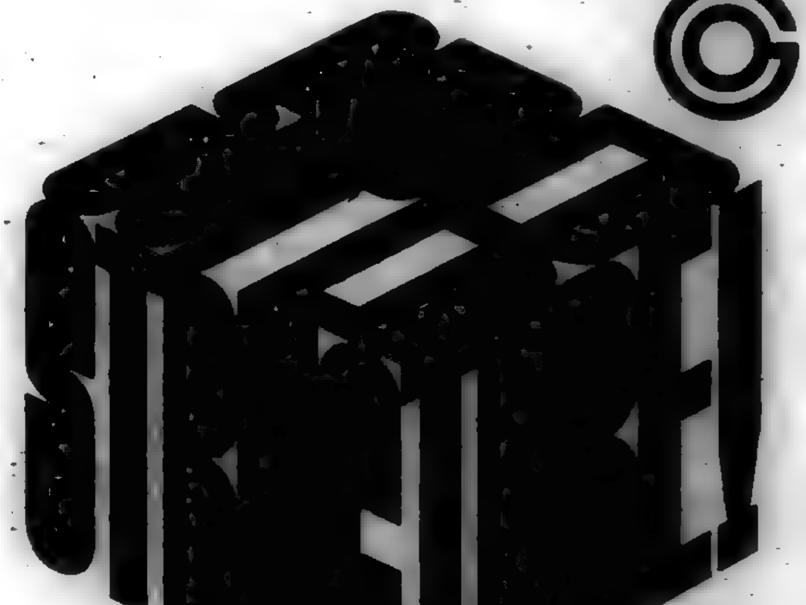

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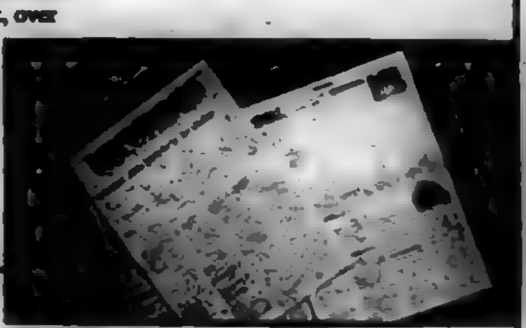

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> *Many personal computer systems mature with problems. A thorough technical review can identify these problems and lead to taking steps to prevent them.*

simpler null modem arrangement. Or perhaps some inexpensive software change such as utilizing a directory structure might make the system easier to manage.

Examine the technical documentation of the system. If the documentation is incomplete or even nonexistent, good suggestions might focus on rectifying this problem.

Consider the various problem possibilities and the procedures in place to deal with them. Are the procedures adequate? Are the personnel responsible for implementing the procedures aware of their duties? All of these can form the basis for system suggestions.

Finally, **don't forget to consider preventive maintenance.** For example, if date or time are important and the system uses a battery-powered clock, establish a semiannual battery change. Perhaps establish other preventive maintenance measures, such as checking the disk drive alignment on a regular basis.

Ranking suggestions

The review process generates a wealth of suggestions on how to improve the system in one way or another. The reviewer will need a ranking mechanism to determine which suggestions should be implemented. The most expedient way of doing this is to rank the suggestions by priority and then by difficulty of implementation.

By priority. Five priority categories (high level, medium level, potential high level, potential medium level and low level) generally breaks down the suggestions in a useful way (Figure 2).

By difficulty of implementation. Some of the suggestions made will be rather simple to implement. Others will involve extensive redesign of the system being reviewed. The suggestion should be ranked according to difficulty of implementation. Three rankings should be used: simple, medium and complex.

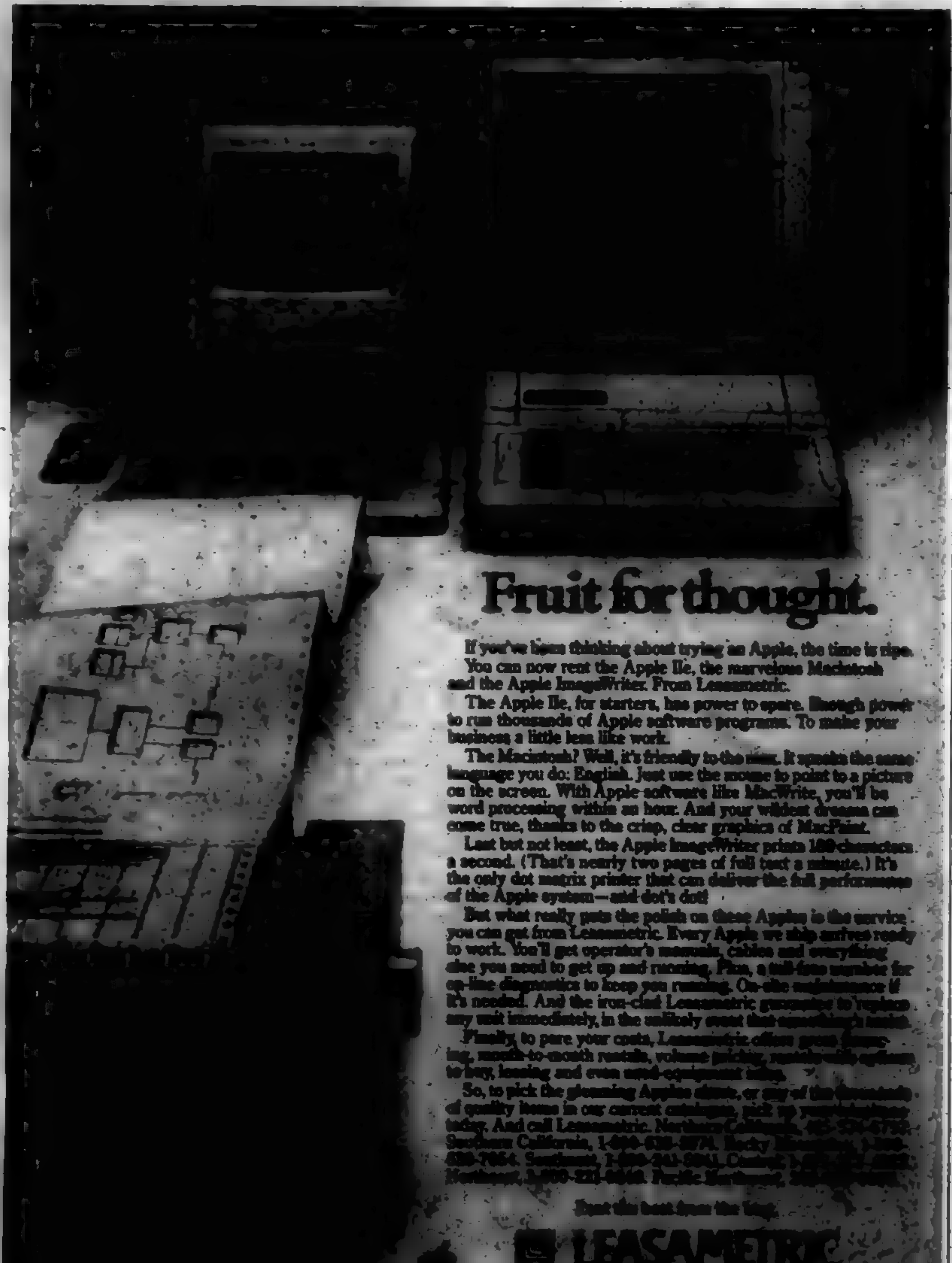
Generating a matrix. Once the suggestions have been ranked by priority and difficulty, creating a matrix based on point values that the reviewer establishes is a simple matter. Assigning point values to suggestions cannot readily be formulated; rather, it is a judgment call based on the reviewer's experience and knowledge of the specific needs of the firm.

Obviously, those suggestions that have both high-level priority and easy implementation should be attended to immediately. Some further thought will have to be given to the other suggestions in terms of implementation. Different firms will have different cutoff points in terms of what suggestions will be implemented.

As more and more personal computer-based systems come into existence, some effort must be made to determine properly the viability and integrity of these systems.

Many personal computer systems mature with major potential problems. Managers often overlook these problems because of the relative ease of getting a personal computer-based system up and running.

Conducting a thorough technical review can help identify these problems and lead to the department taking steps to prevent them. Otherwise, system users and managers will be forced to live under the shadow of Murphy's Law. ■



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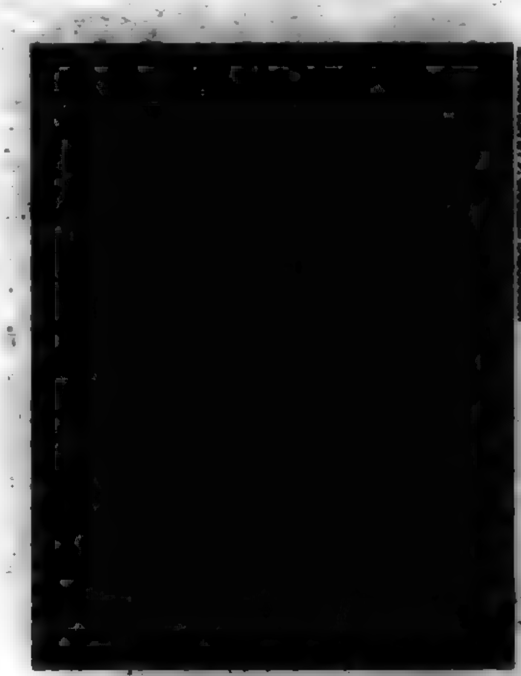

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Black-box technique automates quality control

This familiar test can be used as an automatic verification process to speed programs into production. With one-command start-up, brief test case development and concise reporting, black-box testing can enhance the current quality control effort.

By Rusty Williamson

DP and MIS staffs have devoted great quantities of time and effort to developing workable software testing systems. Methodologies and techniques abound, but the real world of competition, rapid development and limited resources leave little room for their use.

In a support environment of ongoing enhancements and expansion, the continual flow of programs that need testing can make the quality control situation next to impossible. Enough time is not always available to create adequate test cases or to analyze data base updates properly for each modification.

Heavy work loads and limited resources may reduce the average software testing done per program to three transaction types run on three devices. Programs are then forced to face the cruel world of production, where 300 devices endlessly bombard the system with hundreds of transaction types at 100 times the throughput.

In some cases, dusting off an old "black-box" testing technique can help. Used as an automatic verification process, black-box testing acts as a final system shakeout. These tests can help assure that new or modified programs being released to production will perform — without error — those functions that are vital to the company.

Basically, black-box testing treats the system being tested as just a box, without tracking or considering what occurs inside. DP staff inputs preplanned data into the system and compares the output, usually files or device messages, with data known to be correct (Figure 1 page 56).

Advantages of automation

The black-box testing technique used as a system or subsystem verification process offers several advantages:

- It can be completely automatic, using one-command start-up. As black-box testing does not require extensive test case development, data base preparation, equipment preparation and usage or transaction entry, it frees quality control personnel to expand the scope of other testing, such as local or program-level testing, error recovery and reporting testing, documentation review.
- It can effectively provide simulation — of both device types and transaction variety — that may not be possible because of time or equipment limitations.
- It accepts new temporary or permanent test cases easily, allowing the automatic-verification-process testing scope to keep up with the system's growth.
- It can assure that the overall functionality of the system has not been distorted by some seemingly minor or unrelated program change.
- It produces a concise report on the outcome of tests.

In practice, DP staff places new or modified programs into a disk

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Rusty Williamson is a programmer/analyst for Gascard Club, Inc., a Del Mar, Calif.-based firm that serves a network of independent petroleum marketers.

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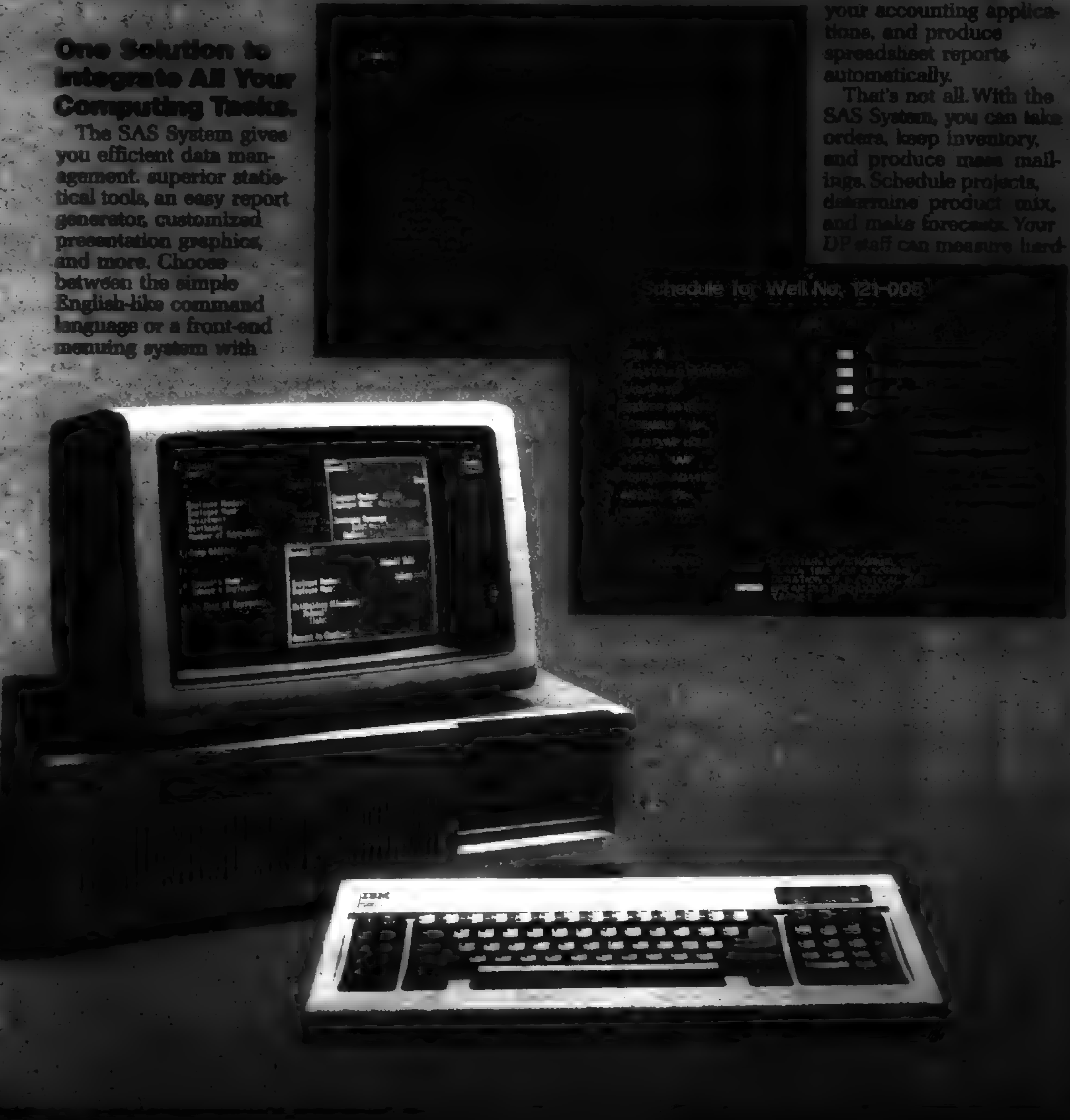

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volume set aside for this purpose. A test staff member types a single command into a terminal, and half an hour later a report prints out. The report might say that 200 transactions have been run through the system and that the system has or has not functioned correctly. The automatic verification process yields results quickly and conveniently.

Conditions of use

Several general considerations apply to the development of this quality control tool by any company.

The automatic verification process must be formed by the programs and files being tested. The less code and process manipulation or simulation introduced into the system, the better. By the same token, the way test data is collected and re-fed to the system should be simple and originate from real devices whenever possible.

The environment also must be controlled and self-contained. The data base has been set up to reflect certain circumstances and must not be modified inadvertently.

Recognizing the limits of the verification process is also vital. The process may not verify certain programs or transactions. Everyone concerned should know this limitation.

In addition, for most companies, ease of development is a must. The automatic verification process must cope with future needs. Ease of test case maintenance and the ability to introduce special, temporary test cases are also desirable.

The verification process should be self-testing. Running tests with the same programs and data should always produce the same results. Its design and use should be as simple as possible.

Last, but not least, the automatic verification process should be a tool to enhance the current quality control effort. It should not be relied on solely for a system's verification.

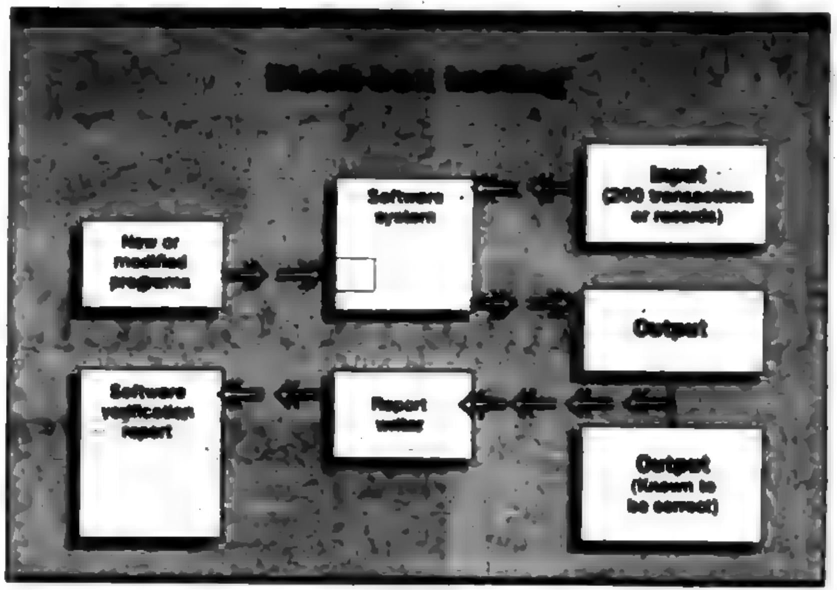
Black-box testing
New or modified programs
Software system
Input (200 transactions or records)
Output
Software verification report
Report writer
Output (Known to be correct)

Figure 1

A test case

The software system or subsystem subject to the black-box automatic verification process could take a variety of forms. The input and output could consist of data base files, transaction files, machine sensors, on-line automated teller machines, point-of-sale devices or other terminals and output devices. The software system at the center might be for batch billing, order entry, machine monitoring, credit authorization or electronic funds transfer.

Figure 2 shows an on-line credit authorization system used as an example. In this system, a host computer receives and sends messages to a network of on-line terminals. The system references and updates a data base. In the on-line credit approval system, the network terminals function as both the input and the output devices.

In the automatic verification process, the software system is a copy of the production system in use. The automatic verification data base represents a scaled-down version of the real one. The automatic verification system in the example uses three on-line terminals standing in for the three varieties supported by the company. As shown in Figure 2, the capture of control input and output data is used later by the verification process when verifying the system.

Overview

A step-by-step overview of the development of this automatic verfication process is shown below.

System code modifications (step 1) performed by the programming department should be kept to a minimum. For this sample system, four new system functions will be required at points 'a', 'b', 'c' and 'd.' All these added system functions can be turned on or off — allowed to execute or not — by switches. These switches can be controlled by an input file, a parameter passed with the RUN command or a compiler switch.

Function 'a' turns on and off the opening and reading of real network terminals. Point 'b' opens and reads a file of captured network terminal messages that also contain a displacement time stamp (time elapsed since the system was started).

The function added at point 'b' releases these terminal transactions to the system according to the displacement time stamp. The displacement time-stamp and release control logic allow multiple-step transaction scenarios to occur in their proper

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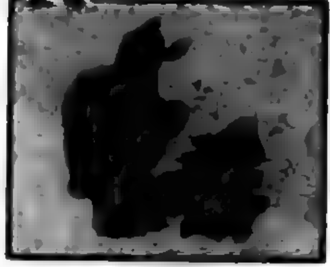

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order. These scenarios include transaction requests, authorization responses and transaction completions.

Point 'c' takes messages coming from the network terminals, adds a displacement time stamp and writes this data to the file read by 'b'. Point 'd' writes all system responses to the network terminals to another file.

The reason for these changes and the way they work together to create the automatic verification process will become clear in a moment.

Test case development (step 2) must produce test cases that represent system functions vital to the company. Closed, open or overdue accounts, credit limits, restrictions and transactions to be run on the terminals all must be documented.

Creating automatic verification systems (step 3) requires that the entire production system be copied to a disk volume set aside for this purpose. As many network terminals as possible are connected to the new automatic verification system; in this case, there are three. All records are deleted from the data base in order to start fresh.

Set up automatic verification pre-data base (step 4). Data determined by step 2 (accounts, credit limits and so on) is set up on this new data base. Once established, the automatic verification pre-data base must be preserved, so a copy of this data base will always be used.

Create automatic verification post-data base (step 5). As shown in Figure 2, the automatic verification system starts up in its "data capture" mode, and operators input the transactions determined in step 2. Switch 'a' is on, allowing the system to communicate with the test network terminals. Switch 'b', which controls a file's reading of terminal transactions, is off (inactive).

Switch 'c' is 'on,' taking transactions being input from the terminals, adding a displacement time stamp and writing them to a file called the automatic verification terminal transaction file. Switch 'd' is also on, writing system response to the terminals to a file called the automatic verification terminal response file.

A copy of the automatic verification pre-data base is referenced and updated. After this data base is completely updated by all the terminal transactions, it becomes the automatic verification post-data base. The terminal transaction and terminal response files now contain all the transactions and responses generated. All of these must be preserved so they can be used later.

Verification of the automatic verification process output (step 6). After the post-data base and terminal response file are updated, qualified personnel should check both manually. It is imperative that both of these are updated correctly, as they will be the yardsticks that measure system correctness.

This manual verification can also act as an audit of the current production system, which is presumed to work correctly. Once verified, both the automatic verification post-data base and terminal response file are cut off from the automatic verification system and preserved.

Set-up of report writer (step 7). Future automatic verification process test-mode runs updating the pre-data base will produce an automatic verification test data base and automatic verification test terminal response file. Test staff should now develop a process to compare post-data base and terminal response file (correct results created in step 5) to these test versions and create a report on any differences.

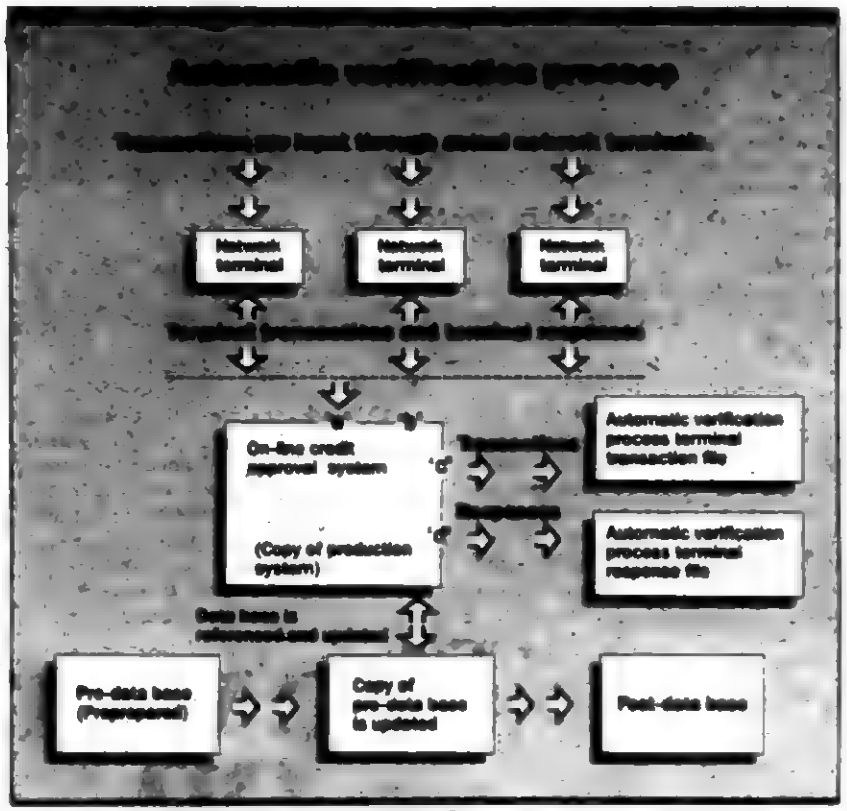
Automatic verification process
Transactions are input through actual network terminals
Network terminal
Network terminal
Network terminal
Terminal transactions and terminal responses
'a'
'b'
On-line credit approval system
(Copy of production system)
'c'
'd'
Transactions
Responses
Automatic verification process terminal transaction file
Automatic verification process terminal response file
Data base is referenced and updated
Pre-data base (Preprepared)
Copy of pre-data base is updated
Post-data base

Figure 2

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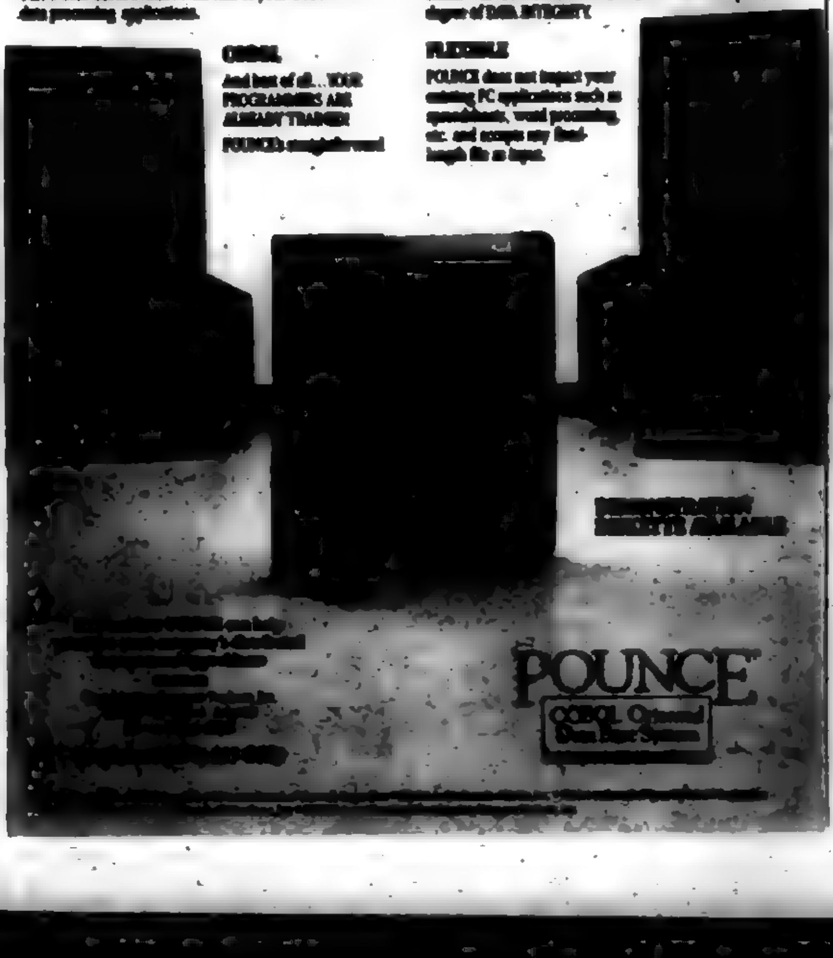

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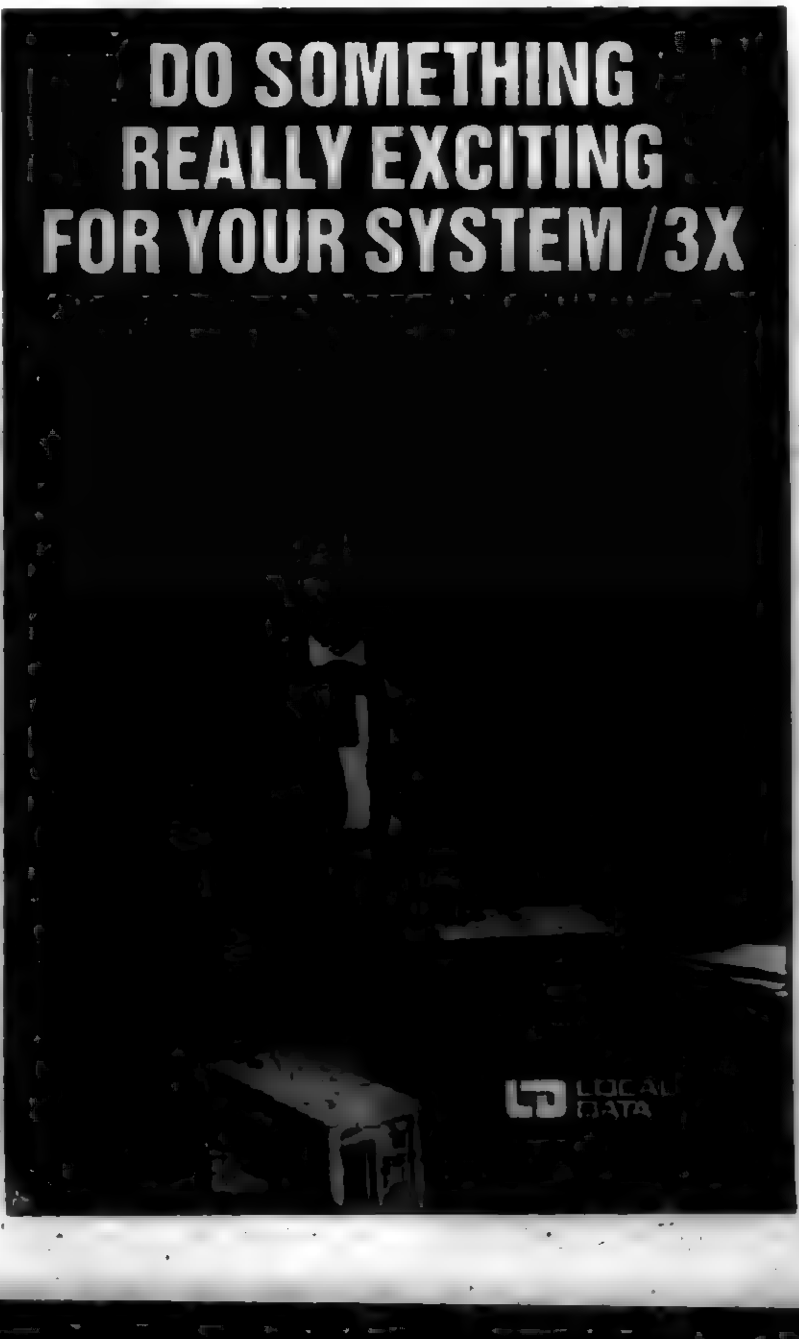

> ”
> *The automatic verification process should enhance the current quality control effort and not be relied on solely for system verification.*

Ideally, a vendor-supplied report-writing utility should be used rather than an in-house developed program. The report writer should compare all data base files, not just those where updating is expected. All differences should be reported.

Verification of consistency (step 8). The automatic verification process should create the same data base updates and test terminal response file if run over and over with the same system.

Testing staff should run the system over and over to verify itself, using the automatic verification process in its testing mode. Here, switch 'a' is off, cutting off network terminals from the verification system.

Switch 'b' is now on, reading transactions from the terminal transaction file (created in step 5) and feeding them to the system via the displacement time stamp. Switch 'c' is off, as capturing terminal transactions is no longer needed. Switch 'd' is on, writing system responses to terminals to the automatic verification test terminal response file.

This automatic verification system eventually will be used to verify the system when enhancements are made to it; now, however, it is testing itself. The report writer should verify that the automatic verification test data bases and terminal response files remain consistent.

Using automatic verification command file (step 9). Most operating systems or their command interpreters will execute files of commands. In most cases, the test process can make use of these types of files or some other method so the operation of the automatic verification process (file copying, run commands and so on) can execute via a single command.

Automatic action

Now the automatic verification process can be put into action. The testing staff places new or modified programs coming from the programming department on a disk volume set aside for this purpose. The automatic verification command file executes, performing the following functions:

■ The new or modified programs are included in the automatic verification system. Any original programs being replaced are saved.

■ A copy of the automatic verification pre-data base is put in place, and the test terminal response file is cleared out.

■ The verification system runs, reading in the terminal transaction file, referencing and updating the pre-data base (creating the automatic verification test data base) and writing terminal responses to the test terminal response file.

■ After all transactions have been processed, the report writer goes to work comparing the newly updated data base and response file to their counterparts, which are known to be correct. It then produces a report that shows any inconsistencies.

■ The system is restored to its original state; all new programs included in step 'a' are removed and the original ones returned.

Only when the new or modified programs pass all testing (the automatic verification process and others) and are placed into production do they become part of the automatic verification system. All older versions are then purged or archived.

The actual use and application of this technique will, of course, vary from system to system. One verification process may check an entire system as depicted in the example, or automatic verification may be applied at the subsystem level.

In determining if an automatic verification development effort would be worthwhile, record the bugs that slip through the quality control safety net and into production. The percentage that would have been caught by an automated verification process is fairly easy to see. ■

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Find out why most companies choose ACF2—the superlative security solution. Call or write Shawn McLaren today at The Cambridge Systems Group.

ACF2 is developed by, and is a registered trademark of SKK, Inc., Rosemont, IL.

1. *Xephon User Survey* ©1984, Xephon Technology Transfer, Ltd.
2. Computer Intelligence Corporation, 1985.
3. *Datamation*, 1984.

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IN DEPTH

DP alliance bolsters security

MIS managers are well advised to forge a strong link between the security officer and the organization's internal DP auditor, whose jobs promote a single goal: protecting the organization's assets from intrusion. Together they can sell top management on the need for improved security measures.

CW PHOTO BY O'CONNELL/LADOUCEUR

By Michael Sobol

An organization's data processing security officer and its internal DP auditor approach their jobs from different perspectives — the auditor from outside the DP shop, the security officer from within.

Even when both professionals respect the demarcation — as they must if they are to perform their jobs properly — they will cross paths often. They cannot avoid meeting because their jobs promote a single goal: protecting the organization's assets from intrusion.

An organization's data security officer and its internal DP auditor share many responsibilities. But each approaches his job from a different angle, depending on his organizational loyalties.

The security officer is trained to look at data security from a DP perspective. The officer looks for potential weaknesses in computer security and recommends technical measures to reduce any weaknesses he spots.

Because this position falls completely within the realm of data processing, the security officer is responsible to the MIS manager. In the same vein, his access is restricted to information that resides within this realm, as is his responsibility.

The auditor is trained to look at data security from a controls perspective. He looks for actual exposures in areas related to computer security and recommends controls to reduce any exposure he finds.

By nature of this charter, the auditor operates independently of the DP management structure; he reports to executive management — not to the MIS manager — and is authorized to gain access to any information, inside or outside of DP, to perform his job.

The courtship approach

At every point where the two can possibly come together, the MIS manager in charge should actively court their cooperation. This approach can breed impressive results, as the following scenarios demonstrate.

Case 1: Divided they fall. The data security officer and MIS manager of XYZ Corp. decide the company needs access control software to protect mainframe data from batch and on-line intrusion. They submit feasibility studies to executive management for approval. But XYZ's top managers feel leery of relying solely on the opinion of the MIS department. They do not find sufficient reason to approve the large expenditure, so they deny it.

Sobol is president of MIS Training Institute, Inc., a Framingham, Mass.-based firm that offers training and consultation services in the areas of security and auditing.

> *The MIS manager should stay alert to see that the two security professionals agree on the assets to protect and the amount of resources to channel toward each type of protection.*

Case 2: United they stand. The same scene plays itself out at ABC, Inc. At this company, however, the data security officer and MIS manager elicit the support of the DP auditor, who harbors similar concerns about the risks of on-line and batch access.

The auditor stands behind the MIS manager's recommendation for installing access control software. ABC's top management — convinced of true need — approves the software acquisition.

Cooperation proves equally successful beyond the realm of software acquisition. In every sphere in which the auditor's and the security officer's responsibilities overlap — whether it be physical security, data security, risk assessment, contingency planning, systems development or production control — the auditor can be the MIS department's strongest ally.

Physical security. Both the auditor and the security officer are concerned, from their separate perspectives, with controlling physical access to an organization's hardware assets — its mainframe as well as its minis and microcomputers. Likewise, they both monitor building construction and environmental controls and make sure the organization installs devices that will detect and contain smoke and fire.

If the officers combine their efforts, they can help each other sell top management on the need for improved physical security measures where appropriate.

Data security. In this realm, the security officer's and auditor's roles are more distinct; still, the roles complement each other.

The data security officer holds responsibility for specific measures: maintaining passwords, monitoring and reviewing security violations and protecting private or sensitive data.

The auditor's role remains more general. He controls and ensures the integrity of sensitive data, sees that the organization follows privacy regulations that govern corporate and employee data and makes sure all necessary access control mechanisms are in place.

The data processing manager, realizing how strongly these two roles depend on each other, should do what he can to encourage their mutual cooperation.

Risk assessment. This area needs little elaboration, as auditors and security officers commonly join forces to assess weaknesses in data and physical security.

The MIS manager should stay alert, though, to see that the two security professionals agree on the assets they want to protect and the amount of resources they want to channel toward each type of protection.

A good method for assuring agreement requires that the auditor and security manager sit down together when the time comes to develop a risk analysis model.

Contingency planning. The security officer usually holds complete responsibility for coordinating DP disaster recovery plans. The auditor, however, can also play an important role in the design, testing and maintenance of such plans.

During the testing of a disaster recovery plan, for example, the auditor can act as an impartial observer or umpire. The auditor, if involved, can offer an independent assessment of the overall success or failure of the test. The MIS department should accept the auditor's opinions as valuable guides toward future improvements.

Systems development. The security officer and the auditor share a great deal of responsibility for seeing that applications systems contain sufficient measures for security and control.

Both employees, for example, must review system specifications to uncover weaknesses. Both the security officer and auditor may also need to conduct system tests, monitor user training programs and review final applications along with their documentation.

Although the security and audit departments must work independently on each of these tasks, each should know of the other's findings. The MIS manager should do his best to keep lines of communication open.

Production control. In this area, the security officer holds the lion's share of responsibility. He must see that only properly designed, tested, documented and approved programs are added to the organization's production libraries. To do so, he must first establish the procedures that control the addition of new applications and the modification of existing ones.

The DP auditor should offer all the assistance he can when the security officer develops procedures. Afterward, he should conduct periodic reviews to check each procedure's effectiveness.

The MIS manager must stay receptive to the auditor's findings: Any weakness in control procedures can lead to unauthorized modifications that will render production data inaccurate. ■

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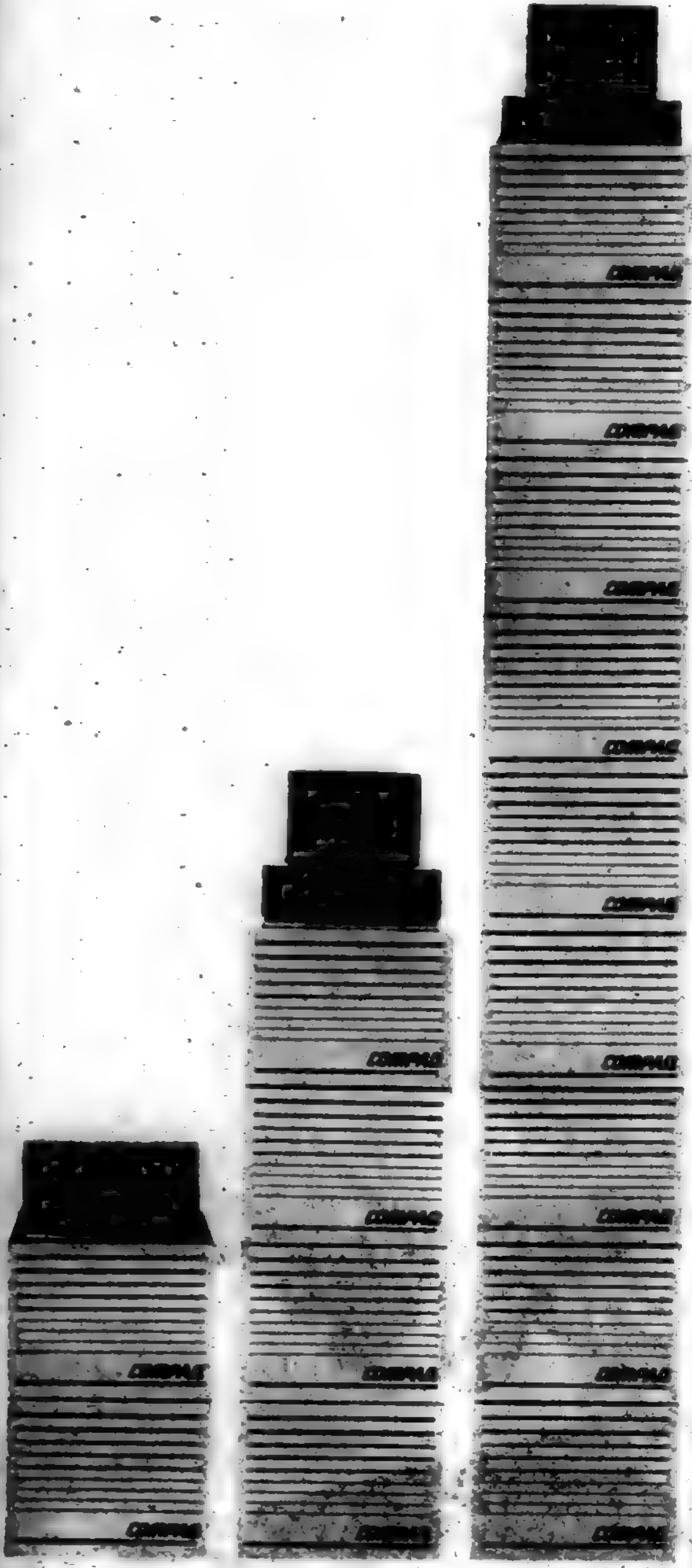

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NEW PRODUCTS

McDonnell Douglas adds minis to line

McDonnell Douglas Computer Systems Co. of Irvine, Calif., has added two minicomputer systems to its Microdata 9000 series product line, the M9250 and the M9050.

The M9250 is offered in a range of configurations.

The base system with 2M bytes of main memory, 260M bytes of disk storage, 32 ports and software is priced at approximately $200,000, according to McDonnell Douglas.

The top-of-the-line system with 6M bytes of main memory, 1,040M bytes of high-performance disk storage and 208 ports is priced at approximately $499,000.

The M9250 comes with software designed to enhance the Reality relational data base management operating system, the company said.

Security enhancements

The M9250 also incorporates security enhancements providing authorization locks to accounts, files and dictionary items. There are reportedly up to 10 different authorization levels.

Also included in the package is the company's fourth-generation application software generator All.

The second computer system, the M9050, is a real-time, transaction-oriented data base machine that supports a range of office automation tasks including spreadsheet, word processing and financial applications.

The M9050 base system, priced from $106,000, comes with 1M byte of main memory, 130M bytes of disk storage and eight ports.

The largest M9050 system, priced at about $360,000, offers 4M bytes of main memory, 104M bytes of disk storage and 128 open ports.

All application software currently available on the vendor's Reality-based systems is code compatible with the M9250 and the M9050 systems, McDonnell Douglas said.

Case's Grapevine net debuts

Links terminals, resources via existing phone wiring

Grapevine uses voice/data multiplexing techniques with existing telephone wire.

Case Communications, Inc. of Silver Spring, Md., has introduced a local-area network for interconnecting terminal devices and computer resources within a building or site.

Called Grapevine, the system uses voice/data multiplexing techniques so that data traffic shares the existing telephone wiring without interfering with or interrupting normal speech usage.

The terminal can be a VDT, word processor or personal computer, the company said. An access unit is plugged into the telephone jack and both the terminal and the telephone handset plug into the access unit. Data rates up to 19.2K bit/sec. asynchronous or synchronous are available over the standard telephone wiring.

There is a central unit, adjacent to the private branch exchange, which filters out voice traffic and passes it to the PBX for normal switching. Data is routed to the appropriate computer or passed to a Case DCX switching exchange for dynamic routing. The DCX extends the local-area facilities of the system by providing access to multiple computers or ports grouped by applications, with built-in contention and queuing facilities. Protocol conversion gateway options can enable asynchronous terminals to access applications hosted in mainframe environments.

Grapevine is priced at $500 per connection. Each connection has 32 channels.

INSIDE

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DEC launches layered software Ethernet tool to monitor status

Digital Equipment Corp. of Maynard, Mass., has announced NMCC/VAX Ethernim, a network management software tool that reports the current, on-line status and condition of an entire Ethernet local-area network.

NMCC/VAX Ethernim runs as a layered software product on the VAX/VMS operating system, monitoring local-area networks by using the Ethernet protocol and Decnet Phase IV network software. It depicts the network graphically and maintains a historical reference file of events.

The monitor tests communications paths, gathers network information and creates a real-time graphics display of the entire local-area network. It can operate in any VAX environment that uses DEC's Deuna Ethernet adapter, including the VAX 8600 environment, and it can monitor the simplest or the most complex local-area network configuration, even those with non-DEC nodes.

NMCC/VAX Ethernim reportedly has the ability to detect and alert local-area network managers to any changes and additions to the Ethernet configuration, including the addition of new nodes to the network. In addition to the diagnostic capabilities, NMCC/VAX Ethernim maintains a permanent, editable data base of information on each node on the local-area network.

A single-use license is priced at $7,080 except for the VAX 8600, for which the price is $10,500.

IBM ups applications, data manager systems

Also introduces funds allocation software

IBM has announced enhanced versions of its Application System and its Data Facility Hierarchical Storage Manager Version 2 and has introduced the Funds Allocation System.

Application System Release 4 is an interactive application development facility that provides non-data processing trained professionals with commands and conversational facilities for solving business problems.

The enhancements include MVS/SP Version 2 — 31-bit addressing — exploitation, Database 2 support in MVS environments, migration aid to assist in the transfer of Application System programs and data from VM to MVS, transportable files, batch mode operation in MVS environments, enhanced data base maintenance facilities, Interactive System Productivity Facility communication function, business tool enhancements and customization options to reduce size of shared segment.

Application System Release 4 will be available in April 1986. It can be licensed for an initial license charge and monthly license charges or for a one-time charge. The initial license charge is $53,500. The monthly charge ranges from $1,700 for 15 concurrently signed-on terminal users to $9,960 for unlimited MVS signed-on users. The one-time charge ranges from $101,500 for 15 concurrently signed-on users to $350,000 for unlimited MVS users.

Data Facility Hierarchical Storage Manager Version 2 Release 2 offers enhanced 3480 Magnetic Tape Subsystem performance via a single-file data format option and use of the 3480 high-speed search feature. It operates with MVS/XA and MVS/370.

Release 2 is available now. The basic license costs $800, and the distributed site license option is $600.

The Funds Allocation System allows users to simulate the effect of current and future investment decisions. It uses parameters unique to the user's institution to provide guidelines for optimal asset allocation and funding policy.

The Funds Allocation System runs on VM/CMS; PL/I Transient Library and MPSX/370 must be installed.

It is available for a one-time charge of $27,000.

Emulation software out

Burroughs Corp. of Detroit, Mich., has announced a Diebold Corp. emulation software package for its RT 750 Customer Activated Delivery System.

The emulation software reportedly enables RT 750s to communicate with mainframe computer systems in the same format as Diebold's Model 910 and Model 911 Automated Teller Machines. The software translates messages sent to an RT 750 in Diebold format into Burroughs format, and vice versa.

The Diebold emulation software package is provided free with any purchase of an RT 750, Burroughs said. The RT 750 prices start at $18,600.

Most 132 column terminals are designed to crunch a lot of numbers.

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NEW PRODUCTS/SOFTWARE & SERVICES

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Systems software

Software International Corp. has announced a new version of its **General Ledger & Financial Reporting System** for the Sperry Corp. 1100 computer.

The version allows on-line inquiry by posting-level account into the transactions in the month-to-date and history files.

There are also description look-up capabilities, the ability to transfer entire structures and mass-deletion capabilities.

The product is available for a license fee ranging from $85,000 to $95,000.

Software International, One Tech Drive, Andover, Mass. 01810.

■

Al Lee & Associates, Inc. has announced an optional **Color 3270** support feature for its on-line application development system Magec.

The new feature supports the extended color and highlighting capabilities of the IBM and compatible 3270-type terminals with seven-color support. It allows applications developers to generate systems that manipulate field-level controls of the seven defined colors and three extended highlighting attributes.

Magec costs $88,000 for IMS, $72,000 for OS/CICS, $32,000 for DOS/CICS or Datacom DC and $28,000 for Westi environments. The Color 3270 feature costs $5,000 for OS and $3,500 for DOS.

Al Lee & Associates, 2324 Seedling Lane, Dallas, Texas 75252.

■

Infocraft, Inc. has introduced the **POS/3000**, a point-of-sale automated polling system designed for the Hewlett-Packard Co. HP 3000.

The POS/3000 provides communications between remote and local point-of-sale terminals and the HP 3000. It can handle up to 1,000 stores with an unlimited number of terminals in each store. It uses the standard HP 3000 bisynchronous communications facilities to talk to the point-of-sale terminals that communicate with an IBM mainframe using 2780 or 3780 protocols.

POS/3000 costs $12,000.

Infocraft, Suite 107, 15614 Hawthorne Blvd., Lawndale, Calif. 90260.

■

Control Data Corp. has added the **ICEM Configuration Manager (ICEM CM)**, an on-line, real-time information system for controlling product life cycles to its ICEM system of integrated software and hardware for computer-aided design and manufacturing functions.

ICEM CM automatically collects, coordinates, formats, stores, updates and distributes product and project data, including design changes.

ICEM CM operates on a Control Data Cyber 830 or larger system. A complete system, including hardware, software, consulting and CAD/CAM applications, is priced starting at approximately $1 million. ICEM CM software only is priced at about $300,000.

Control Data, 8100 34th Ave. S., Minneapolis, Minn. 55440.

■

GMD Systems International, Inc. has announced **34/36 Jobqueues**, a batch throughput system for users of the IBM System/34 and 36.

The product allows increased batch throughput performance. It offers security provisions and performance monitoring. It features a global search-and-replace feature; preservation of external program switches and substitution parameters; and reports on the IBM JOBQ contents, security, job conflict and performance test statistics.

The product costs $1,000.

GMD Systems, 8601 Dunwoody Place, Atlanta, Ga. 30338.

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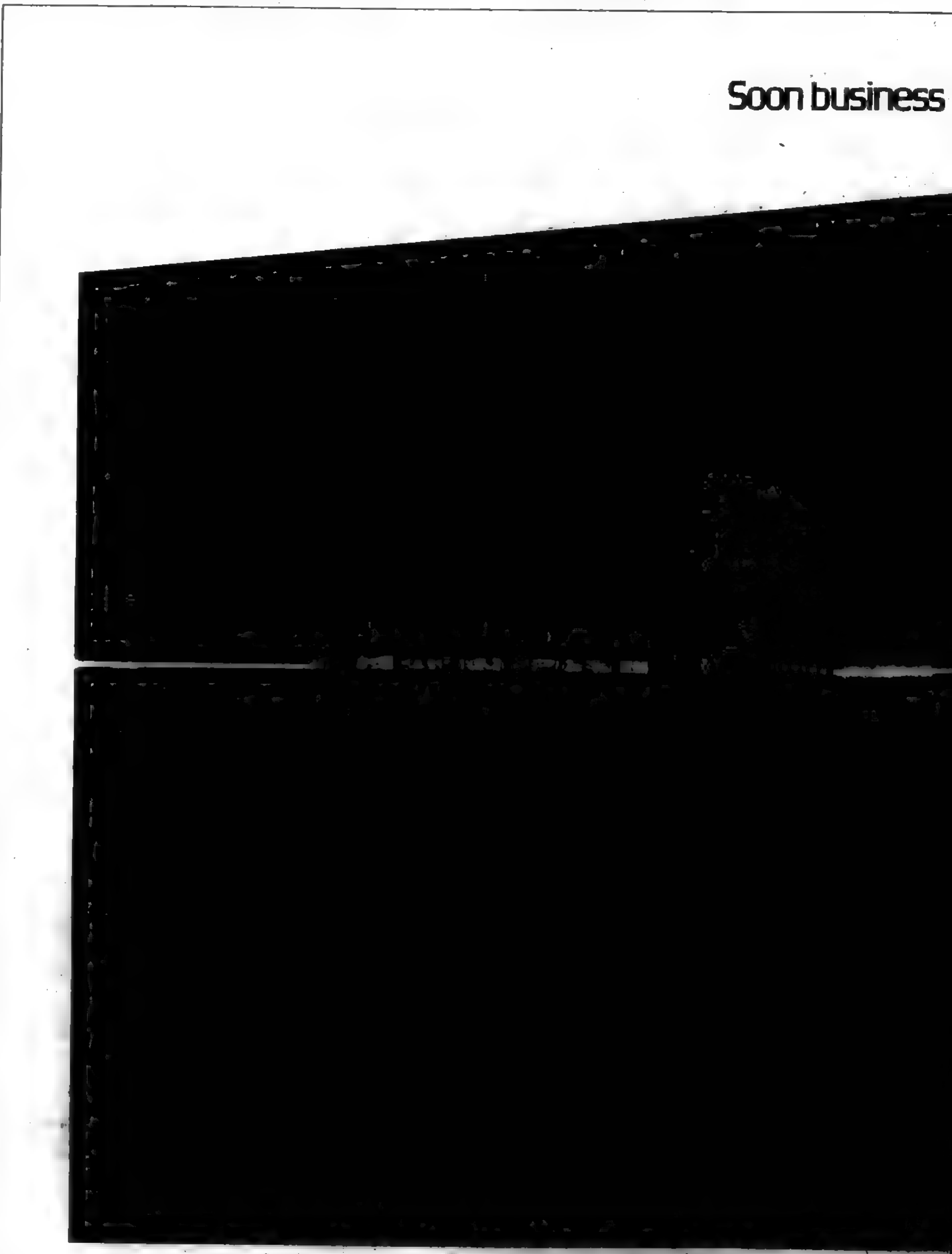

Advanced Systems Concepts, Inc. has announced **Command Source** retrieval, a software product said to retrieve command definition source statements from any command object.

Command Source was designed for the IBM System/38. Each process examines resident System/38 object code and manipulates it in order to retrieve the original source code. Once command source has been retrieved, it can be changed and the command re-created.

Command Source is available for a one-time license fee of $500.

Advanced Systems Concepts, Suite S, 1350 Remington Road, Schaumburg, Ill. 60195.

■

Control Data Corp. has announced its **Eden** student records system.

Eden supports student-related administrative functions like admissions, registration and grades, financial aid processing and student accounts receivable.

The system can be modified to adapt to a school's policies and procedures. It runs on CDC's Cyber 180 computer series, ranging from the entry-level Model 810 to the high-end Model 990.

Eden is priced from $150,000 to $200,000.

CDC, 8100 34th Ave. S., Minneapolis, Minn. 55440.

Epix application development software that allows users to create and alter data collection programs was unwrapped by **Epic Data.**

Epix lets users develop programs on the Digital Equipment Corp. VAX-11/750 or the IBM Personal Computer. The programs are uploaded to the vendor's Host Programmable Control Unit or Host Programmable Portable Terminal for implementation.

The software includes an interactive editor, compiler and program transfer function for downloading data.

Epix requires a C compiler with AT&T Unix V7 compatibility library and 128K bytes of memory. The package, including an IBM Personal Computer distribution disk or tape for the VAX-11/750, sells for $6,800.

Epic Data, 7280 River Road, Richmond, B.C. V6X 1X5 Canada.

Productivity aids

Eagle Software, Inc. has added the **Manager** utility to its VS Toolbox for Data General Corp.'s AOS/VS operating system.

The Manager enables space management on Infos II indexes and data bases that have disabled space management without having to rebuild the file.

Companies that have already purchased the VS Toolbox will receive the Manager free of charge. The VS Toolbox is priced at $1,850.

Eagle Software, P.O. Box 16, Salina, Kan. 67402.

■

Relational Data Base Services, Inc. has announced a **data base tuning service** for users of Software House, Inc.'s System 1032 data base management system for Digital Equipment Corp.'s VAX computers.

A consultant will review data base descriptors provided by the user for data type inconsistencies. The consultant will review the programs and data management control for use of current efficiency techniques, structured programming and possible program design improvements.

The consultant will provide a written analysis and recommendation for each data management descriptor and control.

The costs for this service are $250 per data management descriptor file and $100 per page per data management control file.

Relational Data Base Services, P.O. Box 644, 121 S. Main St., Kernersville, N.C. 27285.

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Application packages

Trax Softworks, Inc. has ported its **ESS** three-dimensional mainframe electronic spreadsheet software to Applied Data Research, Inc.'s ADR/Roscoe.

ESS generates 3-D spreadsheets of unlimited size and communicates with micro spreadsheets to bring peripheral information into the corporate data base.

The annual license for ESS is $2,400.

Trax Softworks, 10801 National Blvd., Los Angeles, Calif. 90064.

■

Lawson Associates, Inc. has added the **Employee Expense** module to its Pinstripe Accounts Payable package.

The Employee Expense module was designed for Burroughs Corp. and for IBM System/38 users. It allows users to match employee expenses with advances, track expense reports and advances, create statements for employee records and keep employee expense checks separate from vendor checks.

The System/38 Employee Expense module costs $4,000. The Burroughs module is priced between $3,000 and $5,000.

Lawson Associates, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

Data base management systems

Sperry Corp. has introduced the **Suprema** system, an on-line maintenance management system designed for use with Sperry 1100 series computers and the Sperry System 11 mainframe.

Suprema is an interactive data base system that can be used to generate and track work orders, work order planning, preventive maintenance tasks, equipment history, spare parts inventory levels and resource requirements as well as a catalog of plant equipment.

Suprema is priced at $68,000 for the System 11, $85,000 for the 1100/60 and 1100/70 systems and $93,500 with the 1100/80 and 1100/90 systems.

Sperry, P.O. Box 500, Blue Bell, Pa. 19424.

Languages

Infotek Systems has announced the **BC 204 Basic Compiler** for the Hewlett-Packard Co. Basic Version 4.

The BC 204 is compatible with the HP 9000 Series 200/300 Technical Workstations. Compiled programs operate directly with Infotek's FP 200 or FP 210 floating-point coprocessors as well as the HP 98635 floating-point coprocessor.

The compiler costs $880.

Infotek, 100 N. Baxter St., Anaheim, Calif. 92806.

[illegible]

Software

Black Sheep Software has introduced a Microsoft Corp. MS-DOS and IBM PC-DOS utility program called **Comsaver**.

Comsaver prevents MS-DOS and PC-DOS application programs from overwriting the transient part of COMMAND.COM and eliminates the need for MS-DOS and PC-DOS to reload COMMAND.COM.

Comsaver costs $19.95.

Black Sheep Software, P.O. Box 1017, Venice, Calif. 90294.

■

Modern Technologies International, Inc. has announced the **Modtech Retail Management System** (RMS) designed for independent retailers using IBM PC-DOS- or Microsoft Corp. MS-DOS-based IBM-compatible personal computers or AT&T Unix-based multiuser systems.

The system is configured to support all transactions entered at the point of sale. Functions performed include the management of sales by register, login of checkers, manual transaction override, weighed items, multiple items, special offers and price lookup. The system will maintain a status of inventory. A customer data base is also provided, as well as a set of management reports.

RMS prices start at $4,995.

Modern Technologies International, Suite 200, 535 Middlefield Road, Menlo Park, Calif. 94025.

■

Everett Enterprises has released **The Private Line**, an encryption utility for IBM's PC-DOS, Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M.

STRATEGY:

Increasing programmer productivity with VERIFY,™ InterTest,® and DataVantage:™ Time is money.

Hardware costs are down, but software costs keep rising. Programmer productivity isn't an option. It's a requirement.

At On-Line Software International, Inc., we've been supplying solutions tailored to the needs of the most demanding IBM® users since 1969. That's why we're IBM Software Authorities. And programmer productivity is one of our specialties.

VERIFY, our newest productivity aid, provides automated quality assurance testing for CICS applications. VERIFY significantly reduces the time and personnel required for comprehensive testing, because you only have to enter the test data once. If you have a DOS/VSE or MVS operating system with CICS Release 1.5 or above, you're ready for VERIFY.

InterTest is an On-Line Software classic, the industry standard for CICS application testing and debugging. Over 1600 users benefit from an average productivity gain of 46%* with InterTest, which combines powerful features with ease of use. CICS systems are more stable, while testing and debugging are faster, easier, and more effective with InterTest.

DataVantage simplifies DL/1 testing and development for users of IBM and DOS/DL1 data bases. DataVantage creates reliable test data bases that check logic thoroughly, even for data bases with complex relationships. Restructuring as well as comparing data bases is streamlined with DataVantage.

Here's how other companies strategically use VERIFY, InterTest, and DataVantage to increase productivity.

VERIFY ……………………
Northern Natural Gas: Maintaining software quality while saving time.

"New applications development methodologies and hardware make it increasingly difficult to maintain quality. That's why we need VERIFY." So says John Latenser, Senior Systems Analyst at Northern Natural Gas, a leader in the transportation of natural gas products. VERIFY helps the Omaha company develop more reliable systems faster. "With VERIFY, we reduce our testing time by 25 to 30 percent," he said. "That gives us a definite competitive edge."

"I think it's fortunate that On-Line Software International came out with VERIFY, because it is the solution we had been looking for," Latenser continued. By way of an example, he cited an on-line system that required five successive revisions. "From the documentation standpoint alone, VERIFY shaved a whole day off the revision process. Quality and reliability were enhanced," he said.

InterTest ……………………
ADT Security Systems: User-friendly testing produces more accurate systems.

Programmer productivity goes up appreciably with InterTest, according to Kathleen Wolfson, Senior Systems Analyst at ADT Security Systems, New York. "We get systems out quicker than we would have otherwise," she stated. "They're much more

[illegible]

NEW PRODUCTS/MICROCOMPUTERS

The Private Line encrypts program or data files in accordance with the Data Encryption Standard. It uses either one or two 64-bit keys.

The PC-DOS or MS-DOS version allows users to create, change and remove directories. Both versions will display, print and purge files. Encrypted data may be converted to ASCII for use over telecommunication systems.

The Private Line is priced at $49.95 for the PC-DOS or MS-DOS version and $29.95 for the CP/M version.

Everett Enterprises, P.O. Box 193, Bath, N.C. 27808.

■

Microphonics Technology Corp. has introduced Version 1.2 of **Pronounce**, its speech input system for IBM Personal Computers and compatibles.

Enhancements include the addition of a set-level utility, faster loading of vocabularies, the capability to password-protect user vocabularies and the ability to change vocabularies through voice control.

Pronounce 1.2 consists of a Personal Computer board, software with predefined vocabularies for Micropro International Corp.'s Wordstar and Lotus Development Corp.'s 1-2-3, a microphone and a user manual. It requires 256K bytes of memory.

Pronounce 1.2 is priced at $695.

Microphonics Technology, Suite B, 234 S.W. 43rd St., Renton, Wash. 98055.

Systems

Digital Equipment Corp. has announced its **Interactive Video Information System (IVIS) 2000**, a version of its multimedia workstation.

The IVIS 2000 is based on the Professional 380 personal computing workstation. The system is offered in eight languages. It has three open slots, so it can be expanded with hardware options like the Decnet-Ethernet local-area network interface and a four serial-line option.

IVIS integrates still photographs and full-motion natural video on a high-resolution display with computer-generated graphics, text and sterophonic soundtracks.

IVIS 2000 is priced at $10,000 for a standard system and $11,100 for the Dectouch IVIS system.

DEC, Maynard, Mass. 01754.

■

Omnicomp Graphics Corp. has announced **Totalcad**, a full-function, general-purpose, two-dimensional computer-aided design and drafting (CADD) system.

Totalcad was designed to distribute different tasks within a CADD system across multiple microprocessors. It uses an IBM Personal Computer or compatible system for main program execution, data management and retrieval. The graphics display controller, Omnicomp's Omni 1000 GDC, performs all graphics commands.

Totalcad costs $12,300.

Omnicorp Graphics, 1734 W. Belt North, Houston, Texas 77043.

■

Datapoint Corp. has unveiled **Starport**, a multiuser data processing system.

Compatible with the IBM Personal Computer AT, Starport supports up to 17 users and will operate in attached resource computer local-area networks.

The vendor's PC8220 software connects Starport to Datapoint host systems running under IBM PC-DOS or RMS. Starport users can access Microsoft Corp. MS-DOS and GW-Basic and user system diagnostics.

A basic Starport system consists of a 16-bit Intel Corp. 80286 processor with 512K bytes of memory, 14-in. monochrome monitor, detached keyboard with 30 function keys, one 1.2M-byte disk and 20M bytes of fixed-disk storage.

The basic system costs $5,995.

Datapoint, 9725 Datapoint Drive, San Antonio, Texas 78284.

Communications

Systems Software and Development, Inc. has announced **Teleplan**, a traffic engineering tool designed for the IBM family of personal computers.

Teleplan allows users to determine grade of service, the minimum trunks needed for a grade of service, calls offered and calls lost, least-

Continued on page 70

MIS DP SOFTWARE STRATEGIES

thoroughly tested, and much more accurate, which is very important to me."

"If ever there was a package that was user-friendly, InterTest has got to be the best at that," Wolfson continued. "The biggest benefit to us is, you can have people who are not the world's greatest experts learn from their mistakes, and they'll be able to turn something around very quickly."

"There are other testing packages, but InterTest is one of the few packages on the market that I just can't imagine running a CICS shop without," she observed.

DataVantage
GTE Communication Systems: Easy testing of complex IMS recursive relationships.

GTE's first use of DataVantage was at its North Lake, Illinois facility for manufacturing large central office switching systems. "This was a particularly demanding application because of the IMS recursive relationships involved," Senior Data Base Analyst Brian Bowers explained. "DataVantage has proved to be a most valuable data base subset management tool for us."

Running an IBM 3084™ under IMS, GTE Communication Systems uses DataVantage to generate accurate subsets of data bases. "We have found it to be a completely functional tool that is also easy to use," he said.

Develop your own strategy for programmer productivity with Executive Seminar Briefings.

To help you develop your own corporate strategy for programmer productivity, On-Line Software has scheduled a series of free half-day seminars on VERIFY, InterTest, and DataVantage. Choose from the seminar locations listed below and call us, toll-free, for exact dates and times.

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January 20-21, 1986 - San Francisco, CA
January 22-24, 1986 - Los Angeles,, CA
February 4-6, 1986 - Fort Lee, NJ
March 4-5, 1986 - Philadelphia, PA
March 25-26, 1986 - Chicago, IL
April 2-4, 1986 - Fort Lee, NJ
April 8-9, 1986 - Toronto, ONT

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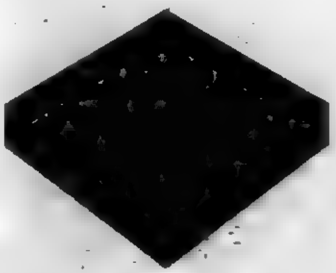

On-Line Software International, Inc.

IBM® Software Authorities

**From an audited survey of all InterTest users conducted by Ernst & Whinney.*
IBM is a registered trademark of International Business Machines.

Continued from page [illegible]

cost planning analysis with or without overflow facilities, queueing performance, number of servers needed for varying conditions and data communications queue and line performance.

Teleplan calculates results directly and can handle traffic intensities up to 2,500 Erlangs. It accommodates up to 5,000 lines.

Teleplan is priced at $195.

Systems Software and Development, Suite 302, 7633 E. 63rd Place, Tulsa, Okla. 74133.

■

Anchor Automation, Inc. has introduced the **Signalman Express** board-level modem for the IBM family of personal computers as well as the **Volks Mini** modem.

The Express is asynchronous and operates at 300 or 1,200 bit/sec. It features autodial and autoanswer capabilities as well as redial and hang-up. It is Hayes Microcomputer Products, Inc. compatible and comes bundled with Lync communications software from Norton-Lambert, Inc.

Volks Mini also provides 300 or 1,200 bit/sec. data transmission. It connects to any computer or terminal through an RS-232C interface and to any Touch-Tone telephone via an RJ11 interface. It is AT&T 212A compatible and offers asynchronous full-duplex, direct-connect transmission.

Signalman Express is priced at $299. Volks Mini is priced at $199.

Anchor Automation, 6913 Valjean Ave., Van Nuys, Calif. 91406.

■

Pacer Software, Inc. has announced **PClink**, a package that integrates Digital Equipment Corp. VAX minicomputers with the IBM Personal Computers and the Apple Computer, Inc. Macintosh.

For running VAX applications, PClink includes high-speed DEC VT100, VT220 and Televideo Systems, Inc. 950 terminal emulation on the microcomputers.

Only the host side of PClink is licensed. Prices range from $2,000 for five personal computers to $15,000 for an unlimited number of personal computers on a single host.

Pacer Software, Suite 320, 100 Pennsylvania Ave., Framingham, Mass. 01701.

Storage

CMS, Inc. has unveiled the **Power series**, a family of external mass-storage subsystems for IBM Personal Computer compatibles.

There are four basic configurations. The Power Twin combines both tape and hard disk drives in one unit. The hard disk is available in 10M-, 20M- and 30M-byte capacities with a 10M- to 60M-byte tape drive.

The Power Tape subsystem features one full-height cartridge tape drive available in 45M- or 60M-byte capacities. The Power Drive subsystem offers additional hard-disk storage without tape backup and is available in 20M-, 30M-, 42M-, 70M- and 120M-byte capacities.

The Power Center subsystem, fully loaded, includes a half-height 60M-byte tape drive and a half-height 10M-, 20M- or 30M-byte hard disk drive.

Prices for the Power Twin and Power Center range from $1,989 to $3,389. Power Tape prices range from $1,694 to $1,794. Power Drive prices range from $1,594 to $7,094.

CMS, 401-B W. Dyer Road, Santa Ana, Calif. 92707.

■

Portable Solutions, Inc. has announced the **BP-25+** portable tape backup system for IBM Personal Computer, Personal Computer XT, AT and compatibles with IBM PC-DOS or Microsoft Corp. MS-DOS 2 or higher.

It can back up more than 25M bytes per cassette at 5M byte/min. The BP-25+ comes with Survival software, a collection of utilities for simplified backup and restore.

BP-25+ is priced at $1,295.

Portable Solutions, Suite 250, 1701 Directors Blvd., Austin, Texas 78744.

Reference Technology, Inc. has introduced the **Reference Technology Clasix Series 500 CD-ROM Datadrive**, a software library of more than 8,800 IBM Personal Computer programs on a single compact disk read-only memory (CD-ROM) unit.

The library includes a selection of word processors, editors, data base management systems, spreadsheets, financial and business applications, communications programs, math/statistical packages, programming languages, graphics packages and games.

The Reference Technology Clasix Series 500 CD-ROM Datadrive costs $1,596, including the Clasix Software Library Dataplate, an IBM Personal Computer interface card and cable.

Reference Technology, 1832 N. 55th St., Boulder, Colo. 80301.

Portable Solutions, Inc. has introduced the **Backpac BP-100+** optical storage system for the IBM Personal Computer, Personal Computer XT, AT and compatibles running Microsoft Corp. MS-DOS 2 or higher.

The BP-100+ is a portable system that uses laser technology for one-time writing and repetitive reading. It comes equipped with three 100M-byte optical disks, ready for use with up to three personal computers.

The unit can be expanded to function with more than three personal computers by adding one I/O extender card per personal computer.

The Backpac BP-100+ is priced at $4,995 including a collection of software utilities for simplified backup and restore operations. Additional extender cards cost $99 each.

Portable Solutions, Suite 250, 1701 Directors Blvd., Austin, Texas 78744.

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You're not limited to just one carrier. There are no equal access penalty charges or delays for changing services. And because CBX II watchdogs every call—like the zillions of per-

4900 Old Ironsides Drive, M/S 626, Santa Clara, CA 95054

NEW PRODUCTS/MICROCOMPUTERS

Digital Equipment Corp. has added to its library of data bases on compact disk read-only memory disks, bringing the total to 10.

The data base disks include the company's Microbasis search and retrieval software for either DEC MicroVMS or Microsoft Corp. MS-DOS.

The new titles include Chemical Engineering from the Computerized Engineering Index by Engineering Information, Inc.; Medicine, Health Care and Biology and Aeronautics, Aerospace and Astronomy, by the National Technical Information Service; Current Biotechnology Abstracts by the Royal Society of Chemistry and The Fine Chemicals Directory by Fraser Williams Scientific Systems, Ltd.

Prices range from $995 to $1,395.

DEC, 146 Main St., Maynard, Mass. 01754.

Printers/Plotters Peripherals

Datatek Corp. has introduced an IBM Personal Computer version of its **Datatimes** optical disk library system for newspaper and magazine publishers.

Publishers can attach the digital reader to the personal computer and have unlimited disk access to more than two years of information. The optical disk system eliminates on-line charges and linkup difficulties.

The system runs on Basis software from Battelle Pacific-Northwest Laboratories and allows disk mastering on Microsoft Corp. MS-DOS-based personal computers.

The optical disk library system is priced at $2,190.

Datatek, 818 N.W. 63rd St., Oklahoma City, Okla. 73116.

Tektronix, Inc. has unwrapped **the LCS Color Graphtext System** for the IBM family of Personal Computers.

It lets users display color graphics and text with 640-pixel by 400-line resolution. The system includes the Tek LCS 1220 color graphics display, a 12-in. LCD shutter display and the Tek LCS E480 emulator card.

The LCS Color Graphtext System costs $1,575.

Tektronix, P.O. Box 500, M/S 46-556, Beaverton, Ore. 97077.

Board-level devices

CMS, Inc. has introduced **Rambo**, a multifunction board for the IBM Personal Computer AT, and the **CMS 4X4**, a four-function, half-size add-in board for the entire IBM family of Personal Computers.

Rambo includes a serial port, parallel port, game port and up to 1.5M bytes of dynamic random-access memory (RAM). CMS 4X4 includes a serial communications port, a parallel port, game port and clock/calendar.

Rambo is priced at $495 with the minimum 128K bytes of RAM. CMS 4X4 is priced at $195.

CMS, 401-B W. Dyer Road, Santa Ana, Calif. 92707.

■

Genoa Systems Corp. has introduced five products for the IBM family of Personal Computers: **Spectrum Plus, Capture, Stretch AT/XT**, the **Novacom** modem and **Spectra-EGA**.

Spectrum Plus is a graphics card featuring an RS-232C serial port, a clock/calendar, 132-col. capability and 16 colors or shades.

Capture is an image digitizer board. It captures images via a standard RS-170 video input.

Stretch AT/XT is a multifunction board available in two versions: one for the Personal Comptuer XT with memory expansion up to 384K bytes and one for the AT with memory expansion up to 3M bytes.

Two versions of the Novacom modem are available: the Novacom 1200 supporting 300 and 1,200 bit/sec. transmission rates and the Novacom 2400 supporting 300, 1,200 and 2,400 bit/sec. transmission rates.

The Spectra-EGA is an enhanced graphics adapter card that supports the enhanced IBM graphics mode and products.

Spectrum Plus is priced at $495. Capture is priced at $1,495. Stretch AT/XT for the Personal Computer XT is priced at $299, and for the AT with 0.5M byte of memory it is $599. The Novacom 1200 and 2400 internal models are priced at $339 and $629, respectively, and external models are $359 and $649, respectively. Spectra-EGA is priced at $495.

Genoa Systems, 73 E. Trimble Road, San Jose, Calif. 95131.

■

Bay Computer Corp. has announced that the **PC/Audit** expansion card for the IBM Personal Computer and Personal Computer XT is now available for the IBM AT.

The PC/Audit card allows the personal computer to allocate time usage of the system to one of 256 different accounts, to limit access to the equipment during certain hours and to provide an audit trail of computer usage for job costing or allocating expenses. The audit trail can be used alone or read into Lotus Development Corp. 1-2-3 for further analysis.

The PC/Audit card is priced at $239.

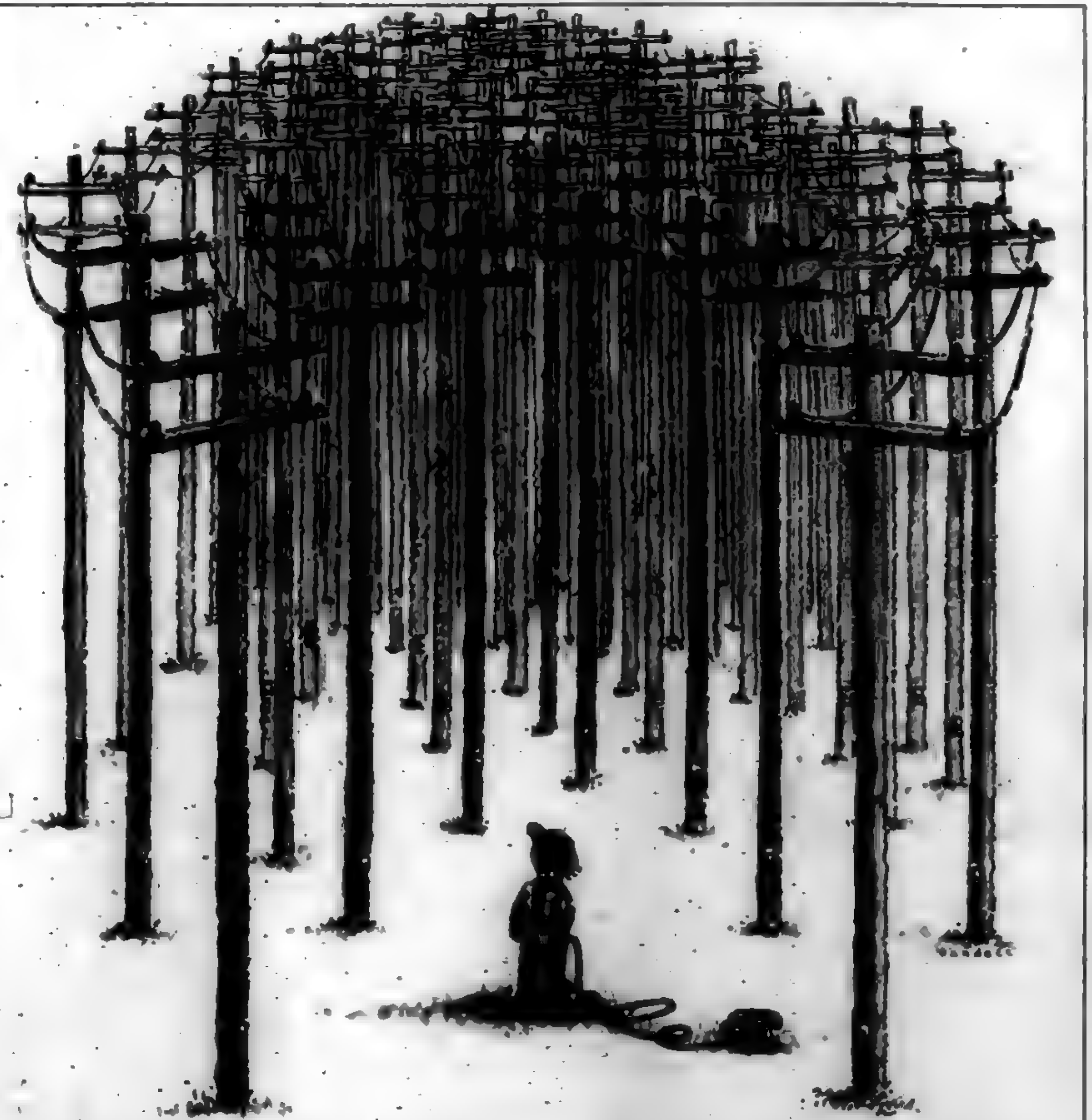
Bay Computer, York & Haverhill St., Andover, Mass. 01810.

■

Iomega Corp. has introduced the **PC2B adapter card**, which enables IBM Personal Computer, Personal Computer XT and AT users with Bernoulli box subsystems to load a microcomputer's operating system directly when the personal computer is turned on.

The PC2B supports enhanced IBM PC-DOS commands, includes menu-driven utilities and offers enhanced backup and restore capabilities.

Continued on page 72



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NEW PRODUCTS/MICROCOMPUTERS

Continued from page 71

The PC2B costs $255; a PC2B upgrade kit for the PC2 card costs $110.

Iomega, 1821 W. 4000 South, Roy, Utah 84067.

■

Compressit, an IBM Personal Computer, Personal Computer XT and AT add-on board that reduces the space needed to store bit-mapped images has bowed from **Chorus Data Systems, Inc.**

The Compressit board removes redundant information and encodes the data. It requires a single slot in the expansion bus.

The Compressit add-on board is priced at $995.

Chorus Data Systems, P.O. Box 370, 6 Continental Blvd., Merrimack, N.H. 03054.

■

The AMI PC-AT Multi-User board for connecting up to eight serial devices to IBM Personal Computer XTs, ATs and compatibles is offered by **American Micronics, Inc.** (AMI).

The board consists of a bus interface, address decode, interrupt timing and decode, eight RS-232 serial ports and standard COM 1 and COM 2 support. It supports all control lines necessary to drive most asynchronous terminals, printers and modems.

Prices are $375 for four-user and $575 for eight-user models.

AMI, Suite H, 17811 Skypark Circle, Irvine, Calif. 92714.

■

The **COM-232/COM-422**, an add-on board that enables serial data I/O through an additional resident port or COM1/COM2 serial ports with no communications programming, has bowed from **Aedex Corp.**

It permits serial I/O from compiled applications or commercial packages such as Ashton-Tate's Dbase II and Lotus Development Corp. 1-2-3.

Users can send and receive data through up to three serial ports on an IBM Personal Computer, Personal Computer XT, AT and compatibles.

The board and firmware list for $450.

Aedex , Suite C, 181 West Orangethorpe, Placentia, Calif. 92670.

Auxiliary equipment

Inmac Corp. has introduced the **Keypatch**, a product that locks the IBM Personal Computer keyboard in Num-Lock and transfers cursor functions to itself.

Keypatch rids errors and wasted time caused by switching between functions. It plugs into the keyboard cable and needs no software.

The Keypatch is priced at $84.95.

Inmac, 2465 Augustine Drive, Santa Clara, Calif. 95054.

■

Computer Products, Inc. has introduced the **Micro-40 series** of off-line switching power supplies.

The series features single output models of 5, 12, 15 and 24 Vdc. All models feature an on-board input filter, input fuse and input voltage select. All outputs are overload protected.

In quantities of 100 it costs $75.04.

Computer Products, 2220 Lundy Ave., San Jose, Calif. 95131.

■

Data General Corp. has enhanced its **On-line Information Service** (OIS), which provides videotex information and support for users of Data General Desktop Generation and Data General/One systems.

The new OIS uses the Compuserve network and features a simplified menu listing separate data bases for the two systems. Users may access OIS via a variety of local telephone numbers including McDonnell Douglas Network Systems, Inc.'s Tymnet and GTE Telenet Communications Corp.'s Telenet.

OIS offers regularly updated downline load software patches; techniques for applications; pricing information; DG Talk, a user bulletin board; and technical information.

OIS usage is based on an hourly fee schedule. Introduction Menu is free of charge; General Information costs $25; Support Information costs $35; and Maintenance Information costs $45.

DG, 4400 Computer Drive, Westboro, Mass. 01580.

COMMUNICATIONS

Multiplexers/modems

Communications Plus, Inc. has announced its **Firecom** modem accelerator.

Firecom is used on remote synchronous modems allowing users of IBM's Systems Network Architecture/Synchronous Data Link Control protocol to reduce the data streams and increase the number of terminals on a link. It works with 2,400, 4.8K or 9.6K bit/sec. synchronous modems on a point-to-point, multipoint or switched communications.

Firecom is priced at $975.

Communications Plus, Suite 250, 3300 Holcomb Bridge Road, Norcross, Ga. 30092.

■

Codex Corp. has announced the **Codex 2122**, a synchronous, limited-distance service unit for point-to-point, multipoint and tail circuit applications.

The 2122 supports four-wire, full or half-duplex and two-wire half-duplex configurations. It operates at user-selectable rates of 40K, 48K, 56K and 64K bit/sec. Other features include an automatic equalizer that compensates for circuit distortion

Continued on page 74

"RM/COBOL's portability has allowed RealWorld to address the micro accounting market with one product line."

David Gale, Founder and CEO of RealWorld Corp., on the advantages of RM/COBOL.

There are two ways to develop software.

One is to have a separate development effort for every different machine on the market. Which becomes geometrically more painful with every new machine.

The other is to do what David Gale and a host of other smart software developers are doing.

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As for supporting enhancements later on, our machine-independent approach lets you make a one-time change in the source code and our runtimes do the rest. So not only do your applications run like the wind, your development effort does, too. And no matter which way the wind blows, you'll still have broad-based market potential.

Even LANs, like IBM's PC® Network, Netware,® 10-Net,® and ViaNet® are covered because RM/COBOL is available for them, too. As well as for UNIX,® Xenix,® and other popular multiuser operating systems.

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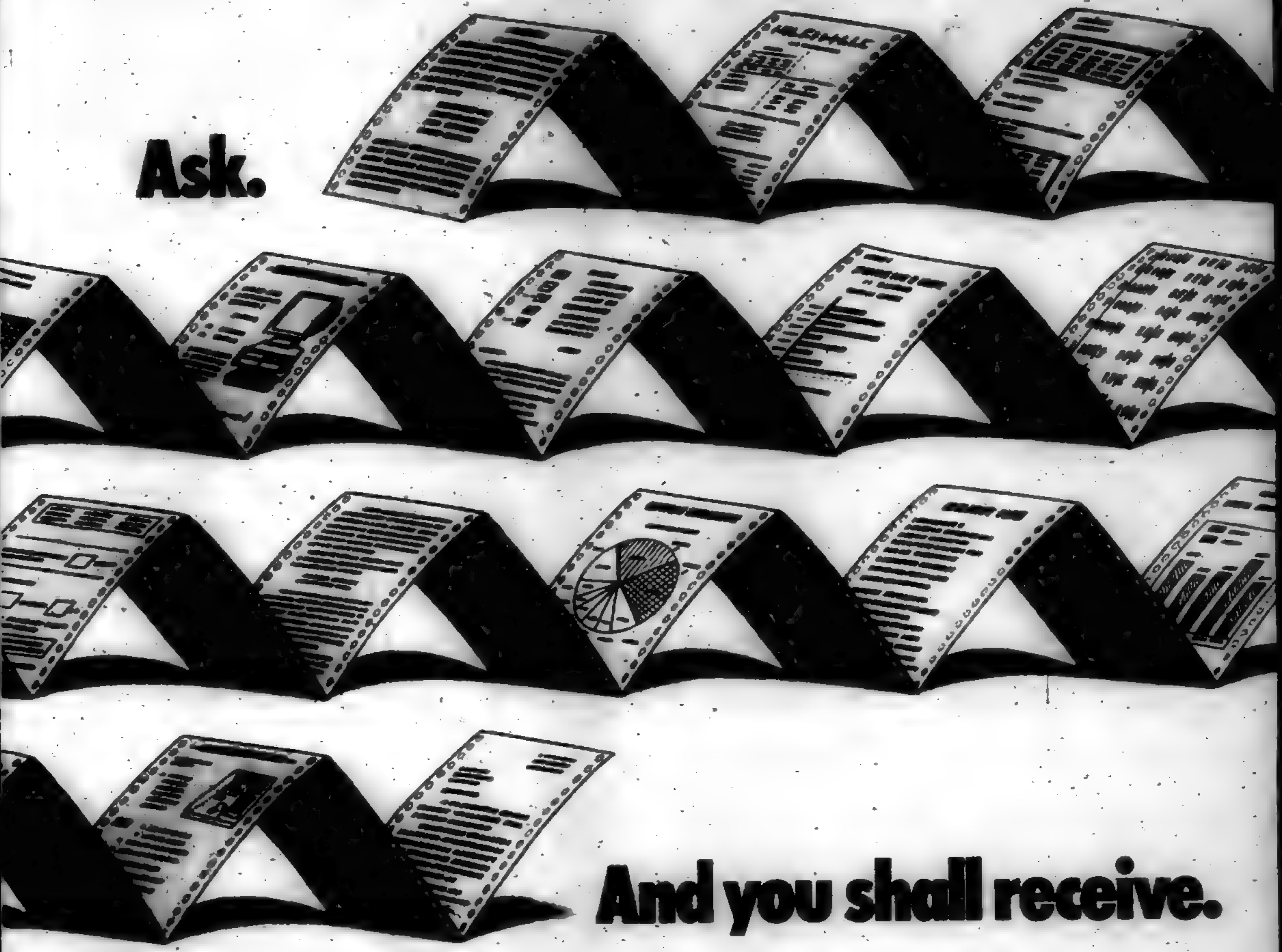


Ask.

And you shall receive.

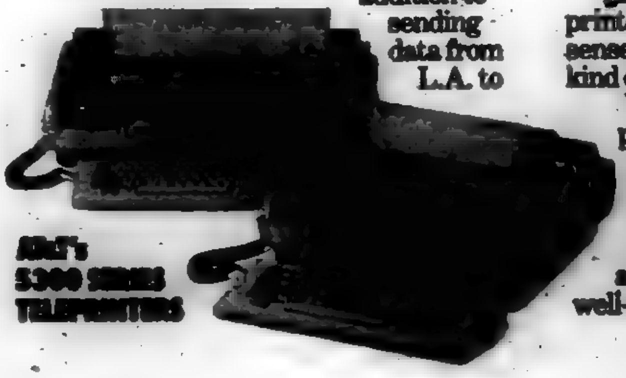
What do you do when you're preparing a report in the Philadelphia office and the Los Angeles office has all the information?

Walk over to your AT&T 5300 Teleprinter and use its keyboard to access the data. Moments later, crisp copy and vivid graphics arrive through your printing terminal.

Teleprinting isn't all you receive.

If all the AT&T 5300 Teleprinter did was teleprint, that alone would be a considerable achievement.

Now consider what other tasks (in addition to sending data from L.A. to Philly) the optional 212A Modem can help the Teleprinter do: serve as a general time-sharing device, send electronic mail, handle inquiries with a host database, and provide other advanced telecommunications capabilities with the stroke of a button.



AT&T's 5300 SERIES TELEPRINTERS

Adapts to almost any office situation.

There isn't just one AT&T 5300 Teleprinter. There are two of them, the 5310 (designed for 9½-inch paper width) and the 5320 (for 15-inch paper width). Both can accommodate up to 6-ply multipart forms.

And though the 5300 Series Teleprinters may stand alone in a physical sense, they interact with nearly every kind of office system.

Without the keyboard, this Teleprinter can be hooked up to displays, the leading PCs and processors through a standard EIA interface.

The 5300 Teleprinters also support popular communications protocols and can talk with systems supporting well-known names, such as DEC* and TI.

Not surprisingly, the Teleprinter interacts with other AT&T integrated products like System 85 and System 75, with Station Message Detail Recording, and our 3B line of computers. For more information, call your AT&T Information Systems Account Executive, authorized AT&T supplier, or call 1 800 247-1212.

What more could you ask for?

© 1985 AT&T Information Systems
*DEC is a trademark of Digital Equipment Corp.

AT&T
The right choice.

NEW PRODUCTS/COMMUNICATIONS

Continued from page 72

and a full range of monitoring, control, test and restoral capabilities.

A stand-alone single unit costs $375.

Codex, 20 Cabot Blvd., Mansfield, Mass. 02048.

■

Case Communications, Inc. has added **Trellis Encoded Forward Error Correction** to its 9.6K bit/sec. **Case 4096** modem.

The added feature reportedly ensures optimum performance on long-haul lines where noise levels are high and can severely affect throughput by imposing errors.

The stand-alone model of the Case 4096 is priced at $2,995.

Case Communications, 2120 Industrial Pkwy., Silver Spring, Md. 20904.

Test equipment

Atlantic Research Corp. has introduced the **NTS 4000 Distributed Network Restoration, Test and Management System.**

The NTS 4000 provides unattended remote alarms, diagnostics and service restoration to a multisite network of up to 16,000 circuits. It permits any mix of alarm, access and switching elements to be distributed in a multivendor network. Up to 16 sites may be controlled locally or from the central site.

The system is compatible with all other Atlantic Research patching, switching and test equipment. It can control any type of network.

The NTS 4000 system is priced starting at $50,000.

Atlantic Research, 5390 Cherokee Ave., Alexandria, Va. 22312.

Auxiliary equipment

Access Data Systems, Inc. has introduced the **Auditor**, an access control chassis designed for data center installations with multiple dial-in phone lines and computer ports.

The Auditor is system transparent and accommodates from two to 128 phone lines. It is installed between the phone line and the data modem.

The Auditor answers incoming calls to the computer system and requires caller identification. User restrictions can be assigned based on time, port and identification. A full audit trail keeps a permanent record of all system access attempts.

The Auditor base chassis is priced at $4,150.

Access Data Systems, Suite 104, 766 Big Trees Drive, Longwood, Fla. 32750.

Data Switch Corp. has introduced the **V.11 Module**, which enables its data communications switching systems to support high-speed lines in X.25 networks.

The V.11 plugs into the Xy-Max Model 2840-II digital matrix switch and the Model 2810 digital switching and analog access and sparing system. It allows those products to switch between communications equipment and lines operating at up to 160K bit/sec., Data Switch reported.

The V.11 is priced at $1,150. A pair of modules for data terminal equipment and data communications equipment is required.

Data Switch, 444 Westport Ave., Norwalk, Conn. 06851.

SYSTEMS & PERIPHERALS

Turnkey systems

Tektronix, Inc. has announced five **6130S series application systems** built around the Tek 6130 Intelligent Graphics Workstation for drafting, technical data analysis and AT&T Unix software development.

The 6130S11 single-user and 6130S12 dual-user drafting systems include Plot 10 computer-aided drafting software. Single-user models come with 1M byte of random-access memory (RAM) and a 40M-byte disk. Dual-user units are supplied with 2M bytes of RAM and an 80M-byte disk. Another data analysis and presentation system, the 6130S73, also uses Plot 10. It is configured with 1M byte of RAM and an 80M-byte disk.

The 6130S71 data analysis system includes an interactive statistical program that offers graphical output capability plus multiple regression analysis and variance analysis.

For Unix-based software development, the 6130S62 system offers the Utek operating system and compilers for C, Fortran and ISO Pascal. It includes 2M bytes of RAM and an 80M-byte disk.

Prices range from $13,100 to $18,650.

Tektronix, P.O. Box 1700, Beaverton, Ore. 97075.

Processors

Digital Electronic Systems has introduced the **Computerist Mainframe (CMF)**, a multiuser 32-bit computer.

The basic CMF system includes an AT&T Unix System V tool set; a 32-bit CPU with direct memory access controller; paged memory mapping unit; 1M byte of random-access memory, expandable to 113M bytes internally; two RS-232 serial ports, expandable to 26; one Centronics Data Computer Corp.-type IBM Personal Computer printer interface; and a floppy disk controller and drive.

Prices for CMF range from $3,250 to $4,995, depending on quantity.

Digital Electronic Systems, 302 South Main, Estill Springs, Tenn. 37330.

■

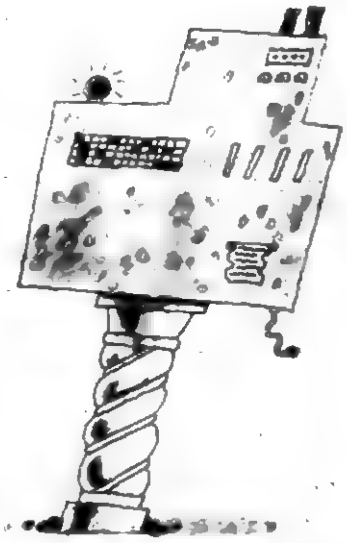
Heurikon Corp. has introduced the **HK68/V10** and the **HK68/VE**, part of its HK68/V family of compatible Motorola, Inc. VME microcomputer boards.

The HK68/V10 addresses AT&T

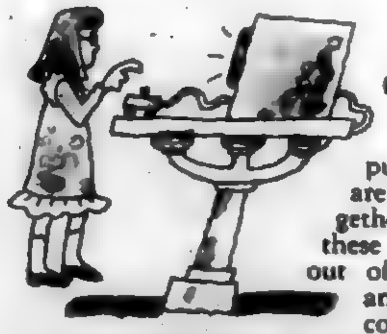
Continued on page 76

WANTED: OLD THINKER TOYS.

CW Communications, ComputerLand and The Computer Museum invite you to send in your early personal computers, software, and memorabilia — you could win a free trip to The Computer Museum in Boston



Your old, dusty "thinker toy" may now be ready to become a treasured museum piece. The Computer Museum in downtown Boston — an international museum dedicated entirely to computing — is searching for the very best and most unique relics of the personal computer revolution.



ComputerLand, CW Communications, and The Computer Museum are working together to bring these early relics out of your attic and into the collection of The Computer Museum. The museum is especially looking for kit machines, prototypes, programs, output, newsletters and memorabilia of early computing from around the world. A selection of the finest items will be used to create an exhibit on the evolution of personal computers and a catalog highlighting the Museum's collections. If your submission is accepted for addition to the Museum collection, you will be invited to the grand opening of the exhibit and will receive a bound edition of the catalog. If your item is selected as one of the five best "finds", you will also receive an all-expense-paid trip to Boston for the grand opening party.

So, get up to the attic, down to the cellar and into your closets, and tell us what you find! Call or write the Museum for an official entry form, or send a photo and description of your items by March 1, 1986 to: The Computer Museum, Personal Computer Competition, 300 Congress St., Museum Wharf, Boston, Massachusetts USA 02110, (617) 426-2800, Telex: 62792318.

ComputerLand

The Computer Museum

CW COMMUNICATIONS/INC.

Entries will be judged on significance, rarity, date, completeness and condition. Items particularly sought include pre-1980 machines, early serial numbers (get those number 1's out), machines made for purchase outside of North America (even modern machines are sought in this category); first releases of software such as first releases of operating systems, languages and mass-marketed and original applications; and pre-1980 photographs, newsletters, manuals and other records. The Computer Museum is a private non-profit educational institution. All donations are tax-deductible according to the provisions of the Internal Revenue Service. Thinker Toys is a registered trademark of George Morrow & Morrow Designs, Inc.

So Six Flags said,
"We need an
office integration system
to run our theme parks
nationwide."

And we said...

"Fasten your seat belts."

Six Flags is the largest operator of themed amusement parks in the country.

They need the convenience of a distributed office system and the efficiency of a centralized network. So, after evaluating 14 vendors, Six Flags decided to ride with The Honeywell Office.

THE HONEYWELL OFFICE, CONVENIENCE AND EFFICIENCY

The Honeywell Office works at each of Six Flags' 10 parks and at corporate headquarters in Chicago.

With Honeywell's versatile departmental systems, each site receives exceptional office and data processing capabilities. Without wasting costly turn-around time from a central processsor.

Now departments like Employee Relations can handle thousands of personnel letters, shift work schedules, and process paychecks. Contracts Administration can create individual vendor contracts by mixing and matching stored phrases. And with InfoCalc, an integrated electronic spreadsheet, Operations can substantially reduce the time required to coordinate the parks' round-the-clock activity.

And because all the systems run through the same office software, Six Flags also enjoys many of the efficiencies of a centralized system—like standardized corporate reports.

Different departments can also share any proprietary office programs they develop, and tie everything into headquarters' IBM-compatible mainframe.

INVESTMENT PROTECTION, TOTALCARE SERVICE

From micros, minis, and superminis, to a complete line of integrated software, The Honeywell Office is designed to be easily upgradable and fully compatible. So your hardware and software investment is fully protected.

Plus all Honeywell products are backed by TotalCare™, Honeywell's nationwide service organization that helps ensure maximum uptime. From terminal to terminal, department to department, even park to park.

After 100 years in business and more than 30 years in computers, Honeywell has earned a reputation for working with customers to solve challenging problems.

Find out how The Honeywell Office can make your information processing seem like a day at the park. Call 1-800-328-5111, ext. 2783, or write
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MA 01821.

Honeywell
100
Years

Together, we can find the answers.

Honeywell

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 76

Unix and other applications and the HK68/VE is for real-time systems.

The HK68/V10 is available with a zero-wait state Motorola 68010 CPU with up to 1M byte of on-board, dual-access dynamic random-access memory (RAM). The HK68/VE features a zero wait-state Motorola 68000 CPU, up to 1M byte of on-board dual-access dynamic RAM.

Additional features of both include up to 128K bytes of erasable, programmable read-only memory; two serial ports; and mailbox interrupt support.

In quantities of 100 or more, prices start at $895.

Heurikon, 3201 Latham Drive, Madison, Wis. 53713.

■

Integrated Digital Products Corp. has announced the **I/O Pro**, a full-duplex I/O processor that supports up to 64 ports at 19.2K bit/sec. on a single board.

I/O Pro has buffers located on the I/O controller board, providing 4K bytes per port. Expansion is accomplished by adding an eight-port concentrator, called a tap.

I/O Pro features four character sets. Each of the I/O Pro's 64 ports can select its own character set independently.

I/O Pro is priced at $3,200 for eight ports, including I/O Prod and one tap.

Integrated Digital Products, 4206 E. La Palma Ave., Anaheim, Calif. 92807.

Data storage

Sony Corp.'s Information Products Division has introduced a **writable optical disk system** for high-density storage of data and digitized images.

The writable disk system comes in two configurations: a single writable disk drive with controller and an autochanger that holds up to 50 disks. The 12-in. disks can hold up to 3.2G bytes in a constant linear velocity format or 2.1G bytes in constant angular velocity format.

The writable disk drive transfers data at 2.4M bit/sec. The writable disk controller can handle up to eight drives. Up to four controllers can be linked together.

Pricing is as follows: 12-in. disks cost $440; 8-in. disks cost $300; 12-in. drives cost $11,700; 8-in. drives cost $9,000; controllers costs $7,000; and autochangers cost $117,000.

Sony Information Products, Sony Drive, Park Ridge, N.J. 07656.

Terminals

CIE Systems, Inc. has introduced an enhanced model of its **CIE 7100** alphanumeric multiuser terminal that provides compatibility with IBM 3101, Applied Digital Data Systems, Inc. Viewpoint and Digital Equipment Corp. VT100 terminals.

The CIE 7100 features a 14-in., 20-degree tilt screen available in green or amber and a 122-key detachable keyboard. The standard format is 25 lines by 80 or 132 characters.

The CIE 7100 is priced at $595.

CIE Systems, 2515 McCabe Way, Irvine, Calif. 92714.

■

Volker-Craig, Inc. has announced the **Graphix** option for upgrading two of its terminals.

The Graphix option allows the firm's VC5000 and the VC4604 terminals to combine graphics and alphanumeric capabilities. Both can be displayed simultaneously. It is compatible with Tektronix, Inc.'s Plot 10 computer-aided drafting software.

The option is available factory installed for $945. It is also available as an upgrade kit for $450.

Volker-Craig, Suite 252, 11772 Sorrento Valley Road, San Diego, Calif. 92121.

■

Omnicomp Graphics Corp. has introduced the **Omni 2000 GDS**, a modular, multiconfiguration graphics display subsystem.

The Omni 2000 GDS offers three basic output systems. One provides for a monochrome display with one overlay plane and upward expansion capability to 256 displayable colors at 1,280- by 1,024-pixel resolution. The second provides 4,096 displayable colors, and the third provides three true-color configurations: 24 image planes with no overlays, 24 image planes with four overlay planes or 30 image planes with two overlay planes.

Each Omni 2000 GDS offers three graphics modes: plot mode, display list processing mode and image block mode. Each module is an oversized Intel Corp. Multibus II circuit card.

Basic configurations start at about $10,000.

Omnicomp Graphics, 1734 West Belt N., Houston, Texas 77043.

■

Westward Technology, Inc. has announced its **Model 3219W Monochrome Terminal.**

The 3219W terminal offers 2,048- by 1,568-pixel resolution with refresh rates near 60 time/sec. It features a 19-in. green phosphor display and offers a choice of 16 graph makers. It is software compatible with the Tektronix, Inc. Tektronix 4014.

The 3219W Monochrome Terminal is priced at $14,950.

Westward Technology, 90 Montvale Ave., Stoneham, Mass. 02180.

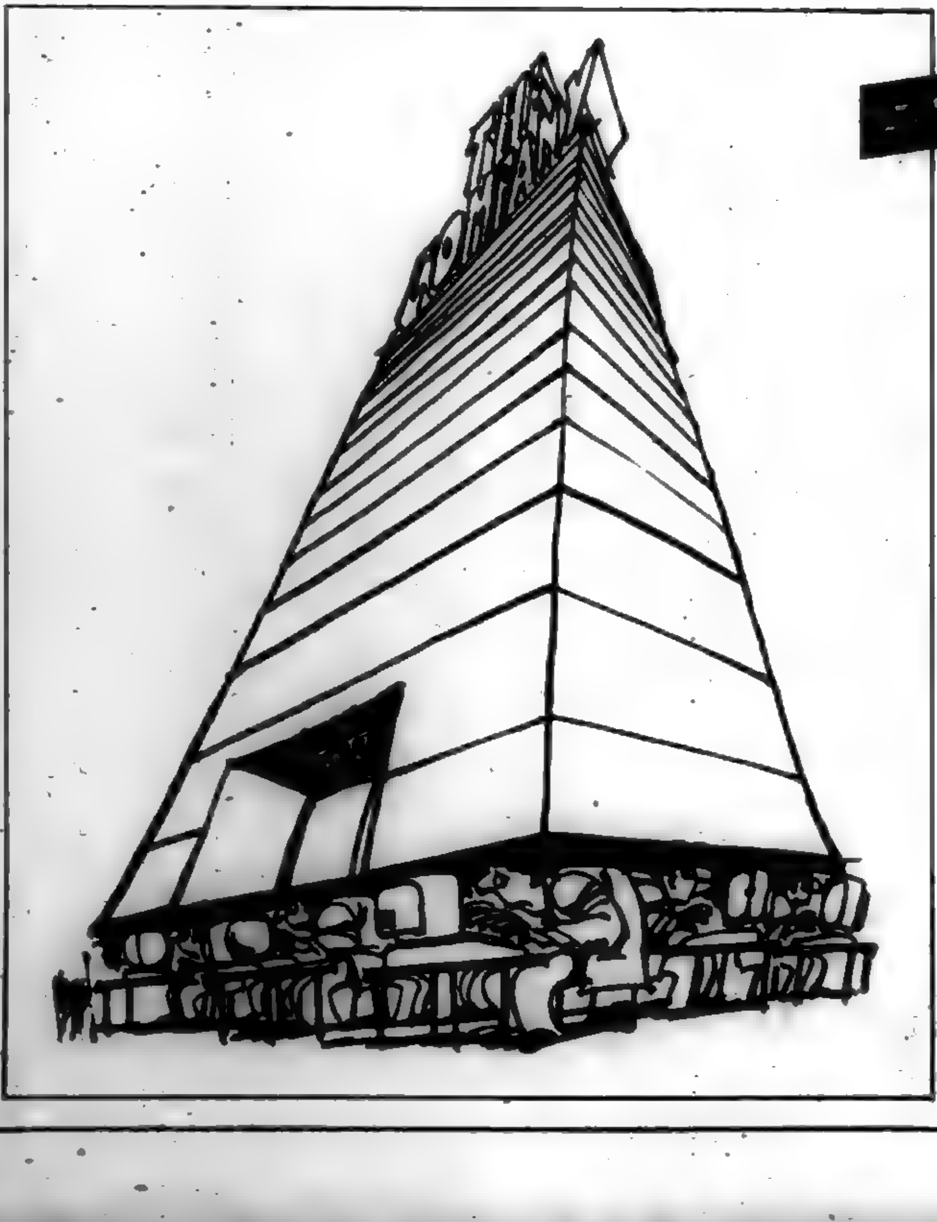
Printers/plotters

Calcomp has introduced the **5800 series**, including three multipass color electrostatic plotters with 1,024-color palettes, 400 dot/in. resolution, integrated vector-to-raster conversion, color separation and electronic registration.

All models generate 500-ft-long plots and use nonimpact electronic charge deposition technology on dielectric media including paper and film.

Besides the standard permanent color palette, the plotters allow users

Continued on page 79



THE CONFERENCE FOR OPERATIONS MANAGERS

At The Annual Parnassus Management Conference in Richmond, Virginia, you will have a chance to meet all those computer operations managers you've been wanting to talk to for so long. About operations problems that plague us all, about putting good ideas into practice, about the way everyone jumps on you when you miss your deadline by five minutes!

The problems which beset computer operations people are indeed international - they go beyond the boundaries of geography and language. Which is why Parnassus, Inc. is bringing together some 200 operations specialists from the United States and Western Europe, from March 31 to April 2, 1986 at the Holiday Inn in Richmond, Virginia.

The purpose of the conference is a non-academic exchange of ideas, chaired by people with years of practical experience. Among the speakers are Wout van Breugel (Heineken Breweries), Rouja Brzozowsky (Chase Manhattan), Tony Carroll (Imperial Tobacco Ltd.), Chester Delaney (Chase Manhattan), Raymond Fernandez (Citicorp), J. Des Lee (Brooke Bond Oxo Ltd.), Bernard V. McGinley (Pittsburgh National Bank), Gary W. Schemmel (Federal Reserve Bank of Richmond) and Berend Vis (Rabo Bank Nederland).
This is the operations conference you've been hoping someone would organize. For $1050.00 (not including air fare) you will spend three days as the guest of Parnassus, Inc., a leader in all aspects of data processing services: training and courses, technical assistance, contract staff, conversions and consultancy.

Information and booking: Parnassus, Inc., telephone 617-542-6877.

parnassus

Parnassus, Inc.,
100 Boylston Street,
Boston, MA 02116.
Telephone 617-542-6877.

Continued from page 78

to define and store up to nine additional palettes.

Prices for the Calcomp 5800 series plotters are $66,000 for the Model 5825 that handles 24-in. media widths, $91,000 for the Model 5835 plotter with 36-in. widths and $112,000 for the Model 5845 plotter with 45-in. widths.

Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

■

Miltope Business Products, Inc. has announced the 3801 nonimpact printer.

The 3801 prints 80 to 90 page/min and has a resolution of 240 by 240 dot/in. It is available in fan-fold or cut-sheet models.

Pricing for the Model 3801 is $84,000 for continuous fan fold and $96,000 for cut sheet.

Miltope Business Products, 1770 Walt Whitman Road, Melville, N.Y. 11747.

■

Advanced Technologies International, Inc. has announced the Laserprint 2670, a letter-quality laser printer that produces up to 26 page/min.

The unit handles print volumes up to 60,000 pages per month. The print quality is 300 dot/in. It can emulate daisywheel, printer/plotter and line-printer functions.

The Laserprint 2670 costs $11,400.

Advanced Technologies International, 2041 Mission College Blvd., Santa Clara, Calif. 95054.

■

NEC Information Systems, Inc. has announced the P6 and P7 Pinwriters, two 24-wire dot matrix printers.

Both printers feature print speeds of 216 char./sec., 180 char./sec. and 65 char./sec. for high-speed draft, normal draft and letter-quality printing, respectively. They feature graphics resolution of 360 by 360 dot/in.

Prices for the P6 and P7 Pinwriters are $695 and $895, respectively.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

Graphics systems

Calcomp is offering the 7500 series of color and monochrome graphics workstations.

The series includes the Graphics Function Manager software, a collection of graphics development aids that helps users port existing applications onto the 7500. The package also permits several applications to run concurrently on the screen.

The workstations include the National Semiconductor Corp. Genix implementation of the AT&T Unix operating system, Ethernet local-area networking, the Intel Corp. Multibus interface and IEEE floating-point format.

Monochrome and color frame buffers offer 1,280- by 1,024-pixel resolution. The color system can be configured with either four or eight planes for 16 or 256 colors from a palette of 16 million colors.

Prices for the workstations range from $20,000 to $50,000.

Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

■

Calay Systems, Inc. has introduced the Calay V04, a computer-aided design system for printed-circuit boards.

The Calay V04 offers interactive graphics design capabilities. It handles analog and digital boards, multilayer boards and boards using the current surface-mounted technology.

Graphics features include hard pan, zoom and rubber banding. The automatic router lays out the circuits. The system covers printed-circuit board design from data preparation, component definition and placement to postprocessing and output documentation.

The two-station V04 system is priced at $179,000.

Calay Systems, 2698 White Road, Irvine, Calif. 92714.

Auxiliary equipment

Qualogy, Inc. has unveiled Micropac, an enclosure for Digital Equipment Corp. Microvax and Micro/PDP-11 computers that lets users add up to 640M bytes of Winchester mass storage to their system chassis.

The single-skin pedestal enclosure can contain a DEC BA23 micro chassis and a Cyclone subsystem chassis.

With Micropac, users reportedly can expand their BA23 systems by up to six 5¼-in. drives within one enclosure.

Cyclone series products with Micropac packaging range in price from $9,095 for a 36M-byte system to $23,095 for a 640M-byte system.

Qualogy, 2241 Lundy Ave., San Jose, Calif. 95131.

■

Optical Coating Laboratory, Inc. has announced the addition of the Spectra polymer filter to its Glare/Guard product line of glass filters for VDTs.

Spectra works with both color and monochrome screens.

According to a spokesman, the Spectra filter enhances the contrast between image and background, maintains high resolution and improves screen clarity.

Spectra is priced at $34.95, the vendor said.

Optical Coating Laboratory, 2789 Northpoint Pkwy., Santa Rosa, Calif. 95402.

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COMPUTERWORLD

How Sperry helped a world-famous movie star become an expert in systems integration.

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Clinton Wilder
CW Senior Writer

Chip actions signify little

Now that the Reagan administration has turned into a would-be Santa Claus for U.S. companies struggling against international trade deficits, the time seems right to comment on the curious logic of protectionism in the semiconductor industry.

Most of the action so far has come in the dynamic random-access memory (RAM) market, with antidumping petitions against the Japanese filed by both the private and public sectors. The moves raise the obvious question — what exactly is it that we are trying to protect?

If we're talking 64K-byte and 256K-byte versions, it certainly can't be market share. With a couple of exceptions, the speed with which U.S. chip vendors have abandoned the low-end memory chip market rivals the megahertz rate for instructions on a state-of-the-art microprocessor. And those that didn't move out soon enough before the Japanese onslaught have suffered the consequences, as Dallas-area neighbors Mostek Corp. and Texas Instruments, Inc. can attest.

The U.S. Department of Commerce and the International Trade Commission appear certain eventually to confirm some evidence of Japanese chip vendors hawking their wares in the U.S. below production cost. But the true litmus test is to ask just how big a role did dumping play in knocking most U.S. players out of the market. In other words — the words that the Japanese are sure to argue — would the history of dynamic RAM have been the same anyway, given the record-high dollar, U.S. vendors' overcapacity, slackened market demand and the inevitable learning curve price drops?

In most U.S. chip industry circles, with the possible exception of the immediate vicinity of Boise, Idaho, all the dynamic RAM sound and fury signifies very little. For Boise-based Micron Technology, Inc., its antidumping ef-

See CHIP page 92

Trilogy banks on Elxsi sales

Three-pronged strategy aims at parallel processing

By Clinton Wilder

After a lifelong career of designing computers, Gene Amdahl is now trying to help sell Joseph Rizzi's computers — and to gain back some respect for loss-plagued Trilogy Ltd.

Trilogy's Gene Amdahl

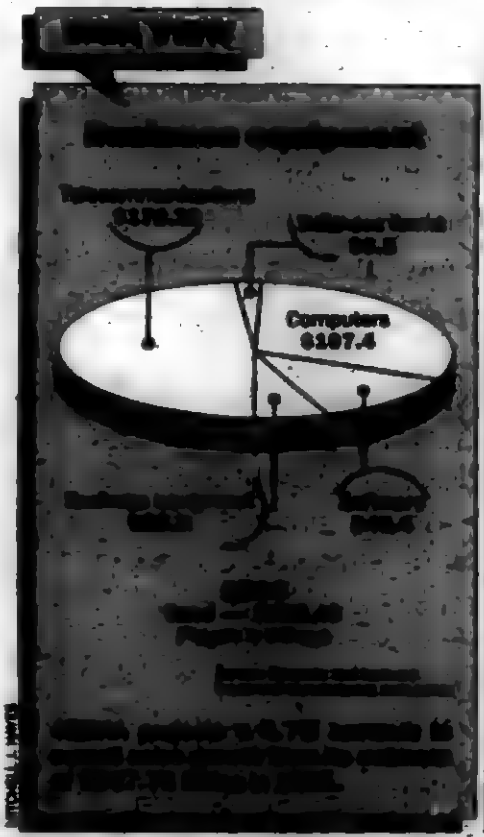
Rizzi is chief executive officer of Elxsi, the San Jose, Calif., parallel processing systems vendor recently acquired by Trilogy. With Trilogy's former $270 million cash coffers now down to about $40 million, Elxsi and its 6400 minisupercomputer probably represent Trilogy's last chance to achieve any noticeable sales in the computer business.

"To commercialize anything, you need a product," the 62-year-old Amdahl told *Computerworld* during a recent tour with Rizzi to promote the merged companies. "We decided to put what we learned from Trilogy's research into Elxsi as our entree into the computer field. We didn't want to be a landlord or a technology company. We want to be a computer company, and now we are."

The sentiments represent quite a change from six years ago, when Amdahl founded what he intended to be a computer company — and an earthshaking one at that. But Trilogy's ambitious plans to design and build supercharged IBM-compatible mainframes based on integrated wafer-scale technology foundered on a well-documented sea of troubles [CW, March 25]. With its ambitious project scrapped, 70% of its original financing gone and its lavish Cupertino, Calif., facilities staffed mainly by lessees including Electronic Data Systems Corp., Trilogy went shopping earlier this year.

"We decided on a three-pronged strategy," Amdahl said. "We would extract what technology we could [from Trilogy's original research and development], pro-

See TRILOGY page 88



Honeywell cuts 600 employees

By Clinton Wilder

BILLERICA, Mass. — In its second work force reduction of the year, Honeywell, Inc.'s Small Computer and Office Systems Group last week announced the layoff of 600 employees in Massachusetts in what it called a streamlining move.

The division, which terminated 130 positions last April, decided to cut back expenses for a major push into the integrated office systems market, according to the group's Vice-President Eugene Manno. The layoffs, to be posted Jan. 17, will affect employees in manufacturing, engineering, marketing and administration in five Massachusetts locations. But Honeywell plans to add 100 to 150 people to the office systems sales force in early 1986, Manno said.

The layoffs will represent about 17% of the office systems division's 4,000-member work force, all of it based in Massachusetts. Honeywell employs about 8,200 in the state.

"In a tight market, you have to put the

See HONEYWELL page 88

INSIDE

Most analysts expect Apollo Computer's stock price to rebound, but it hasn't happened yet/85

The leasing industry's trade association supports the U.S. House of Representative's latest tax reform plan but is split over elimination of the investment tax credit/86

Most Japanese semiconductor vendors react calmly to recent U.S. government trade moves against them/87

INSTANT ANALYSIS

"When Wang turns the corner, everybody can heave a sigh of relief."

— Dan Bellomy of International Data Corp. on the computer industry outlook for 1986

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More than 400 businesses around the world rely on the SOTAS VS Freedom Series of financial application products to fully utilize the power of their Wang VS systems. By doing so, they maximize reporting format flexibility and minimize software maintenance problems.

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Introducing the

The best of both worlds.

For owners of IBM Personal Computers, combining personal productivity and business applications is now less of a leap than ever before.

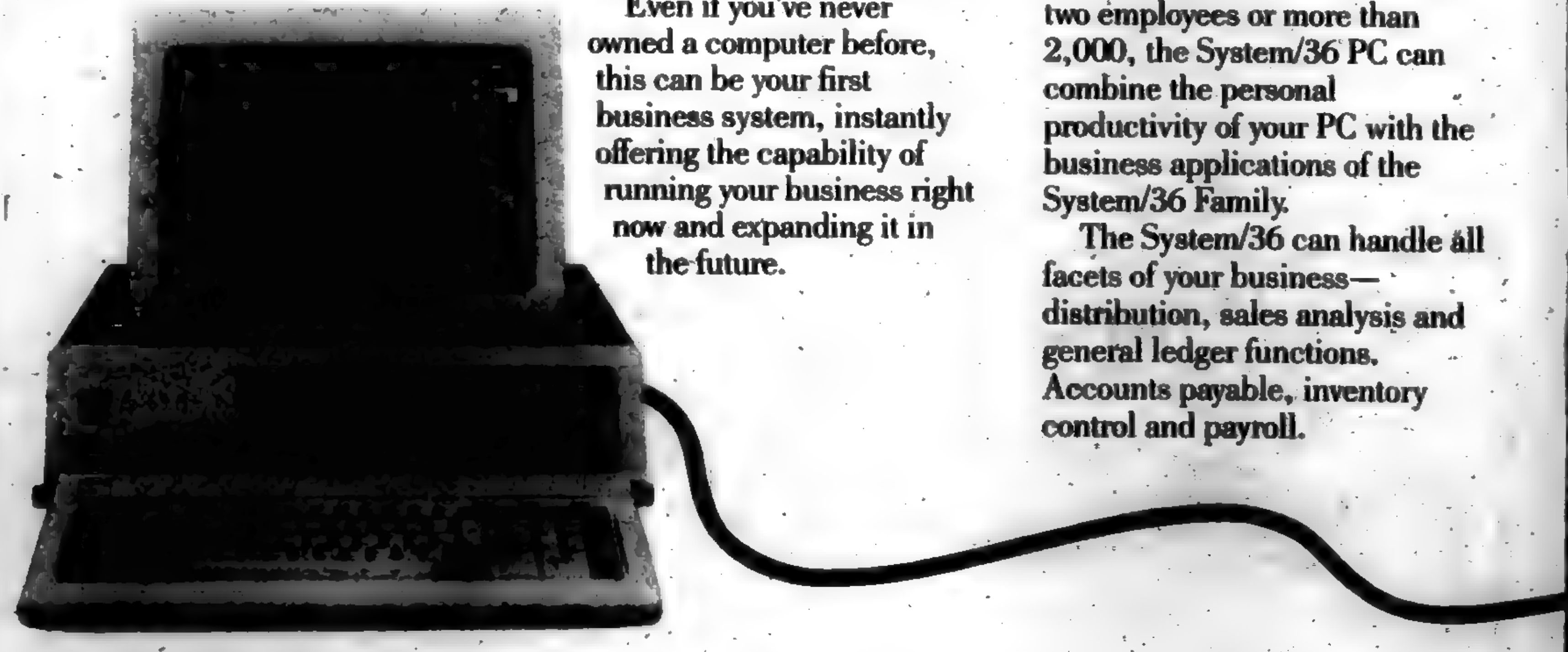
There's a new IBM product that marries the IBM System/36 and the IBM Personal Computer to give you the best of both worlds.

The newest member of the System/36 Family starts at only $5,995.

It's called the IBM System/36 PC.

Very small but it opens up new worlds for your personal computer. Very affordable yet capable of running System/36 programs that will help you run your business.

Even if you've never owned a computer before, this can be your first business system, instantly offering the capability of running your business right now and expanding it in the future.



Multiuser system.

System/36 PC can be a standalone computer for small companies or a departmental system or even part of a distributed network for larger companies, providing multiuser access to data.

The System/36 PC is made up of a 5364 Processor attached to an IBM PC, PC XT or PC AT. And you can connect up to three more of these personal computers. Or you can connect terminals such as System/36 printers or displays.

Flexibility.

Whether your business has two employees or more than 2,000, the System/36 PC can combine the personal productivity of your PC with the business applications of the System/36 Family.

The System/36 can handle all facets of your business—distribution, sales analysis and general ledger functions. Accounts payable, inventory control and payroll.

IBM System/36 PC.

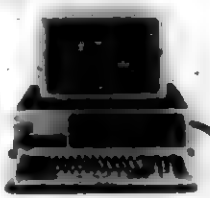
And you can get traditional PC functions such as spreadsheets and word processing.

Software for the System/36 has been developed over the years and has proven invaluable in all kinds of businesses of all sizes. And with the thousands of programs written for both IBM PC and System/36, the sky's the limit for business and planning applications.

The System/36 PC even provides you with data security features so that the right data gets into the right hands.

Small yet powerful.

All of this processing power can sit right on a desk or under it —either horizontally or vertically. It measures a mere 21¼"x16¾" x6½"—about the size of a small suitcase.



Yet as small as it is, this little box has multiple processors, with main memory that can be dedicated to running your business functions. In plain English, this means you can get better response time. The System/36 PC comes with a 1.2 MB diskette drive and either 40 or 80 MB disk storage, depending on your information storage needs.

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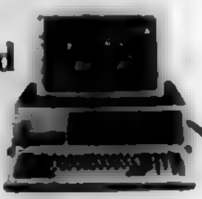

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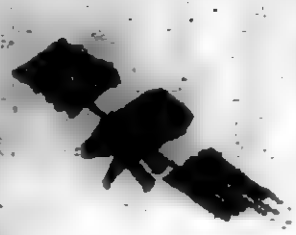

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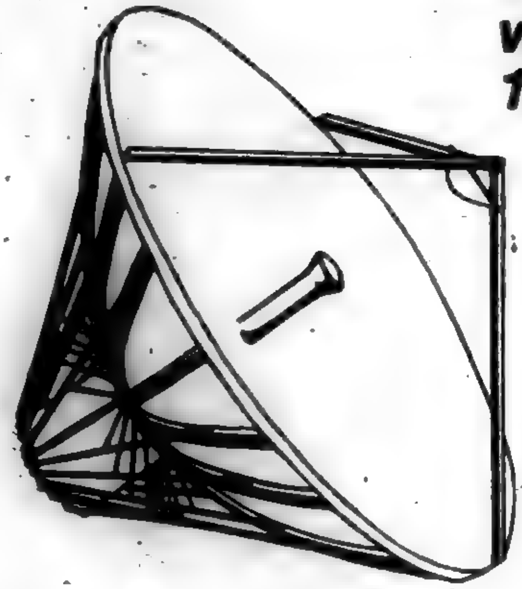

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Apollo struggles with quarter losses, strong competition

By Kathy Porteus

Apollo Computer, Inc.'s stock has yet to recoup what it lost in price per share on Sept. 24.

On that day, reacting to news that Apollo expected a third-quarter loss of $18 million, the company's stock tumbled 21%, closing at $12.25. For much of the recent market surge, Apollo hovered in the $11 to $12.50 range until a Thanksgiving Day rally among technology stocks boosted Apollo to $14. Nevertheless, investor uncertainty about Apollo's prospects continues to check any major advance in stock price.

Most analysts agree that Apollo is yet another victim of the ongoing computer industry slump. Carol Muratore, a vice-president with Prudential-Bache Securities, Inc. said, "We will know for certain whether or not Apollo's third quarter was an earnings blip when there is a pickup in the industry." According to David Wu, analyst with Montgomery Securities, Apollo is experiencing a short-lived lapse in profitability but should "rebound nicely because the firm expanded its customer base by 50% in the first nine months of 1985."

Analysts estimate that Apollo will break even in the fourth quarter of 1985 and earn 60 to 65 cents per share in fiscal 1986. However, John Rohal, vice-president with Alex Brown & Sons, Inc., was quick to point out that Apollo is "in a period of transition, and, therefore, the earnings model of the firm is not as predictable as it has been for the first three or four years of the company's existence."

Much of the skepticism surrounding Apollo stems from increased competition in the engineering and scientific workstation market. Digital Equipment Corp.'s Microvax II is making a splash with unit shipments exceeding 5,000 since its May introduction.

Craig Symons, analyst with Gartner Securities Corp., said he believes DEC's Microvax II will affect Apollo in much the same way the IBM Personal Computer knocked Apple Computer, Inc. off its perch.

IBM poses another threat to Apollo's market share. Although IBM has yet to announce its long-awaited engineering workstation, analysts are already commenting that the No. 3 slot in a growing market, like that for workstations, will not be such a bad place for Apollo.

Rohal of Alex Brown suggested that Apollo could even slip to fourth position since Sun Microsystems, Inc., a private company, has "really taken the momentum in the marketplace away from Apollo."

In addition to meeting competitive pressures, Apollo must make the transition from successful start-up to large, mature company. The resignation of Apollo's founder and chairman, John Poduska, underscores the cultural and business changes of such a transition.

ACTIVE ISSUES

Recently, Apollo addressed some of its strategic shortcomings. Until this year, three OEM customers accounted for much of Apollo's business. But as of September of this year, Apollo shifted its customer mix to 40% OEM and 60% end user. Also, Apollo is moving from its proprietary systems architecture to embrace AT&T's Unix and connect to IBM and DEC operating environments.

Despite uncertainty as to timing, most analysts expect Apollo's stock price to rise as the firm's earnings improve during the next year.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

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Leasing industry backs latest tax reform bill

But CDLA split over tax credit

By Mitch Betts

WASHINGTON, D.C. — The computer leasing industry is supporting the latest federal tax reform bill because it places computer equipment in the five-year tax depreciation category, James F. Benton, executive director of the Computer Dealers and Lessors Association (CDLA), said last week.

But Benton said the CDLA is taking a neutral position toward the proposed elimination of the 10% investment tax credit because the association membership is "split right down the middle."

Benton commented on the tax reform bill written by the Ways and Means Committee of the U.S. House of Representatives [CW, Dec. 2]. If passed, the bill will cut corporate income tax rates, reorganize the equipment depreciation schedule, eliminate the investment tax credit and reduce many other credits and deductions.

Computer leasing is expected to generate $9.25 billion in revenue this year, up 25% from 1984, according to International Data Corp. (IDC), a market research firm in Framingham, Mass. Lessors retain any tax benefits from purchasing hardware, and then lease the equipment to users.

Earlier this year, the

INDUSTRY NOTES

Uccel buys subsidiary of Rand

Uccel Corp. recently announced another in its recent flood of acquisitions, this time of a Raleigh, N.C.-based vendor of software that facilitates migration from the IBM DOS to the MVS operating system. Uccel bought, for $3 million, the Conversions, Inc. subsidiary of Rand Information Systems, Inc. of Alameda, Calif. The purchase also includes Rand's Exitdos, another conversion product, as well as software exchange with Rand for internal use. Uccel will solicit its installed base for customers of Rand systems conversion services.

■

Another acquisition-minded firm, Lee Data Corp. of Minneapolis, last week purchased Phaze Information Machines Corp., an IBM 3270-compatible terminal vendor in Scottsdale, Ariz. The move gives Lee Data an IBM clone for the low end of its terminal and workstation product line. The purchase will be a $1 million cash acquisition, and Lee Data will retire Phaze's $770,000 convertible debt. Phaze, with sales of $6.5 million in 1984, will operate as a wholly owned subsidiary of Lee Data.

■

Hewlett-Packard Co. restored all of its U.S. salaried workers and some hourly workers to full-time employment effective Jan. 1. The workers were taking two unpaid days per month as part of HP's no-layoff cost reduction program. The 30,000 salaried workers will be paid 5% below their normal salaries at least until April. The returning hourly workers will be paid at full salary.

■

Monday, Dec. 9, was not a bad day for Cray Research, Inc. The Minneapolis supercomputer leader completed deals for two X-MP/24 systems, one sold for $10 million to AT&T Bell Laboratories and another leased for $16 million to the National Aeronautics and Space Administration's Lewis Research Center in Cleveland. To put this in perspective, a year of $26 million revenue days would make Cray a $9.49 billion

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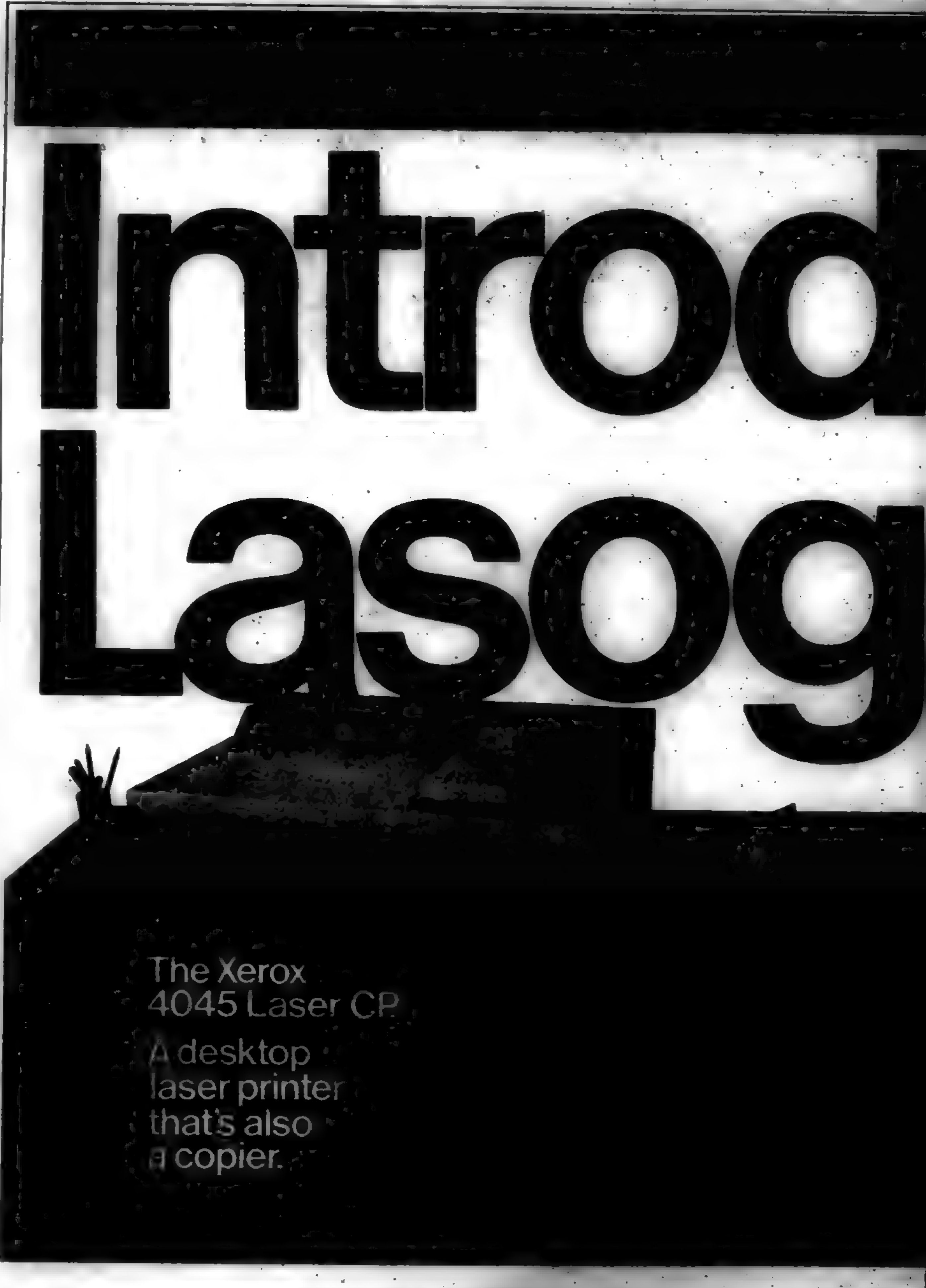
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CDLA lobbied hard to revise the U.S. Department of the Treasury's tax reform plan, which placed computer equipment in an eight-year depreciation category that Benton called "ludicrous and unrealistic."

He said the five-year schedule approved by the Ways and Means Committee is similar to the CDLA's own recommendation, although the CDLA previously sought a three-year schedule [CW, March 11].

Benton said that under the accounting procedures proposed by the committee, 40% of a computer purchase can be depreciated in the first year and 24% in the second year. He called the plan "very realistic and very fair."

Concerning the 10% investment tax credit, Benton reiterated that its loss would increase costs for lessors, who would then pass the higher costs to their customers.

But many CDLA members see advantages to killing the credit, he added. "We can get back to our traditional business of computer leasing, rather than tax-advantaged transactions, which we've never made as much money on anyway," Benton said.

Moreover, this would remove the distasteful tax shelter label from computer leasing, he acknowledged.

Leslie Townsend, a leasing analyst with International Resource Development, Inc. of Norwalk, Conn., agreed that computer leasing firms have mixed reactions to tax reform. Loss of the investment tax credit would eliminate one of the industry's financial benefits, but it would also reduce paperwork burdens for obtaining the federal credit, she said.

Losing the tax credit is more upsetting to the transportation leasing industry, mostly because of the huge cost of aircraft and ships, she said.

Japanese vendors unfazed

By Takahiko Kondoh
Computerworld News Service

TOKYO — Most Japanese semiconductor vendors appear unperturbed by the U.S. Department of Commerce's preliminary ruling against them for dumping 64K-byte dynamic random-access memory (RAM) chips in the U.S. market [CW, Dec. 9].

Fujitsu Ltd., Hitachi Ltd., NEC Corp., Oki Electric Co. and Toshiba Corp. responded by saying they have shifted focus from producing 64K-byte RAM chips to producing 256K-byte RAM chips.

Only Mitsubishi Corp. said it is ready to "explain [to the Commerce Department] what we are actually doing and let them know there's been no dumping."

Firms required to post bond

The Commerce Department reportedly has reason to believe that Mitsubishi was selling its semiconductors below cost and has required the company to post a bond equal to 94% of the total value of the semiconductors that Mitsubishi imports into the U.S.

Similar bonds have also been required of Hitachi (18%), Oki Electric (13%) and NEC (8.9%).

Mitsubishi said it believes that the Commerce Department sympathizes with the antidumping complaint made by Micron Technology, Inc. of Boise, Idaho, and has ignored the data submitted by Mitsubishi.

Other vendors calm

Japanese semiconductor vendors other than Mitsubishi remained calm toward the Commerce Department's action, many because they are now producing chips for U.S. customers at plants in the U.S.

Chips manufactured or assembled in the U.S. are less likely to be affected by import restrictions. NEC, Toshiba, Hitachi and Fujitsu are currently producing chips, mostly 256K memories, in California and Texas.

The Japanese semiconductor manufacturers said they have yet to formulate a position on the Reagan administration's own predatory pricing petition against several of them. But many Japanese semiconductor makers said that they are increasingly concerned about potential U.S. trade restrictions.

Kondoh is Tokyo bureau chief for the Computerworld News Service.

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Honeywell cuts staff

From page 81

wagons in a circle," Manno said. "We know perfectly well it will be a tight year. We expect the integrated office systems market to grow by 20%, but there are a whole bunch of people out there selling to it. We don't think the marginal ones will be around too much longer, and we had to get our costs in line."

Manno said Honeywell has targeted the supermini-based, departmental office systems arena as a key growth niche — a strategy announced by several vendors in the past year. In addition to traditional players such as Digital Equipment Corp., Data General Corp. and Wang Laboratories, Inc., major firms such as Prime Computer, Inc. and Hewlett-Packard Co. have made the office automation arena a crowded one.

"There is IBM dominance in the mainframe and micro fields, but not here," Manno said. "There is more room to compete and more growth — a good place to put your bet."

Honeywell's actions also included a commitment to dedicate 40% of its small-computer sales force to specialized distribution channels such as value-added resellers and the consolidation of its existing national reseller program into the small computer group.

Effective Jan. 1, the group will also reorganize along functional lines, which will allow the job elimination, Manno said. Marketing and production of small office machines and DPS 6 minicomputers will now be combined. Marketing will be handled by the new Office Marketing Systems Division and production by the Small Computer Producer Division.

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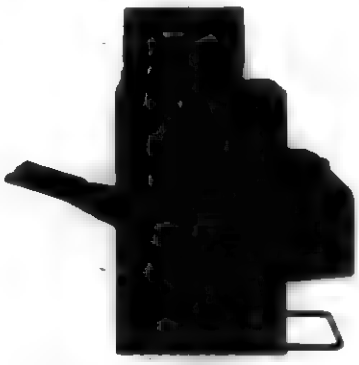
3700 Laser Printing System

8700 Laser Printing System

Trilogy banks on Elxsi sales

From page 81

duce revenues by leasing parts of Trilogy's center and use our cash to back a product. We looked at semiconductor and workstation manufacturers as well as parallel processors. We decided parallel processing was the future market, the way computers had to go. Semiconductors could be, but the field was overcrowded."

By teaming up with Elxsi, Amdahl, who pioneered the IBM 360 architecture and later the Amdahl Corp. IBM plug-compatibles that still bear his name, has entered a new world — one dominated by the computers of Digital Equipment Corp. Although a system upgrade announced last week is said to make the Elxsi 6400 comparable to a Cray Research, Inc. supercomputer for certain applications [CW, Dec. 9], most of its sales will come in the high-end DEC arena.

"In 90% of our sales situations, we're selling against DEC as the alternative," Rizzi said. "If the customer's foreseeable need is for a single VAX 8600, DEC owns that. But if the customer in the increasingly computation-intensive engineering world wants something bigger and 20% to 30% faster, we do that much more cheaply than the DEC upgrade strategy, which is a cluster."

Rizzi admits that Elxsi is "traveling in uncharted waters" in selling to the ill-defined parallel processing market. That is where Amdahl and the cash reserves of Trilogy are valuable.

"Ours is a big machine that forces people to make deliberate decisions on a long-range commitment," Rizzi said. "One of the most important things when you make that commitment is the company behind the product. With the merger, we have access to a lot of capital. We don't have to be 100% preoccupied with the next quarter and weathering a slow market."

The going has been slow for Elxsi, which was privately held before the merger. The firm lost $12.5 million on $16.4 million in sales in the first nine months of 1985. In 1984, Elxsi lost $7 million on sales of $18 million.

But Trilogy expects those results to turn around soon, having staked its last remaining hope for a revenue-producing product on 7-year-old Elxsi. If the 6400 can fly, Trilogy will be able to continue its work in other areas, such as R&D with other computer vendors on its high-density interconnect known as a multichip module. But until Elxsi's growth is a reality, Trilogy will clearly operate in retrenchment mode.

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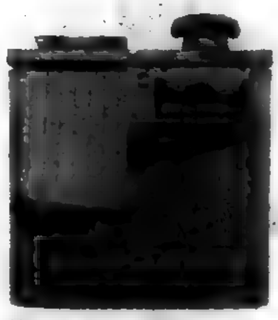

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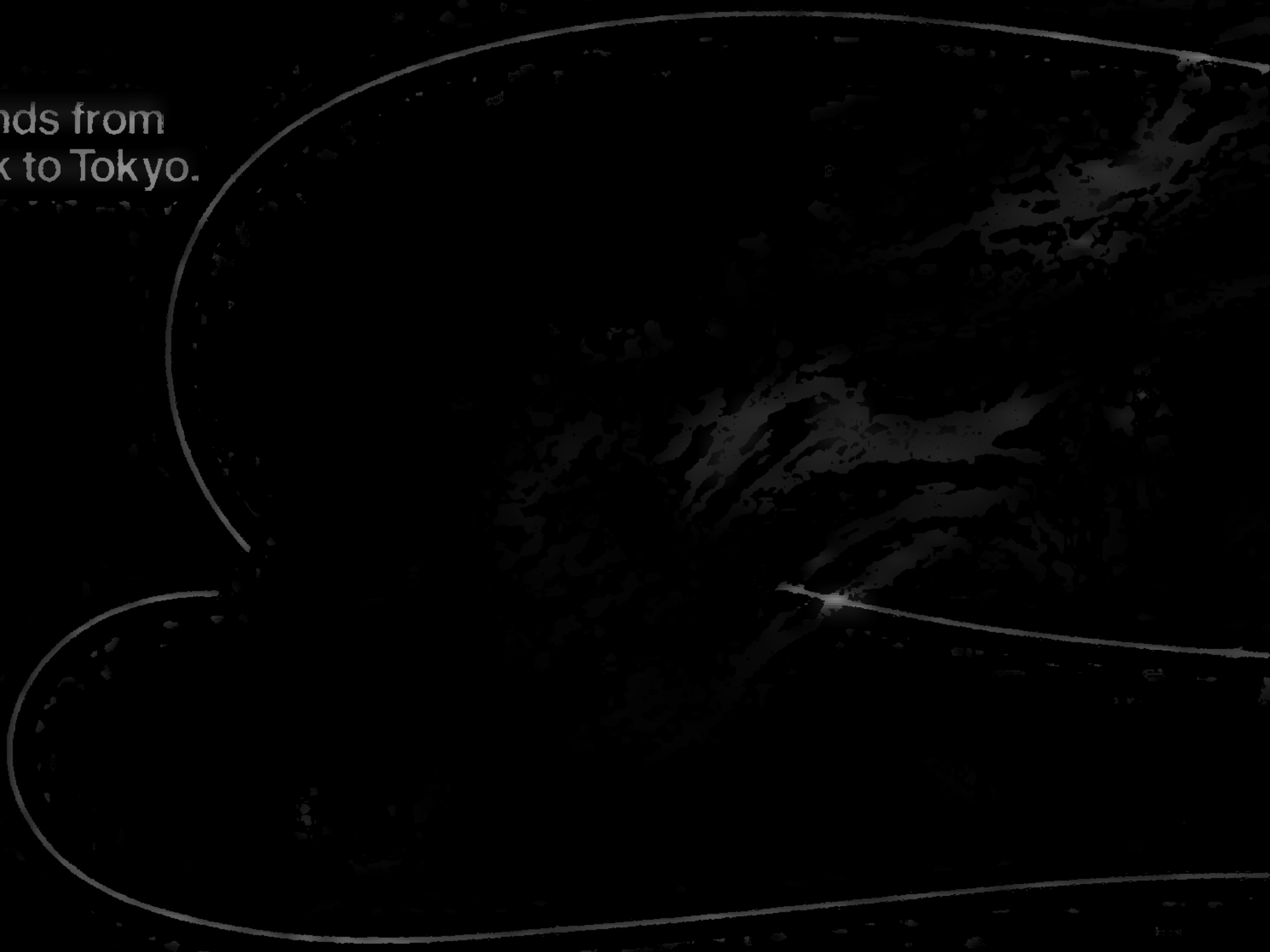

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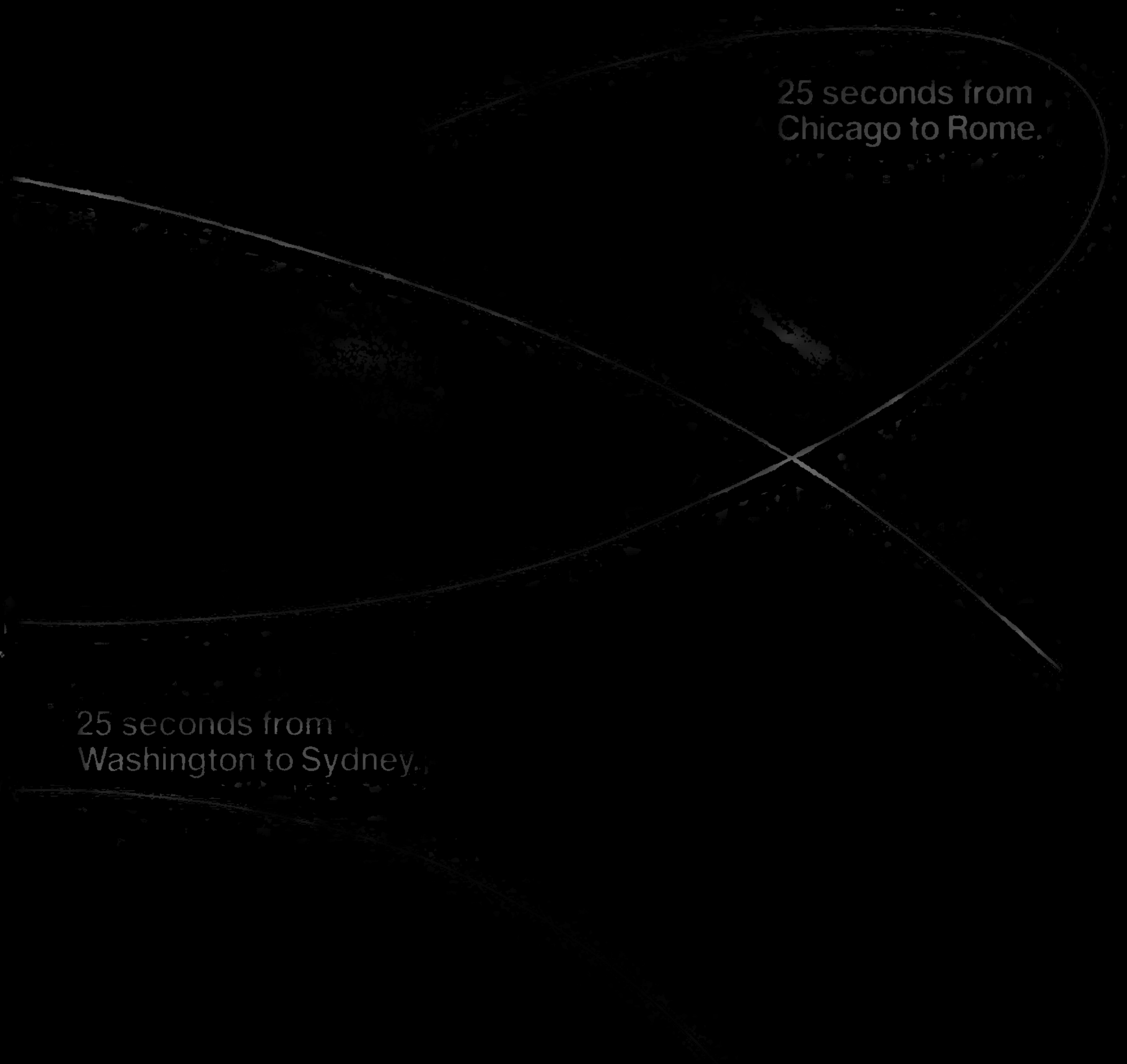
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Chip actions signify little

From page 81

forts have been worth their weight in trade press ink. But even for Micron, and certainly for the rest of the U.S. industry, the value of the administration's stronger trade policy won't be known for quite a while.

U.S. market share in the low-end memory market is history, and protective tariffs against the Japanese will not do much to raise prices or new fabrication plants in this country. The important battles will be waged in microprocessors, 1M-bit and larger memory chips and application-specific circuits such as Advanced Micro Devices, Inc.'s new chip-of-the-week offerings.

The stronger U.S. government stance shown in the last several weeks might convince Hitachi Ltd., NEC Corp. and others to modify their aggressive, market-share-or-else approach to U.S. sales of future generations of semiconductors. However, that hypothesis seems more like wishful thinking than strategic marketing.

In any segment of the electronics business, U.S. trade policy is not likely to alter the maxim that has been proven time and time again: When the technology becomes an off-the-shelf commodity, the U.S. loses. If it becomes cheap and easy to make 4M-bit memory chips in Japan in the next few years, it spells trouble for U.S. firms — no matter what a trade policy strike force might do.

Is there also a downside risk to more aggressive U.S. trade policy in semiconductors? The answer is "yes." If the ultimate result is higher prices for Japanese-made RAM chips — virtually all RAM chips — it is the U.S. computer industry that stands to lose.

Cray Research, Inc. Chairman John Rollwagen, who admittedly has an annual $75 million vested interest in dynamic RAM prices for his mega-number crunchers, recently pointed out that higher prices are the reward that the Japanese have sought in the market share war. It was no surprise, for example, when NEC, Toshiba Corp. and Fujitsu Ltd. recently announced approximately 20% price hikes on 64K-byte and 256K-byte dynamic RAM chips.

What was surprising was that NEC tried to paint the increase as a conciliatory measure, and one national newspaper — not known for in-depth business coverage — noted that NEC had "ended the price war." Isn't that the whole idea of a trade war — to grab market share and then raise prices?

Unfortunately for U.S. vendors, the war in dynamic RAM chips ended many months ago. And to the victor went the spoils.

INDUSTRY NOTES

NOTES from page 86

company — or about one-fifth the size of IBM.

•

Intelogic Trace, Inc. recently added the products of a leading local-area network vendor to the list of hardware it services. Intelogic Trace will support the local-area nets of Nestar Systems, Inc., including the token-ring net it introduced at Comdex.

•

Two vendors, AST Research, Inc. and Wicat Systems, Inc., recently announced sales reorganizations. AST Research, based in Irvine, Calif., consolidated the sales and marketing efforts for its IBM Personal Computer add-on products into a single organization.

Wicat Systems of Orem, Utah, a vendor of specialized micro systems for business training and education, centralized its sales force by dissolving three divisions. Sales personnel who previously concentrated on either general systems, training systems or education systems will now sell Wicat's entire product line.

•

In a potential early indicator for the Christmas selling season, retail microcomputer sales in October trailed those of 1984 by 4.2% in units and 13.5% in revenue, according to Future Computing, Inc. The loss leader was Apple Computer, Inc., with unit sales 33.6% below the October 1984 level.

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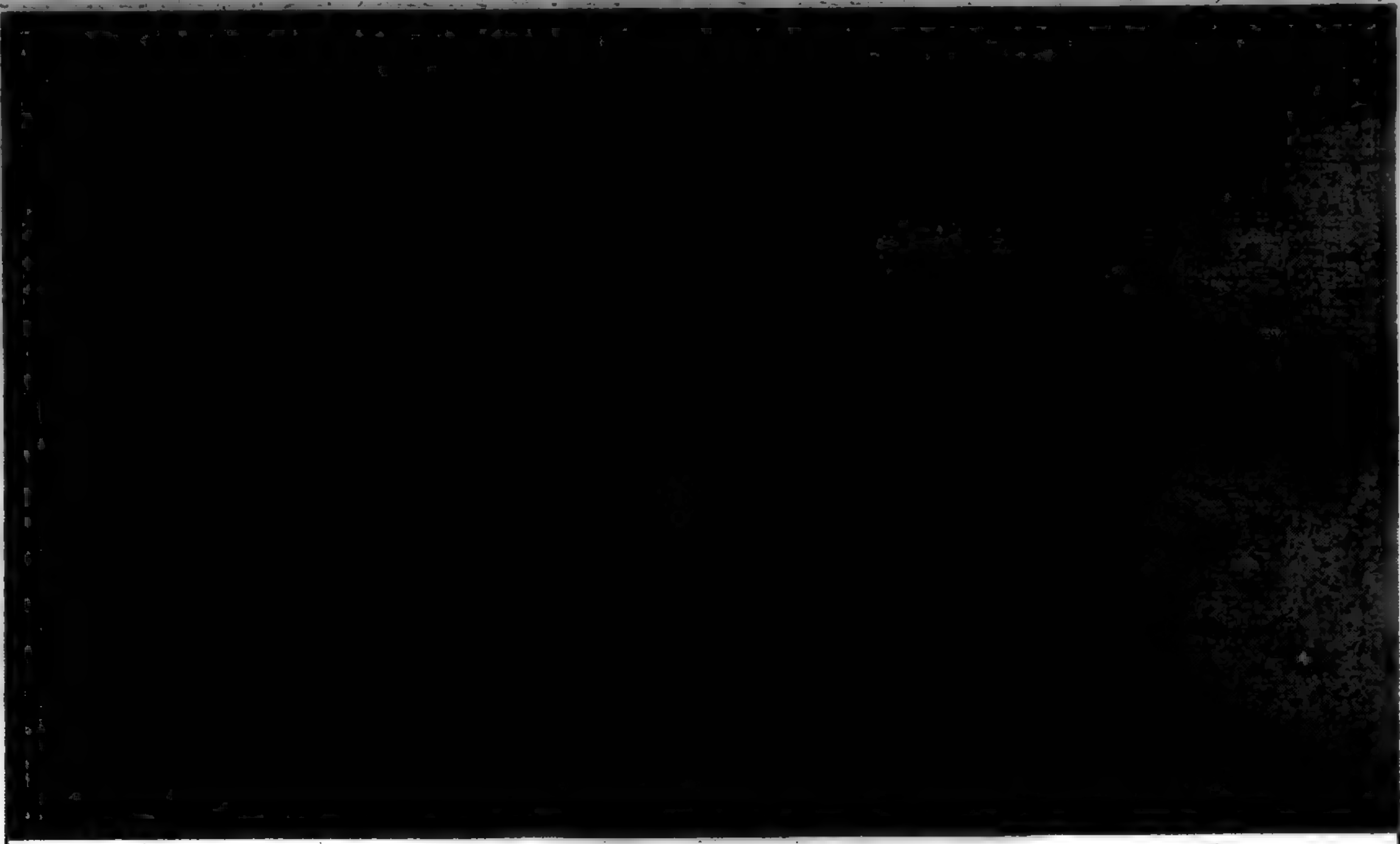

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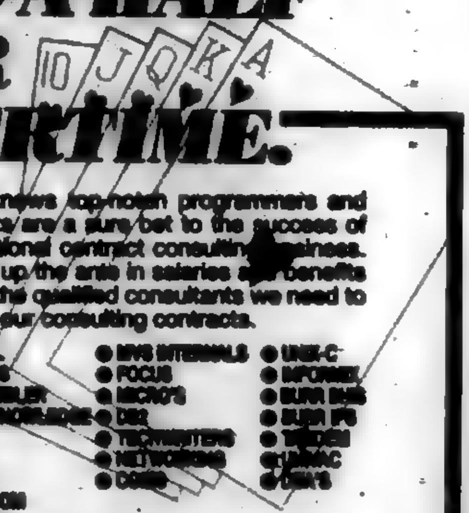

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Maine mfr. requires tech team leader w/extensive RPG III expertise for devel. & support assignments. Best profile will incl. mfg. & integrated fin'l. apps. exp. Hi energy team environ. in beautiful coastal area. Salary to $33,000.

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Estab. Providence fin'l. svc. firm seeks mgr. of staff of 20 opns. & tech svcs. personnel. Environ. is IBM 30XX OS/MVS. N.E. candidate preferred w/knowl. of capacity planning. Salary to $50,000.

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Principals only. Send resume to:

Microproducts, Inc.
370 W. Camino Gardens Blvd.
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We desire someone who has experience in systems development and implementation in a high volume manufacturing environment and the ability to lead this function to the forefront of technology. Familiarity with NCR hardware will be helpful but not necessary.

Reply to CW-B4729, Computerworld,
Box 880, Framingham, MA 01701

Systems Analyst

Responsibilities include development of Computer Systems for client contracts. Will be involved in analysis, design and testing of various computer programs. Responsible for enhancement and modification of existing systems. Responsible as called upon, for the preparation of technical reports, special studies and manuals. Will, when necessary, supervise programmers and work closely with client users to prepare modifications to existing systems. Must have 2 years in job being offered or 3 years as Programmer/Analyst. Experience must include work on larger [illegible] type main frames such as ICL, Honeywell, Burroughs, UNIVAC; programming languages should include at least one of the following: COBOL, PL/I, Assembly. Experience with on-line systems using large scale data bases such as CICS, IMS, DL/I, DMS. Total [illegible]. 40 hr. wk. [illegible]. Salary [illegible] to [illegible] per yr. [illegible] Send resume to NYS Job Service [illegible] 175 Remsen Street 2nd Floor Brooklyn, New York 11201.

COMPUTER SYSTEMS ANALYST wanted to design, develop and implement new computer software systems for patient management and accounting applications; design/code online input/output screens and files, design/code forms/reports; develop work plans, timetable estimates and manpower requirements and develop system user documentation and train users of systems. Requires M.S. in Computer Science. $26,000.00 per year, 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. [illegible]. "Employer Paid Ad"

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You will have had experience in:
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Application forms and further information may be obtained from:

The Director
Personnel Department
National University of Singapore
Kent Ridge
Singapore 0511

Mr. Peter Lim
Director, North America Office
National University of Singapore
780 Third Avenue, Suite 2403
New York, N.Y. 10017, U.S.A.
Tel: (212) 751-0331

Administrative Computer Services

Manager, Systems and Programming - The Systems and Programming Manager is responsible for the installation, evaluation and maintenance of all systems, software, and software packages utilized by the computer center.

QUALIFICATIONS: • Min. of 5 yrs. of large mainframe computing exp. including 2 yrs. of supervisory exp. in programming. • Strong application systems analysis skills and technical strength in operating systems, data base management and high level language. • Knowledge of standards and procedures for software development.

Manager, User Support Services - The User Support Services Manager is responsible for coordinating the resources of the computer center with end-user requests for data processing services. The User Support Services Manager works with departmental personnel in systems acceptance testing, problem resolution, and the development of user documentation and training programs.

QUALIFICATIONS: • 3 yrs. programming experience or 2 yrs. application software development on large mainframe computer. • Strong systems analysis skills. • Exp. in distributed processing systems and user training preferred.

Systems Programmer - The Systems Programmer is responsible for implementing and maintaining all systems software as well as the data base management system for the central mainframe system, organizing and preparing systems software documentation and identifying methods to optimize data access procedures.

QUALIFICATIONS: • 2 yrs. of programming exp. on large mainframe computer system. • Technical exp. with the implementation of online transaction processing monitor and data base management system. • Exp. with NCR VRX operating system and PLUS-4/MBASE-9 data base management system preferred.

Bachelor's degree in computer science or a related field. Extensive exp. in the areas indicated will be considered in lieu of the formal education requirement.

Applications will be accepted until the positions have been filled. To apply, submit a letter of application and resume to: A.J. Brooks, Director of Personnel, Sinclair Community College, 444 W. Third St., Rm. 7240, Dayton, OH 45402. An equal opportunity employer.

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To apply for a position of System Analyst/Programmer in the Academic Computing Group, please send a letter of application; a current resume; official transcripts of all college work; and the names, addresses, and telephone numbers of at least three references to:

Joseph D. Witeski
172 Thackeray Hall
University of Pittsburgh
Pittsburgh, PA 15260

Applications must be received by January 13, 1986.

To request more information or to discuss details of the position, call Mr. Witeski at (412) 624-6700.

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BERMUDA GOVERNMENT MINISTRY OF FINANCE

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The Bermuda Government is seeking a Controller to take charge of its Central Data Processing Unit. The Unit supports all electronic data processing and office automation activities within the government. It operates a central IBM System/38 computer, plus distributed minicomputer and microcomputer facilities when appropriate. The areas of application cover all aspects of the government's activities. The establishment of the Unit comprises ten professionals, 15 technical and 12 clerical staff.

The Controller is responsible for the direction and control of EDP and office automation activities within government, under the policy guidance of the Financial Secretary and the Minister of Finance. The post reports through the Financial Secretary to the Minister of Finance.

The successful applicant will have a relevant degree or equivalent professional qualification in the field of data processing, and will be able to demonstrate a minimum of ten years EDP experience. A sound knowledge of IBM System/38 equipment is essential, and significant exposure to microcomputer hardware and software is also very desirable. Applicants must have experience at a senior management level within EDP, and have been responsible for not less than 25 to 30 staff.

The salary of the post will be Bermuda dollars 57,353.00 per annum. The Bermuda dollar is kept at par with the US dollar.

There is no income tax in Bermuda, but the cost of living is high, particularly rent which can be expected to be 25 percent of salary for a married person with family.

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THE SECRETARY
PUBLIC SERVICE COMMISSION
GENERAL POST OFFICE BUILDING
HAMILTON
5-24
BERMUDA

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Applications to arrive in Bermuda not later than the 3rd of January, 1986.

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These positions involve database applications on PRIME computer systems in scientific and clinical research areas, development of database structures and programming procedures, user consulting and computer-to-computer data transfer between US and UK computer systems. A scientific background and PRIMOS, FORTRAN and database experience are required. Some experience with 4GL relational database systems and micro-mainframe links is desirable.

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This position is for a Manager-Technologist who will head-up a new group for research applications. The position requires an individual with extensive experience in scientific computer applications with emphasis on database design and implementation, and ten years experience in project management. Emphasis will be placed on knowledge of PRIMOS, planning, organizing, project leadership and communications skills. Pharmaceutical industry applications experience and an advanced degree are desirable.

SENIOR PROGRAMMER ANALYST

This position involves implementation of database technology projects on PRIME computer systems. Requires an individual with six or more years experience in scientific computer applications with extensive experience in the design of interactive information systems and database implementation. A scientific background, experience with 4GL relational database systems and an advanced degree are desired.

PROGRAMMER ANALYST

This position will participate in the design and programming of research applications on PRIME computer systems. Requires an individual with 3-5 years experience in PRIMOS, FORTRAN and scientific computer applications with experience in design and implementation of interactive systems and database design.

You can look forward to a competitive starting salary; excellent company benefits; and a highly desirable location that combines a mild climate and relaxed lifestyle with easy access to numerous cultural, recreational, educational and historical attractions.

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Box #CW-[illegible]
Computerworld
P.O. Box 880
Framingham, MA 01701

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The City of Englewood, Colorado has an immediate opening for Information Systems Division Head reporting to Finance Director. Plans, administers and directs all data processing, office automation, micro computers, data and telecommunications activities. Bachelor's degree in Computer Science, information systems or other related field desired plus 3-5 years progressively responsible experience with Prime Information Systems preferred in an on-line, interactive environment. Salary [illegible] to [illegible] plus excellent city benefits. Please send resume with salary history no later than December 31, 1985 to: Human Resources Department, City of Englewood, 3400 South Elati Street, Englewood, CO 80110. An Equal Opportunity Employer.

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SENIOR PROGRAMMER ANALYST: Design of [illegible] systems [illegible] hardware, [illegible] and software [illegible]. [illegible] of X.25 and SNA protocols. [illegible] DOT [illegible]. [illegible] Bachelor's in Math or C.S. and 2 years experience. [illegible] per year. 37.5 hours per week. Mail resumes to: N.Y.S. Job Service, J.O. [illegible], [illegible] Blvd., Rego Park, NY 11374.

PROGRAMMER/ANALYST II: Code, test & implement applications software for on-line and batch large scale insurance systems, using knowledge of Computer Science, IBM 3081, 3033 & 8100 hardware and software including Assembler, COBOL, JCL, CICS, & TSO/SPF. Knowledge or experience with JCL, CICS, COBOL required. B.S. in Computer Science or Data Processing and 2 years experience or M.S. in Computer Science or Data Processing and 1 year experience required. 35 hours per week. $28,000 per year. Resume to NYS Job Service JO #S018173, 175 Remsen St., 3rd Floor, Brooklyn NY 11201 DOT 012.167.066.

STRUCTURAL ANALYST ENGINEER wanted for research and development on structural dynamics for the automotive industry using computer based Finite Element methods, stress and vibration analysis and optimization techniques; Requires M.S. degree in Mechanical Engineering; $33,280 per year; 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, MI 48202 Ref. #70686 "Employer Paid Ad".

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You will establish the capacity planning function. This would include evaluating capacity planning software, capacity planning and performance management and training staff in this area.

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You will be responsible for the installation and maintenance of MVS and related systems software. The successful candidate will have a minimum of 2-5 years experience working with large scale IBM computers. Additional knowledge of CICS, IMS, and VTAM along with other software would be a definite plus.

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To code, debug and document programs and analyze existing computer programs. Requires college degree, or equivalent, with at least 2 years' programming experience on a large-scale system; and knowledge of COBOL, IBM JCL, and TSO. Additional knowledge or experience in FORTRAN, VAX 780 VMS, CAD, IMS/DLI, CICS is an asset.

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Systems Programmer [illegible]

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SYSTEMS PROGRAMMERS

A minimum of 3 years direct experience on one of the following:

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- ACF/VTAM and ACF/NCP including network definition, route planning, CNM product installation (NCCF, NPDA, TAF) and trace analysis.

All require experience with system maintenance using SMP/E, problem determination and resolution, assembler, language coding, system generation and dump analysis. Knowledge of RACF is beneficial.

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(Intermediate through Senior level)

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- 4+ years programming experience with the following is desirable: Mark IV, Mark V, PL1, JCL, TSO/SPF, IMS, VM/CMS, CPC or CDBS.

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- Structured systems design and implementation
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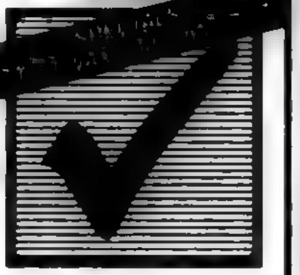

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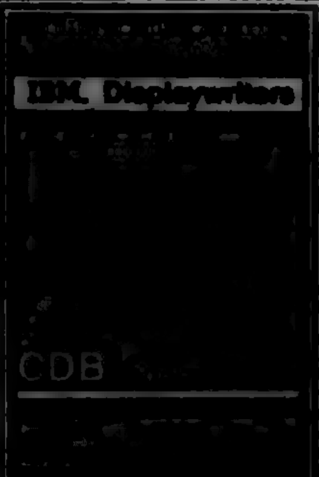

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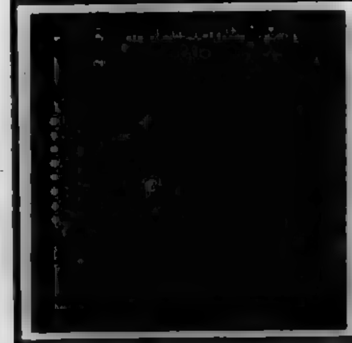

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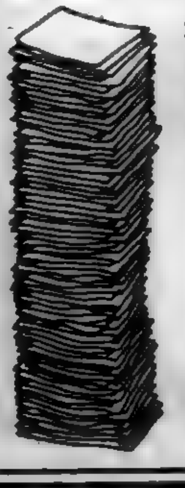

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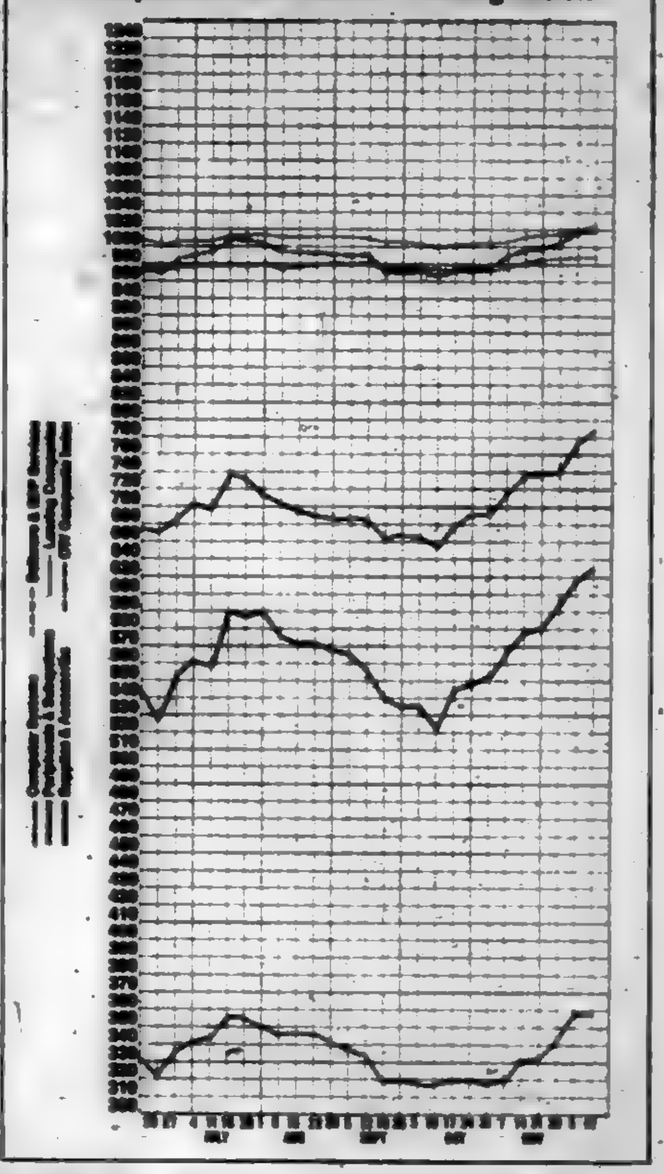
Computerworld Stock Trading Index

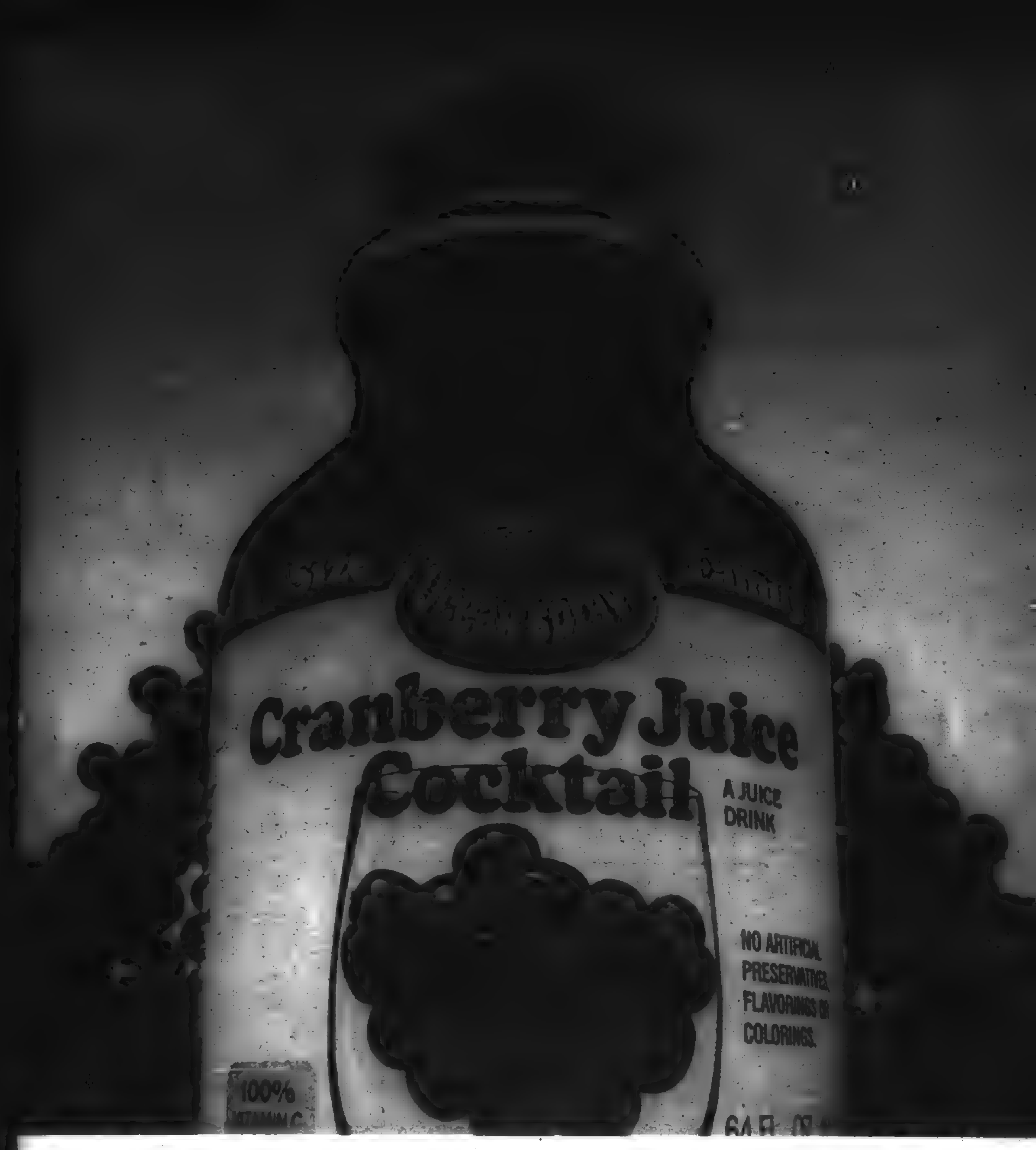


Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 11, 1985

All statistics compiled, computed and formatted by TRADE QUOTES INC. Cambridge, Mass. 02139

EXCH		1985 RANGE (1)	CLOSE DEC 11 1985	WEEK NET CHANGE	WEEK PCT CHANGE
	COMPUTER SYSTEMS				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	LEASING COMPANIES				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SOFTWARE & EDP SERVICES				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	PERIPHERALS & SUBSYSTEMS				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SUPPLIES & ACCESSORIES				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



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VOL 19

ISSUE 51

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COMPUTERWORLD

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The spirit of giving flourishes at a Connecticut firm that tries to fill the computing needs of community agencies. **Page 2.**

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Digital Communications Associates, Inc. ships a version of its Irma board, claiming that it runs up to 100 times faster than the original. **Page 17.**

●

Hacking incidents have not spurred insurance companies to write policies covering the problem. **Page 4.**

●

The long wait for practical optical storage may be winding down. **Page 25.**

●

Burroughs rolls out its latest micros, basing multiuser systems on Intel's 80286 processor. **Page 5.**

●

***New Jersey Bell* is the first** divested Bell phone company approved to offer an X.25 protocol conversion service. **Page 10.**

●

The much-heralded marriage of Applied Data Research, Inc. and Ameritech is a *fait accompli* following stockholder approval of the acquisition last week. Ameritech reported that nearly 4.4 million ADR shares were tendered at $32 per share, exceeding the 3.7 million share minimum needed to acquire the company. The tendered shares represent some 59% of ADR's outstanding stock, and Ameritech will begin payment on them immediately.

●

Apple Computer last week said it expects profits from the current quarter to reach an all-time high, despite lower sales than the year-earlier quarter. The company said it expects profits in the range of $52 million for the first quarter of fiscal year 1986. Apple President John Sculley said the predictions indicate the company can become significantly more profitable on flat revenue

See NEWS page 8

Staff, system woes tax IRS

By Mitch Betts

WASHINGTON, D.C. — Tax return processing at Internal Revenue Service computer centers should avoid 1985's legendary snafu this coming tax season, but the IRS still faces significant personnel, management and hardware problems, a congressional panel was told last week.

Perhaps the biggest problem is the extreme difficulty the IRS service centers have had in hiring and keeping experienced computer and data entry personnel, according to the IRS and other government officials. The problem will get worse if the IRS is hit by budget cuts next year, warned U.S. Rep. J. J. Pickle (D-Texas), chairman of the U.S. House of Representatives Ways and Means Committee's Subcommittee on Oversight.

See STAFF page 4

MIS wish lists may go unfilled

Software productivity tools, networking aids top '86 needs

By Clinton Wilder

Like millions of others at this time of year, DP/MIS managers such as Michael Luciuk are given to itemizing dreamily the gifts they would like to receive to make their professional lives more pleasant next year.

Unlike many others, however, DP/MIS managers' Christmas wish lists this holiday season are more wish than list.

"If anyone were to give me a Christmas present, it would be that the vendor community would get together on some broad

See MIS page 6

Users attack 1-2-3 move; Lotus shrugs

By Peggy Watt

Angered by pressure from Lotus Development Corp. to replace their familiar version of the 1-2-3 spreadsheet at a high cost in dollars and inconvenience, microcomputer managers at some major corporations are lobbying Lotus to reconsider its upgrade policies.

"I say, bring back 'classic Lotus,' just like Coca-Cola brought back Classic Coke," said Alan Gross, president of the Manhattan-based Microcomputer Managers Association and micro manager of a major New York investment brokerage house. Gross, like others interviewed by *Computerworld* last week, said his company would now take a closer look at alternative spreadsheet packages.

Such complaints come from "a small, disproportionately vocal group," Lotus President Jim Manzi responded. "More micro managers are saying that they like the upgrade, and they have committed to buy many thousands of copies." Asked about requests to continue shipping the earlier release, he said, "We're not running into that at all."

Release 2 of the spreadsheet features such advances as unlimited spreadsheet size, expanded memory capacity, keyboard macros and coprocessor support, other Lotus officials pointed out. Concurrent with the firm's first shipments of the new release three months ago, it stopped delivering the enormously popular 2-year-old Release 1A.

But rather than applaud the new features, Gross and many colleagues object to the tedious task of converting a significant installed base. They also expressed concern over compatibility between files created under each version, especially during the transition. Additionally, they described the upgrade's price as insult added

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CW EXCLUSIVE

High-test blend: Texaco, Getty merge DP centers

By James A. Martin

HOUSTON — While lawyers for Texaco, Inc. waged legal battle in a Houston courtroom regarding the company's $10 billion megamerger with Getty Oil Co., DP managers for the two oil giants were embroiled in a behind-the-scenes battle of a far different sort.

Company lawyers recently lost the initial round in their epic confrontation with Pennzoil, Inc., another Getty suitor. Pennzoil won a $10.53 billion jury judgment that could push Texaco into Chapter 11 bankruptcy proceedings unless a compromise settlement is reached. Meanwhile, the computer professionals have so far been successful in their efforts to combine the two sprawling DP operations at Texaco and Getty into a single state-of-the-art organization that will provide the functional foundation for the merged companies' corporate operations.

Hutzelman

Following the merger, management decided that two central computing centers and one systems test location were needed to accommodate approximately 12,000 on-line domestic and international users. Part of the strategy behind combining the DP centers was to phase out older technology, including IBM 3033 and 3080 systems, in favor of newer 3090 processors [CW, Sept. 2] and more advanced 3380 disk drives and 3480 cartridge tape systems.

"The idea," said David W. Hutzelman, director of technology and planning for Texaco's computer and information systems department, "was to pull all the geographically dispersed DP operations together as quickly as possible into a single, coherent, functional entity and to take advantage of new technology along the way."

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NEWSPAPER

Donation of computer expertise valuable gift to nonprofit agencies

By [illegible]

NEW LONDON, Conn. — "My knowledge of computers is what I have to give." That thought helped inspire a U.S. Coast Guard lieutenant from Connecticut to serve his community's not-for-profit agencies with his computer expertise.

Gerard Massad, a computer science instructor who has been with the Coast Guard since 1974, donates his time, software development skills and knowledge of personal computing to help agencies get organized. He wants to see the idea of community computing catch on nationwide.

Places like the Ronald McDonald House for families of sick children, the Christian Community Action organization, the New Haven Community Soup Kitchen, the Jewish Federation of Southeastern Connecticut and the New Haven Preservation Trust have benefited from work done by Massad and his partner, Jim Glover. Glover, a doctoral candidate in psychology at the University of Connecticut and a computer trainer at Combustion Engineering, Inc. in Windsor, Conn., and Massad recently set up the Center for Community Computing, Inc. in New Haven, Conn.

The two men met by chance in a computer store in New Haven a year ago. After striking up a conversation, each discovered that the other had a desire to help people somehow, but each one needed the support and the motivation that a partner could provide. Together, they have managed to offer consultation, hardware, time on their own computers, training and encouragement to a number of agencies.

Any not-for-profit organization is eligible for help, Massad said. "We don't discuss what the religion, politics or race of an agency is. We will do pro-life or prochoice. Our purpose is not to decide whether or not they are the right people but if they have a need."

Not-for-profit organizations tend to rely heavily on human resources, Massad said. That is not always the most efficient way to get things done. Computers are much better at keeping lists, creating mailing labels and making multiple copies of a form letter. A personal computer can free up a good portion of an agency's time, he added.

Preston Maynard, executive director of the New Haven Preservation Trust, agreed. "We wanted to computerize, but nobody on our staff of six knew how," Maynard said. The agency had money for hardware but no funds available for consultations. When Massad came in, he helped choose and buy the hardware, and he designed special programs and a data base of historical information for the New Haven Preservation Trust over a period of four to five months.

Massad is currently working on a data base program that will allow the Uncas on the Thames hospital located in New London to keep patient information in a personal computer, instead of on the 2,000 to 3,000 index cards it now uses. His past accomplishments include a one-shot job of creating and maintaining mailing lists of donors who contributed to the Ronald McDonald House in New Haven and a project to help the Jewish Federation of Eastern Connecticut organize a data base.

Massad "helped us select a data base program to use, helped to set up how we should use it and designed the formats for us," said Jerome Fischer, executive director of the Jewish Federation. Fischer found Massad through contacts at the Volunteer Action Center of Southeast Connecticut. The only problem Massad cannot solve for the organization is finding the volunteer labor necessary to enter data in the data base, Fischer said.

"We don't want to have to continually provide support," Massad said. "We want to educate and provide people with equipment."

Trying to get equipment donated is a difficult part of Massad's and Glover's job. "We hope that the tax benefits and the feeling of goodwill toward the community will prompt [vendors and others] to give," Massad said.

The men have applied for grants from IBM, Digital Equipment Corp., Xerox Corp. and others, Glover said. He is putting together a letter to try to interest computer retailers in developing trade-in policies for their customers. The traded-in equipment could then be donated to the center and give the retailers a good tax break at the same time, he said.

Combustion Engineering has donated time in its large training center for training a group of 10 people from the New Haven Commission for Equal Opportunity, Glover said. The Commission owned two IBM Personal Computer XTs and some software for four or five months, but nobody in the office knows how to use them, he explained.

Three months ago the two men sent out an assessment survey to 250 not-for-profit organizations. "The response has been overwhelming," according to Massad. "We even had people call and say, 'Where can I pick up my computer?' "

Corporations or individuals can donate materials on an unrestricted basis, meaning that Glover and Massad will decide where to put them to use, Glover said. Or if the donor prefers, donations can be made to a specific organization or a type of agency, he said.

800-343-6474

Hard as we try to give our readers the most complete information available, some good news and feature stories never reach us.

Are you involved in an unusual application of DP technology in your company? Know any unsung heroes? Heard any hot news about vendors?

If so, we'd like to hear from you. Computerworld has established a hot line for information regarding items of interest to the computing community. Call us toll free at (800) 343-6474. Ask for Peter Bartolik, news director.

CORRECTIONS

The correct price of Mathcom, Inc.'s Mathcom Compressor [CW, Nov. 18] is $19,500.

AT&T's homegrown approach to MRPS is called BRPS, the Business Resources Planning System.

The article "Crunch time for software independents" incorrectly listed the name of Computer Associates International, Inc.'s integrated data center management system. It is called CA-Unicenter.

There has been no announcement to date from AT&T regarding an agreement with Ing. C. Olivetti & Co. to produce an IBM-compatible laptop computer as was stated in "Tandy plays hardball in IBM's Personal Computer park" [CW, Dec. 9].

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PAGE ONE ILLUSTRATION BY ALAN D. HOPKINS

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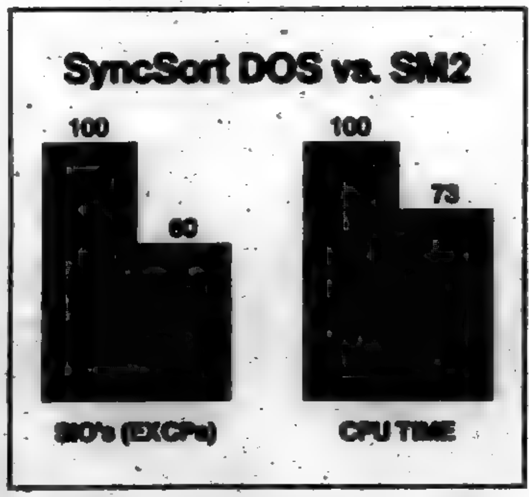

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Firms run into obstacles to insure MIS data

Most believe size of premiums unjustified

By Paul Korzeniowski

Amid the mounting concern over computer security and hacking incidents, a number of corporations are groping with the issue of providing adequate and cost-effective insurance to cover damage to information resources.

"I'm really not very comfortable with the level of insurance coverage we have," said Dan Wertz, risk manager at Boise Cascade Co., the Boise, Idaho-based conglomerate. "We simply try to keep our coverage at a level that is consistent with other companies in the same business."

Executives at Boise and many other companies understand that information represents a key corporate resource, and they want to protect it. But they are struggling to determine how much that asset is worth and how much money should be paid to insure it.

Technical advances opened corporate doors to adolescents equipped with home computers, and in a few celebrated cases, large corporations lost substantial amounts of money. Spurred by those incidents, many corporations examined their insurance coverage to see if such losses were covered. The companies found a void between what their policy covered and what they could possibly lose.

Approximately two years ago, companies such as Lloyds of London and Shand Morahan & Co., an insurance company based in Evanston, Ill., tried to fill this void with a special type of coverage, called unauthorized access or third-party fraud insurance.

William Bramer, currently a security analyst at Arthur Andersen & Co. in Los Angeles, helped to write the Lloyds policy. He said in a recent interview that Lloyds predicted a large, lucrative market would exist for this kind of coverage.

To date, that large market has failed to materialize, and only 70 companies, primarily large financial institutions, have the new coverage. "Companies do not seem to be as concerned about third-party fraud losses as one might expect," Bramer said.

Shand Morahan began to offer its policy a few years ago, and interest has been only sporadic. "There were peaks and valleys," noted Shand's Terri Moss-Lesser. "Interest rose a few months after *War Games* was released. Also, whenever there was a celebrated computer hacker case, we received a lot of telephone calls. At other times, there didn't seem to be much interest."

Shand Morahan, like most insurance companies, did not have a good year in 1985. As a result, the company has stopped writing all new policies. Moss-Lesser stated that Shand plans to write new unauthorized access policies when the freeze is lifted. Insurance analysts said, however, that the company has permanently dropped the coverage because it was not making enough money.

A principal reason for the lack of interest in the new coverage has been its very large premiums. In some cases, they run as high as 1% to 4% of a company's total revenue, according to insurance analysts.

"Most companies do not think that

See OBSTACLES page 5

Staff, system woes tax IRS

From page 1

Lengthy delays in processing tax returns, refunds and correspondence occurred due to various problems with a computer modernization program, which replaced outdated CPUs with Sperry Corp.'s Univac 1100/82 processors running software that was converted from assembly language to Cobol [CW, April 15].

After a major investigation, the U.S. General Accounting Office (GAO) attributed the 1985 processing problems to late delivery of the computers and tape drives, slow Cobol programs written by inexperienced programmers and inaccurate data entry by inexperienced employees.

The GAO also found that computer programs either did not contain good checkpoint routines or contained no checkpoint routines at all. As a result, programs that failed had to be rerun from the beginning instead of from the checkpoints.

At a subcommittee hearing chaired by Pickle, officials testified that the agency has taken numerous steps to fix the computer and management problems that caused the processing backlog. For example, the IRS has rewritten the slow Cobol programs and increased the systems capacity at the service centers with 20 new Sperry computers, officials said.

Several remaining problems

But the GAO identified several remaining problems. The auditors questioned whether the IRS can eliminate its backlog of unresolved tax cases by the end of the year and pointed out that the IRS lacks a central DP office to administer its computer replacement programs.

The GAO also expressed concern that replacements for 14-year-old Sperry front-end processors have been delayed, and additional disk drives and disk controllers will not be delivered until March 1986.

M. Eddie Heironimus, associate IRS commissioner for data processing, responded that Sperry has been "extremely responsive" in providing backup front-end processors when necessary. Concerning the disk drives and controllers, Heironimus said, the extra units will not be needed in 1986.

"I hear you, and I hope you're right," Pickle said. "If not, we're going to have you back up here on the carpet," he said.

The personnel problems, such as low pay and undesirable working conditions, are likely to continue to some degree in 1986, the GAO added. A Sperry audit in early 1985 showed eight of the 10 data centers did not have enough program analysts to oversee computer runs, and many IRS officials complained of inexperienced data entry personnel, the GAO noted.

IRS officials attributed the personnel problems to inflexible work hours, the seasonal nature of the work, unattractive compensation and benefits, job stress due to performance standards and entry-level salaries that were often lower than those offered by local fast-food restaurants.

IRS Commissioner Roscoe L. Egger Jr. confirmed that there is a very high turnover in personnel at the service centers and said the 1986 staff will be very inexperienced. He put some of the blame on budgetary restraints. "For example, we need more trained operators in our computer rooms — 24 hours a day, seven days a week — to fix glitches when they occur," Egger said.

Pickle warned that the recently enacted deficit-reduction legislation, the so-called Gramm-Rudman bill, is likely to force the IRS to take more budget cuts. However, Egger said he hopes the IRS will be immune from such cuts and perhaps will get budget increases since it is the IRS that collects tax revenue to reduce the federal budget deficit.

"Well, now you're engaging in wishful thinking," Pickle retorted.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (6 issues), May (5 issues), June (5 issues), August (5 issues), September (7 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Obstacles to insuring data

From page 4

the premiums are justified," security analyst Bramer said. He added that some of the country's largest banks are so dissatisfied with the high premiums that they are exploring the possibility of supplying their own coverage.

Companies may have a basis for their dissatisfaction. Despite the hoopla about computer hackers, not one of approximately a dozen insurance experts contacted by *Computerworld* could identify a single unauthorized access claim filed in the last few years. Usually, few claims bring low premiums. Yet, this is not the case with unauthorized access insurance.

Most insurance companies are being extremely cautious with the new coverage. "Because the coverage is so new, most companies are unsure of the type of risk that is involved," noted Marv Haack, product manager for electronic information technology at St. Paul's Companies, Inc., a St. Paul, Minn., insurance company. "Insurance companies will not write this type of policy without setting a very high premium."

The technology involved presents another problem. Insurance companies think that evaluating a company's security procedures and determining if they are adequate to safeguard a company's information resources is almost impossible. "With computer technology rapidly advancing, a number of companies just refuse to get involved with this type of coverage," Haack said.

Also, because of recent insurance industry woes, few insurance companies have the revenue needed to add new types of coverage. Those with the cash have been reluctant to increase their types of coverage.

Thus, only half a dozen companies supply unauthorized access insurance, and they are free to set premiums as high as they wish.

The few suppliers carefully choose their customers. Haack reported that St. Paul's offers its coverage to only half a dozen corporations.

To cope with technical change, St. Paul's hires a security consultant to evaluate a client's procedures. The product manager reported that a number of companies mistakenly think that this coverage is a replacement for adequate security procedures. Often, the consultant recommends that coverage not be granted because the potential client's procedures are so poor.

There is also a question of what the new insurance covers. Many companies incorrectly believe that their current disaster recovery insurance policy covers unauthorized access claims.

Most companies have disaster recovery insurance. Typical claims occur when a fire destroys a data center or software malfunctions and accounts receivable are lost. Usually, the policies pay for computer equipment and the time needed to restore the system to its prior operating capabilities.

But if a hacker accessed a system and destroyed a number of corporate files, it is not clear a company's disaster recovery insurance would cover the loss. "No one can be sure," Bramer noted. "That is one of the problems with insurance coverages. There are few clear-cut cases."

Usually, companies find out what their policy covers only after a claim has been filed. When hackers broke into data bases at a financial service bureau a few years ago, an alarm was sounded in that industry and similar corporations added unauthorized access coverage. To date, the financial industry has generated most of the interest for unauthorised access coverage.

Yet, other companies may also be at risk. For example, a competitor could break into a manufacturer's data base and steal its trade secrets. The company may have no coverage.

Analysts said that only when that type of incident occurs will other industries demonstrate an interest in unauthorized access coverage.

Burroughs multiuser units out

DETROIT — Burroughs Corp. continued to round out its line of distributed processing computers with the introduction last week of two models of a multiuser microcomputer that can support up to 12 intelligent workstations.

The B28 features an Intel Corp. 80286 microprocessor running at a speed of 8 MHz, a 12-in. monochrome monitor, two RS-232 ports, a parallel port, an RS-422 port used to connect the microcomputers, Burrough's BTOS operating system and support for up to eight users.

Designed in modular fashion, the system can be expanded, in 1M-byte increments, to include up to 4M bytes of random-access memory; 10M-, 20M- and 40M-byte hard disk drives; graphics terminals; a word processing keyboard; and support for 12 users. The B28-MCP works with an Intel 80287 math coprocessor and can process floating-point calculations 40 times faster than the base model.

The product can run application software designed for other Burroughs machines. On the low end of the product line, Burroughs B25 supports up to five workstations. At the upper end, the company's XE 520 workstation works with up to 64 microcomputers.

The price for a B28 equipped with an 80286 microprocessor, BTOS, a 12-in. monochrome monitor and the various ports is $5,130.

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MIS wish lists may go unfilled

From page 1

communications standards," Luciuk, manager of systems and services for Exxon Corp.'s Communications and Computer Science Division told *Computerworld* in a year-end survey of computer managers designed to ascertain their expectations for the coming year.

"That won't happen in 1986, though," he added. "We want compatibility on a corporate basis, but there are a lot of local reasons for choosing a particular vendor. The trick is finding some basic compatibility to interchange documents," Luciuk said.

'Like an erector set'

Dan Cavanagh, senior vice-president of DP at Metropolitan Life Insurance Co. in New York echoed that opinion: "Some of the products that are out there now do part of the job of networking micros to each other and to the mainframe, but it's like an erector set. My Christmas wish is for someone to put the parts of the erector set together for me."

The specter confronting Luciuk, Cavanagh and their colleagues is variously described as the personal computer revolution, the rise of end-user computing, the search for network solutions, or — the MIS managers' seeming favorite — effecting distributed processing.

Whatever the label, the heavy burden of solving the connectivity puzzle has been blamed by analysts as the cause of the 1985 computer industry downturn and cited by MIS managers as their most formidable challenge of 1986.

Key to solving the challenge, said Tim Gallagher, MIS director at Nashua Corp., in Nashua, N.H., is hardware independence. "My wish is for a single workstation that could access the network through software and be transparent to the end user. IBM's Systems Network Architecture is getting there, but unfortunately it's not cheap, and you still have to upgrade your control unit to use it," Gallagher said.

The network solution Santa Claus will most probably come wearing IBM-blue pinstripes or some other major corporate attire, according to Bob Capone, senior vice-president and director of technical operations at J. C. Penney Co. in New York. "It has to be done by the IBMs, NCRs and AT&Ts of the world," Capone said. "It's not just a simple software solution, and it won't be solved overnight."

Capone said he is encouraged by a greater industry focus in the right direction, which he partially attributes to the 1985 computer slump. "The need has really been there all along, but vendors have given it more attention this year," he said. "If we had had better communications solutions, we would have bought more this year, particularly in the personal computer area. The lack of that capability has certainly acted as a deterrent for us."

Most users hailed IBM's recent Token-Ring network announcement, although more as a step toward a micro networking standard than for the attributes of the IBM product itself. "I think it will become a de facto standard like Systems Network Architecture," Cavanagh said. "Some vendors who were not sure what they would do will at least go ahead to be compatible with it."

While many MIS departments face the challenge of implementing the best network technology to satisfy micro user demands, Tom Ardell said he has the opposite problem. Ardell, manager of computer services at John Deere Co. in Portland, Ore., said his shop has incorporated IBM and 3Com Corp. technology into micro-to-mainframe and local-area network solutions, but the micros still sit unused on employees' desks.

"It's the old adage — you can lead the horse to water, but you can't make him drink," Ardell said. "We've micro-mainframed, local-area networked, personal computered and word processed, and so what? The vendors have done their part; more user response is what we need."

Things are very different at Agway, Inc. headquarters in Syracuse, N.Y., where MIS Director Bob Woodrow's new year involves what he calls "the most significant technological step this company has ever taken." Woodrow will soon choose among five vendors for a distributed processing system to connect about 2,000 micros in Agway's 1,200 stores in the Northeast.

"We've been preparing and gearing for it for several years, but recent changes in hardware price/performance make this the time to buy," Woodrow said. "Once it is installed, the real challenge is one of proper training and education of the users."

Equaling or exceeding networking solutions on some MIS managers' wish list is a significant leap forward in fourth-generation language and software productivity tools. Most users agreed that fourth-generation languages have not yet met either their own needs or software vendors' promises.

'We lust for productivity aids'

"We lust for productivity aids in the software arena," said George DiNardo, senior vice-president for information management and research at Pittsburgh's Mellon Bank. "We spend a fortune here chasing them. "All the talk about fourth-generation languages is a lot of smoke. We're looking at a $15 million to $20 million rewrite of our 13-year-old trust system, and there's no product out there to help us enough to justify its price."

Front-end, natural-language user interfaces also appear to be a hot item users will be seeking in 1986.

"We don't expect our top executives to learn new query languages," said the head of information services at a Boston-area high-tech and defense firm. "Artificial intelligence is an idea whose time has come, but its implementation leaves something to be desired. We've developed many things on Symbolics, Inc. systems, but we're a little disappointed with the slow pace of the rest of the industry."

"The fourth-generation languages that exist today are just relational data bases with utility tools," Gallagher said. "The user should be able to type the word 'sales' and get a sales chart on the screen; we need to define data files, integrate new fields and change formats, all in English. There are some packages that do pieces, but you need a pure fourth-generation language to tie it together. And it must bridge from existing structures like CICS so we don't have to build from scratch."

Also high on Gallagher's new year's wish list is a better pool of job candidates for technical analysis and applications development. For people coming out of college now, their computer science degree "might as well be history or math," he said. "The colleges don't develop technicians; we're more likely to see people on their way to an MBA degree. We have to trudge our way through the development cycle."

For the Gas Company of New Mexico in Albuquerque, the new year will bring a complete rewrite of the utility's 8- to 10-year-old applications, most of which were developed in-house. MIS Director Barbara Weaver said that her firm is evaluating several productivity tools to help them do that, including Pansophic Systems, Inc. Gener-ol; IBM's CSP; and other CICS-type tools.

"We have to do a lot of fire fighting," she said. Weaver's challenge includes a potential future integration with the systems of Public Service Company of New Mexico, which recently acquired the gas firm.

'Best solutions have not been created'

At California First Bank in San Diego, Merrill T. Miller Jr., senior vice-president of central operations, is wrestling with his industry's increasing dependence on continuous on-line services. "The best solution now is to off-load [from the bank's IBM 3083 and 3033] to a fault-tolerant front end such as a Tandem Computers, Inc. system, but I don't particularly like that idea," Miller said. "I'd like to have it all in one system. In my judgment, the best solutions have not yet been created."

Whether in banking, insurance, manufacturing or other industries, the issue that will continue to confront nearly all large DP installations is the management of distributed processing.

For Exxon's Luciuk, who refers to his end users as customers, that trend has fundamentally changed the nature of his job.

"Our role is gradually changing into being consultants to our customers," he said. "Distributed processing is forcing us to deal with far more vendors and options, and we have to know that those vendors will be around in three or four years. It's too easy to select the solution of the month, and then you've let an orphan into your shop. A better understanding of where the market is going is more critical than ever."

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Oil firm merger: High-test mix

From page 1

The former Getty DP operations in Tulsa, Okla., were expanded to serve as development and production centers for corporate and international users, and Texaco's Bellaire location in suburban Houston was reorganized as a production center for domestic operations. Both now have information centers as well.

The migration paths for work loads, data sets and mainframes from center to center resembled "an elaborate checker game," Hutzelman added. "We started with one new IBM 3084 mainframe in Tulsa and moved some work up for that machine. That freed up another machine, and then we found some work to move to that one, and so forth. For the next nine months, we were involved in moving things around piece by piece."

The strategy called for consolidating mainframes and applications from three Getty computing locations — Los Angeles; Briarpark, Texas; and Tulsa — with those from three Texaco DP facilities, all in the Houston area. The merged companies' 18-month plan for integrating systems began in July 1984, with the majority of migrations completed by year-end 1985.

While embarking on this complicated migration of data sets and mainframes, Texaco's information center in Bellaire became one of the first to install an IBM 3090 Model 200 mainframe. A total of four 3090s were installed within a few months at the two data centers in Tulsa and Bellaire, replacing IBM 3080 and 3033 AP processors.

With IBM's announcement of the 3090 mainframes in February, Texaco DP management decided the new technology would be a cost-effective replacement for several 3080 systems. "Since we had developed such an extensive plan for moving equipment and data around, we just got everyone who was involved in planning back together to decide the best way to use the new equipment," Hutzelman said.

The Sierra models offer vector processing capabilities, but Texaco DP managers had not yet decided to exploit that option. If they do, vector processing would be used for seismic studies and refinery modeling applications.

Texaco is considering upgrading the 3090 200s to quadratic processor Model 400s when those systems become available in late 1986, although Hutzelman said no definitive plans have been determined.

IBM eliminated "most of the trauma" in communicating with the 3090s, said Mike Jones, manager of capacity planning and hardware evaluation. "The main difference [between the 3090 and the 3080 series] is in the channel connection. The channels are not lined up exactly as they were on the 3081, so you cannot use the same hookup arrangement. Because of that, it's important to use backup channels if something happens to go wrong. But that's a very minor change."

Two tasks to accomplish

Before the checkerboard migration of DP operations could begin, two things had to be accomplished, according to Hutzelman. First, Getty's computer center in Tulsa was expanded to serve as one of the two main DP centers for the combined corporation. Second, a communications network was installed so the end users of both companies could access information from any processor within the merged corporation's network.

The 10,500 sq-ft computer room in Tulsa was expanded to 24,900 sq ft to accommodate the additional hardware, according to Jack Anders, manager of systems coordination and computer center migrations. The Tulsa facility was chosen as a DP center because it was "an excellent building with good facilities and was well located with good communications and power grids," Anders explained.

In addition, Getty's Tulsa center provided Texaco with a needed backup facility outside hurricane-prone Houston. "With that in mind, we decided we should expand the former Getty computer center so that it would be capable of being one-half of our total computing resource requirement," Anders said.

Getty had a "very capable group" of DP personnel in Tulsa, he added. "With the high cost of relocating people, it seemed a good idea to move the work to them rather than vice versa."

Construction schedule drafted

A 13-month construction schedule was drafted to expand the Tulsa center, with the first 3084 mainframe migrated from Houston over the 1984 Thanksgiving weekend. "Between July 13 and Thanksgiving, we completed 13 months of construction with various contractors to get the center ready for the first mainframe," Anders said.

To protect the expanded Tulsa center from such DP catastrophes as power outages, a 2,000-kVA uninterruptable power supply system and 3,000 kVA of diesel generator automated backup power were installed. These systems offer detection devices that determine when and if power has been lost and for what duration, and they provide backup power as well.

Aside from expanding the Tulsa center, establishing communications links between the Getty and Texaco terminals was another primary consideration. "The objectives were first to provide minimal connectivity for selected users and then to develop a plan that would allow any terminal to get to any processor anywhere in the network," according to Carlton Wilbanks, manager of data communications.

The first step was to install a

See Oil, page 9

Texaco, Getty blend DP [illegible]

[illegible] merger between Texaco Inc. and Getty Oil Co. in [illegible] 1984, Getty had operated two corporate DP centers (in Houston and Tulsa, Okla.) as well as a systems test facility in Los Angeles, with a total of some 1,000 terminals.

The Houston production center housed an IBM 3081 Model K in an [illegible] TSO and Software AG Adabas environment for production and [illegible] applications. The Tulsa center supported an IBM 3081 Model K and an IBM 3033 Model UP in TSO, CICS and batch processing environments for [illegible] and manufacturing applications. [illegible] applications from Getty's IBM 4341 in Los Angeles were [illegible] to the IBM 4381 at Texaco's Regency Square facility in Houston.

Getty's DP operations ran under IBM's [illegible] operating system and were linked by [illegible] network [illegible].

At the time of the merger, Texaco operated a total of four data centers within two Houston locations — downtown and Bellaire — in addition to the systems testing facility at Regency Square, a total of approximately 7,000 terminals. At the downtown offices, an IBM 3081 Model K and two IBM 3033 Model APs supported a TSO and IMS environment development center. An information center at the same location was supported by a 3081 Model K and a 3033 Model AP in a TSO and Model 204 data base management system environment.

At Bellaire, the production center had an IBM 3084 and an IBM 3033 Model AP for IMS marketing and production applications. The interactive end-user center was supported by an IBM 3084 and a [illegible] [illegible] environment. [illegible] operating [illegible] network.

The migration project is scheduled to be completed by early 1986, with the last major phase — migrating development applications once performed on the 3081 Model K and two 3033 Model APs downtown to the 3084 in Tulsa — to be completed by year's end.

When complete, the configuration of Texaco's merged DP operations will include the following: In Tulsa a 3084 with a TSO, IMS and batch environment [illegible] development center, an [illegible] 200 for IMS and batch production applications and a 3090 for the corporate and international information center TSO and APL users.

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Oil firm merger: High-test blend

From page 8

communications network to solve the problems of addressing incompatabilities and capacity constraints for end users. Both companies had operated under the IBM Systems Network Architecture (SNA) environment, "which was a real plus" in communications planning, Wilbanks said.

The bad news was that the SNA environment allowed a limited number of lines per processor, and "we were far above that limit on at least five of our front ends," said Ron Curtis, manager of communications software. "So we had to off-load lines from 3705s and 3725s to other front ends to go below that limitation, plus bring in some new 3725s," he added.

Duplications were discovered among CPUs when the Getty and Texaco networks were linked. During a July 1984 weekend, both SNA networks were shut down and new Network Control Program and VTAM system generations were loaded into every communications controller and CPU in both networks. Once loaded, a new integrated network that allowed users access to any network processor was activated.

> **99**
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> ***'The intent was when users came in on Monday morning, they would not even know the migration took place.'***
>
> — Kirby Sternfels
> Texaco, Inc.

Once the networks were compatible, two T1 carrier systems were installed to provide sufficient bandwidth. All front ends were equipped with the ability to run Multisystem Networking Facility ties between the two networks via two 56K bit/sec. communications links.

"Once we put the network together, we were hitting the limit on the number of CPUs we had to network," Curtis said. "We had so many CPUs and front ends that we had come to both limits. To help us get out of that problem, we are planning to implement Extended Network Addressing software."

Application migrations followed in the wake of mainframe realignment. To accomplish this with a minimum of complications, data sets were assigned a weekend migration date. End users were then asked to identify their data sets and to determine if and when they could be moved before the assigned date.

"We made the assumption that a good amount of all data had not been accessed in the last 30 days. That turned out to be a good assumption and allowed us to move data ahead of time," according Kirby Sternfels, manager of change control.

Up to 90% of all TSO data to be moved on a particular weekend was already in the receiving center by Friday afternoon, at which time the appropriate users were asked to log off for a final data pickup. On Saturday, the data was reloaded at the receiving center. Several key Corporate Information Service Department programmers and end users came in Sunday to test the system for problems before Monday morning logon.

The data was loaded onto magnetic tapes and sent by air courier service from Bellaire to Tulsa, and vice versa, at different times. "It was a continuous process. As we sent up data daily and over the weekend, we sent it on three different planes with someone there to meet the planes," Anders added.

"The intent was when users came in on Monday morning, they would not even know the migration took place. Generally speaking, we were fairly successful at doing that. The key was to move the data ahead of time as much as possible," Sternfels said.

TOP OF THE NEWS

NEWS from page 1

in the current fiscal year.

■

Voting control over Eagle Computer, Inc. will be held by a South Korean firm by the end of March if provisions of a financial deal announced last week are met. Eagle said Korea Electronics & Co. will acquire voting control through a new issuance of preferred stock. The deal hinges on Bank of America's willingness to accept preferred stock in exchange for $4.4 million of long-term debt and on Eagle obtaining a cash infusion of $2 million.

■

The major tax reform bill approved last week by the U.S. House of Representatives would kill the 10% investment tax credit, which may raise slightly the cost of buying or leasing computers. The bill had modest support from the computer industry because it would allow a 20% credit for R&D expenses for three years, retain five-year depreciation for computer equipment and cut the top corporate tax rate to 36%.

■

Honeywell, Inc. will come out with its first 32-bit virtual superminicomputer by the middle of 1986, according to Eugene Manno, group vice-president of Honeywell's Small Computers and Office Systems Group.

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FCC approves X.25 conversion services

By Bryan Wilkins

WASHINGTON, D.C. — New Jersey Bell was recently granted approval by the Federal Communications Commission for its X.25 protocol conversion service. The subsidiary of Bell Atlantic Corp. will market the service to computer firms and microcomputer users.

The FCC had held up its approval of the X.25 protocol conversion tariffs filed by New Jersey Bell, Bell South Corp. and Nynex Corp. while it reviewed complaints and motions to delay filed by other value-added carriers such as GTE Telenet Communications Corp.

The other carriers contested the telephone company's security controls over customer proprietary information as well as its other aspects of pricing and configuration.

Private value-added carriers depend on local telephone companies to deliver their services to end users, and the carriers say they are alarmed by the entrance of the telephone company into the packet data field. They assert that the marketing forces of telephone companies can learn about their clients' data communications needs and target them with their own sales forces.

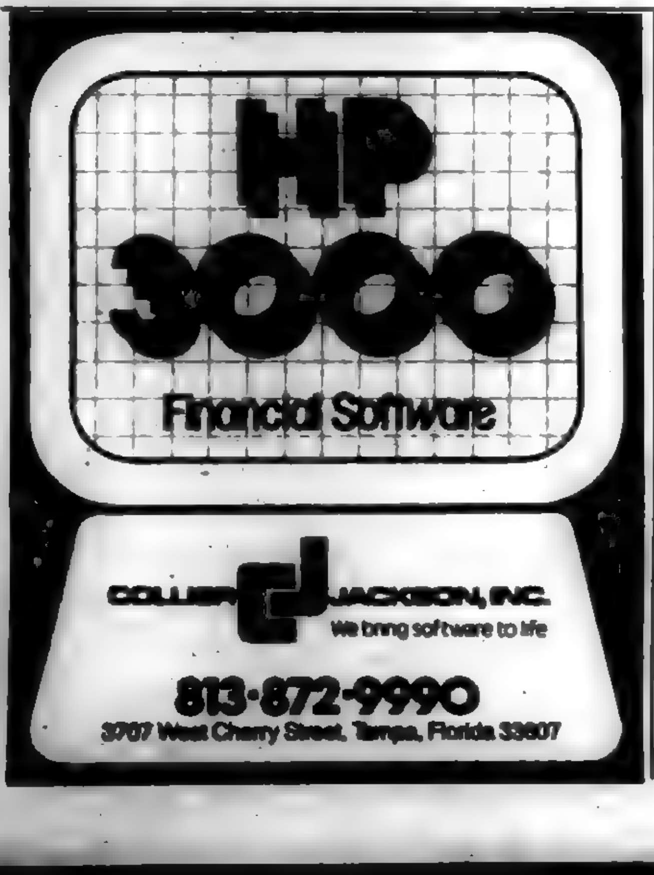
The FCC upheld the view of the private value-added carriers and demanded the separation of accounting, billing and customer information within telephone companies for packet-switching service and voice service. The FCC accepted New Jersey Bell's plan to mark its customers' accounts and billing records with a symbol identifying the records that cannot be viewed by sales personnel marketing X.25 conversion services.

Additionally, the FCC accepted New Jersey Bell's plan to mark with a symbol customer billing records associated with long-distance carriers and information service providers, such as data base services, that may also use X.25 protocol conversion. Sales personnel at the telephone company will have to sign nondisclosure statements and affidavits pledging to abide by the rules.

New Jersey Bell said its rates for its local packet-switching service would be 4 cents for the first minute plus 1 cent for each additional minute for the basic charge as well as 40 cents per kilopacket for the usage charge. These rates would apply mostly to residential users.

Larger users would pay a charge of approximately $27 per month for basic service at 1.2K bit/sec., $48 per month at 2.4K bit/sec., $75 per month at 4.8K bit/sec. and $105 per month at 9.6K bit/sec. Usage charges will range from 40 cents per kilopacket for volumes up to 2,000 kilopackets per month to 32 cents per kilopacket for volumes of more than 6,000 kilopackets per month.

AT&T regional holding companies and their local telephone subsidiaries said that they expect demand for their public packet-switched X.25 service to develop gradually. The New Jersey Bell X.25 protocol conversion tariff approved by the FCC is slated to go into effect Dec. 23, Bell Atlantic said.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Users attack 1-2-3 move

From page 1

to injury.

Lotus charges $150 for single-copy upgrades, $125 each for upgrades of 100 or more copies and $100 each for upgrades of 1,000 or more copies. Release 1A copies bought within the past six months are upgraded free.

"Our bulk purchase was only a little more than twice the price of the upgrade," said Karl Kendall, Metropolitan Life Insurance Co.'s New York manager of microcomputer support.

Several managers also complained that they would prefer to go through their dealers rather than directly to Lotus because dealers might offer more attractive pricing on an upgrade. But dealers "just don't want to deal with it for that kind of money," said Lotus Sales and Service Vice-President Stephen Crummey.

MMA's Gross estimated the cost of upgrading 500 copies at $625,000 and 750 man-hours — figuring $125 each for copies, a half hour to install each copy and another hour to convert files — which is accomplished by simply storing them under the new program.

Gross is currently supervising dual installation of 1-2-3 Release 1A and the new Release 2 on his company's hard disks "with very strong warnings to users to use 1A." Moreover, he added, "We're trying to avoid upgrading, at least temporarily."

A Lotus spokeswoman said that upgrade response is "above projections," but that the company knows that not all users will eventually upgrade, though it encourages them all to do so.

"It's new technology, and it's where we're going with the product," she said. "But we also wanted the new product to be very familiar. It's still good old 1-2-3."

Steven Roth, manager of decision support systems for Manufacturers Hanover Leasing Corp. in New York, said he almost wishes the new 1-2-3 was not so familiar. Lotus justified the price by saying, " 'This is like a new product,' " he noted. "If it is, let them call it 1-2-4 and let us continue to buy 1A."

Roth further charged that Lotus does not realize — or care about — the implementation problems that an upgrade can create for major customers. "It's making more work for us until everybody's on one version," he said. "The companywide stuff is going to have to be on 1A. We're going to have to go for the lowest common denominator. That's a pain because there are some nice new features in Release 2."

"The problem is, what is the alternative?" Lotus' Crummey asked. "As technology moves ahead, we have to stay with it."

Crummey emphasized that "we do not intend to abandon 1A customers at all." He also listed the special upgrade arrangements for corporate customers, including discounts and the ability to destroy old copies rather than ship them back to Lotus.

Manufacturers Hanover Leasing's two dozen Digital Equipment Corp. Rainbow users that are stuck with Release 1A are "dropped in the ocean," Roth added. Crummey replied that the company will upgrade versions for other selected systems eventually, with DEC and Wang Laboratories, Inc. micros among the most likely candidates.

> ***'Lotus has always been a little arrogant. It seems to think the personal computer was built for Lotus.'***
>
> — Karl Kendall
> Metropolitan Life Insurance Co.

McDonnell Douglas Aerospace Information Services Co. Senior Section Manager Richard Nelson said he dreads upgrading 3,000 users and crates of archived data.

Gross said the MMA wants Lotus to reconsider its upgrade policy.

"They should've left the original on the market for six to 12 months so the corporations could evaluate and ease into the new version."

He is not optimistic that his crusade will change Lotus' mind, but hopes other software companies will take note and perhaps strengthen their alternatives to 1-2-3.

Many other packages now can read 1-2-3 files, Metropolitan's Kendall commented. Metropolitan's large Supercalc user community may grow thanks to Lotus, he added. "Lotus has always been a little arrogant. It seems to think the personal computer was built for Lotus.

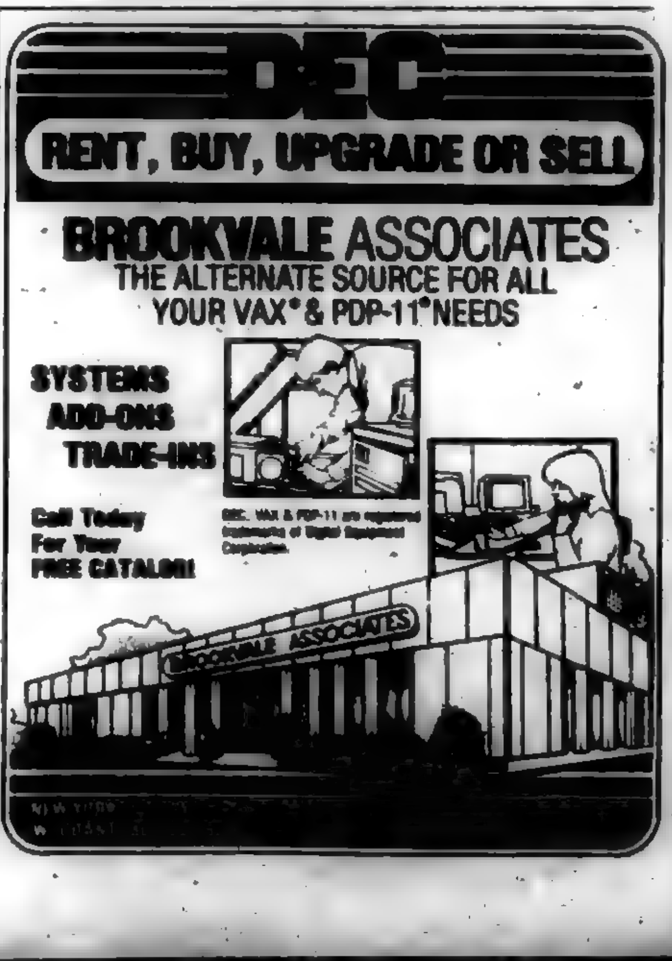
"Upgrades are a hard pill to swallow as it is without having to deal with mandated updates and difficult pricing policy," he added. "And it doesn't do the corporate support people any good.

Roth echoed the charge. "Lotus is taking unfair advantage of a very loyal user community," he said. "It's a pompous act. I'm disappointed. The whole thing leaves a bad taste in my mouth. Adam Osborne, where are you?"

More than a few of Roth's counterparts said they are calling Osborne's software outlet, Paperback Software, Inc., to evaluate its low-priced 1-2-3 look-alike, VP Planner.

Osborne declined to give names, but said he has demonstrated VP Planner to more than 100 corporations since its introduction in October and has entered site licensing and volume purchase negotiations with several businesses. VP Planner actually goes beyond 1-2-3, combining a spreadsheet and data base manager and is priced at $99.95.

Osborne promised upgrades will "read 1-2-3 Release 2 files, but write Release 1A files. . . . We feel 1A will remain the industry standard."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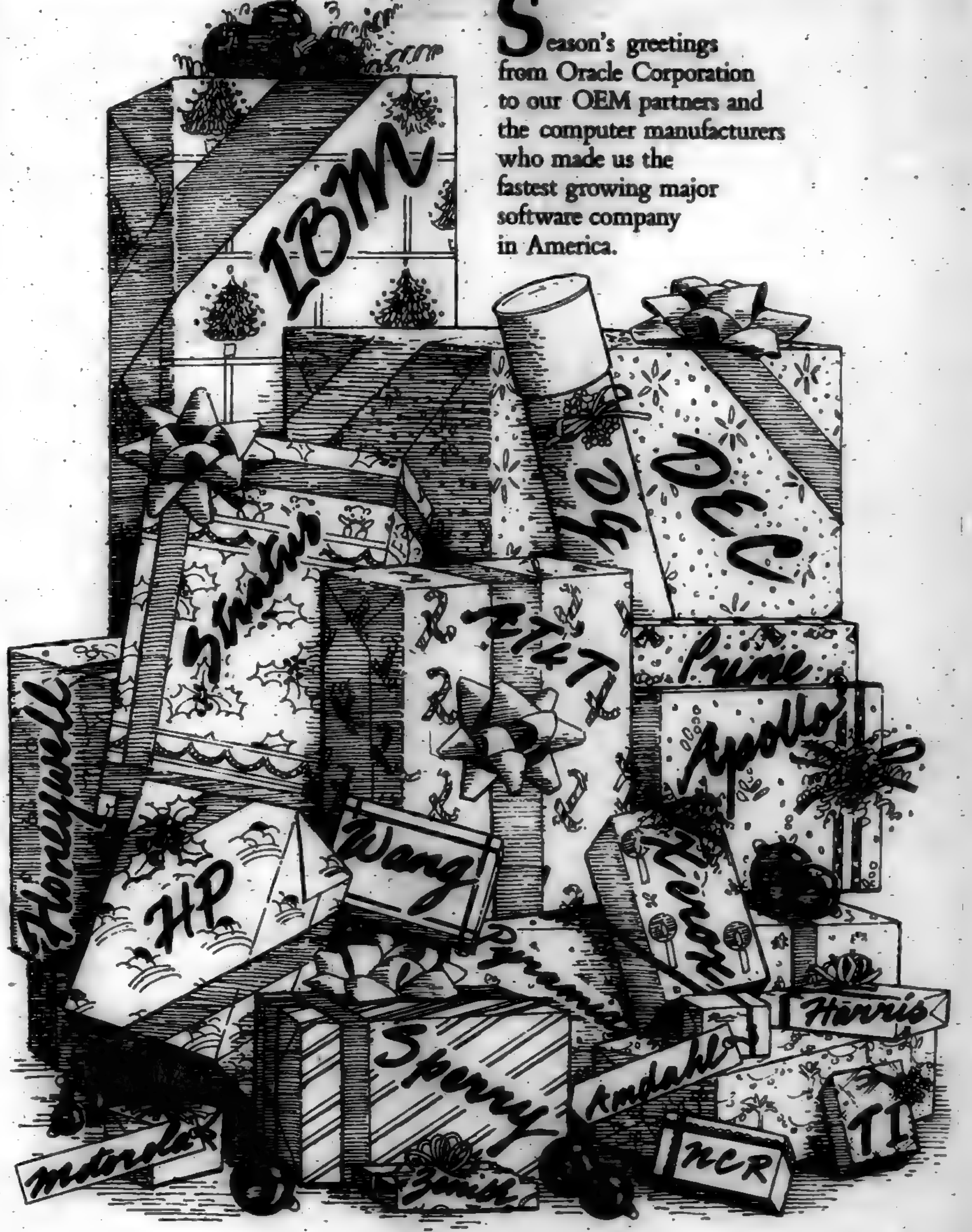

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VIEWPOINT

EDITORIAL

The best and worst of times

The temptation all along has been to label 1985 as a disaster, perhaps the worst single year, economically, in the history of the U.S. electronics industry.

The semiconductor slump turned into an everything slump. Thousands of employees at such bastions of fiscal stability as Wang Laboratories, Inc., Honeywell, Inc. and AT&T were laid off. Financial reversals in the micro market hit hard at such one-time highfliers as Lotus Development Corp., where growth slowed dramatically, and Apple Computer, Inc., where founder Steve Jobs was judged out of step with a maturing market and was kicked first upstairs and then out the door.

But preoccupation with vendors' balance sheets is both risky and wrongheaded. Such an attitude tends to ignore the continuing vitality and energy present beneath the surface of an industry that continues to experiment, develop and otherwise explore the far frontiers of electronic technology. Indeed, the past year was rife with major developments that will have direct impact on the professional lives of those in the DP community.

Most major mainframe and supermini manufacturers either introduced or began delivering their next-generation machines — for example, the IBM 3090 Model 200 and the Digital Equipment Corp. VAX 8600.

The International Standards Organization's Open System Interconnect (OSI) network architecture model took a giant step forward when IBM opened an OSI research facility in France and announced OSI support up through the middle layers.

IBM's Token-Ring network debuted and thus ratified the local-area network market.

Intel Corp.'s 386 chip was finally introduced, providing the engine for a new generation of small footprint computing devices.

DEC's Microvax II set new industry standards in the race to put more power on a chip.

Palladian Software, Inc. and Applied Expert Systems, Inc. delivered where others had only promised, unveiling the first commercial expert systems for business applications.

The murky outlines of IBM's integration strategy became clearer thanks to developments in LU6.2 and the Distributed Office Support System (Disoss). Vendors such as DEC and Data General Corp. announced Disoss compatibility.

New code restructuring products and services permitted users to unscramble spaghetti code.

After nearly a decade of debate, Cobol 85 was finally approved, making that venerable language a far better tool, particularly for large DP shops.

General Motors Corp.'s Manufacturing Automation Protocol gained vendor and user support, and Boeing Computer Services Co. introduced a similar user-driven office standard, the Technical Office Protocol.

Although the above list is not all things to all DP professionals, it indicates that even during an industrywide decline, the computing world moves staunchly ahead. Corporate America has far too much invested in information technology to stop and wait while overly optimistic — and perhaps misdirected — vendors sort through their bottom-line woes. If 1985 proved anything, it proved that technology is user driven. This lesson may serve everyone well as the second half of the decade begins. Happy New Year.

LETTERS TO THE EDITOR

DPMA exec defends group's efforts to influence DP-related legislation

During the past two years, the Data Processing Management Association (DPMA) has made computer crime one of its main focal points in government affairs. However, the editorial "Security alert" [CW, Nov. 25] contends that the DPMA has been neglecting its responsibilities to the data processing field by not participating in the interstate debate on computer crime that has developed in the U.S. Congress.

No organization's activities and successes receive total coverage in the press. Your readers need to know that the DPMA has played and is playing a significant and influential role in shaping national policy and thought.

As the largest association representing the information management profession worldwide with nearly 50,000 members, the DPMA is highly concerned with public policy issues affecting the industry. When an issue arises, the DPMA first develops and adopts a formal position statement that represents the opinions of DPMA members. After such a position statement is adopted, an organized effort is made to let that position be known in Congress and in state legislatures.

Such will be the case in 1986 as DPMA members introduce the DPMA's position on VDT legislation to lawmakers in all 50 state capitals and in Congress. Additionally, the DPMA has proven to be a valuable resource to lawmakers in terms of its expertise and large representation of the data processing profession.

The same holds true for DPMA's activity on computer crime. DPMA members have participated in congressional hearings in the past, and efforts last year were geared toward the drafting of the model act, which is applicable at the state and federal levels. DPMA's Model Computer Crime Act addresses the need for comprehensive laws in all 50 states as well as the problem of interstate crimes. When officially adopted by the DPMA in 1986, the model act will be introduced to state legislatures and Congress.

A number of key legislators have already expressed an interest in DPMA's Model Computer Crime Act. Individuals with experience in computer crime legislation around the country are being requested to review the second draft of DPMA's document; changes for the final draft will be based on input from that review process. The DPMA will continue its efforts in representing our membership in a wide range of concerns affecting the profession, business and society.

Eddie M. Ashmore
International President
DPMA
Park Ridge, Ill.

Prototyping still key to productivity despite fourth-generation claims

The article "Language barrier: The fourth generation at work" [CW, Nov. 11] highlights a widely held misconception in our industry: that fourth-generation languages are the key to productivity.

Prototyping is the real key to productivity because it is the only way to ensure that the system being developed will meet the user's needs. Having to retrofit a system after failing acceptance testing costs more than a fourth-generation language could ever save.

With prototyping, you correct the requirements analysis early in the design phase by allowing the user to see exactly what the final system will look like. Because most users do not have data processing expertise, you can hardly expect them to understand what the system will look like until they see it and work with it.

Just ask James Martin. He will tell you that you are better off with a good prototyping tool than a fourth-generation language even if you had to write the whole system in Cobol based on the specifications from the prototype.

All of this controversy about the inefficiencies of fourth-generation languages reminds me of a consultant I know who was asked to help out a 30-member project team at one of the Big Three automakers. They had designed a system to configure cars based on the historical demand for different options. Unfortunately, their system produced cars with three backseats and six tires. After a month of work, he came up with a design for a system that really worked, only to be challenged by the 30 people who stated that their system was more efficient.

If we cannot get the specifications right, who cares about efficiency?

Jan [illegible]
Technical Support Officer
Synerlogic, Inc.
Ardrossan, Alberta

VIEWPOINT

Matching personalities to jobs

MANAGEMENT MATRIX

By Walter F. Cuirle

Overheard at the next table during a dinner meeting was the following conversation;

"It's ridiculous. I might as well quit trying to do long-term projects and open up a school for programmers. Turnover is running something like 20% lately; it seems that no sooner do I get new hires up and in harness than they're gone."

"So how does your boss feel about it?"

"He understands. He's concerned, but he understands. We're going to try to play with the salary structure, and we just got the money approved for that. We think it will help."

"You're lucky. Charley over there is afraid he'll wind up on the street because his 12% turnover is significantly above the company average. Say, if you're looking for . . ."

It's almost an article of faith that low employee turnover is better than high employee turnover. The problem lies in finding a realistic figure for acceptable turnover. If a company is in high-tech goods or services, it probably has similar employee problems. Management in such a company is likely to be understanding and will probably be willing to work with the MIS director and other department heads to correct the problem.

It is likely to be a different story in a company where MIS is just part of the internal support services. There, the role of MIS is important but secondary. If employee turnover is out of line with the rest of the organization, then it's predictable that in some cases upper management will blame the MIS supervisor. After all, if other departments can keep their people, why can't MIS?

It seems that the support and attention you get for this problem is proportional to the weight that MIS has in the organization. The corollary to this is that there just doesn't seem to be any one percentage that everybody will agree is normal for employee turnover. Whatever it is, most managers would like to see it lower.

One place to start is at the interview. Let's set salary considerations aside for the moment and look at the people. Most managers ask about the prospective employee's goals and experience. What about talents? Do you know what your potential employee likes to do and is good at doing? Careful, now — these talents may or may not match the experience shown on the resume. Once you know the kind of work someone likes to do, you can tailor assignments to match. It can be a powerful motivator.

It's hard to match talents in the context of traditional staff titles. After all, it doesn't mean much to say that someone likes to do senior systems analysis. Staff titles are a convenient shorthand for comparing experience, responsibilities and salaries from company to company. It doesn't tell you much about whether or not the person was any good at the job, let alone whether or not he actually liked the work.

Look at the job of creating software and systems from a different, broader point of view. If software is a tool, then at least three different types of people are involved in its production: tool users, tool designers and tool makers.

The tool user has a talent for seeing how a system should look from the point of view of the end user — your client. The value of this talent is most visible in the problems that develop when you don't have a good tool user on staff.

You've been here before — your staff does its homework, develops a good set of specs and gets the end user to sign them off. You put the new system in place, and then the complaints start: "This field ought to be in the upper right corner of the screen"; "We don't use that abbreviation, we use this one"; "Why did you put the menu in that order?"

It's no wonder you hear MIS people complain that end users don't know what they want. A tool user knows what the system can do and enjoys figuring out how your end users do their work and what the best way is for a system to support it. This is a talent for optimizing the user interface.

A tool designer gets the most enjoyment from painting a system in broad strokes. At this level, that carefully crafted user interface is just so much I/O. It isn't so much that the interface isn't important to the designer, it's just that there are far more interesting things like choosing the best file type and structure and language for the job. The designer's interest wanes when it is time to start coding. Code they can, if code they must, but your designers would rather leave that last step to someone else.

That someone is the tool maker. Here's a person who would rather code than do anything else and takes pride in attention to details that no one else is ever likely to see. When a project is going full tilt, the typical tool maker stereotype is the programmer in the corner who you have to kick out at the end of the day, the one who says, "Wait, I just want to try one more thing."

You can see these three different personality types in other endeavors. Building a house, for example: interior designers and landscape people share the personality of tool users; architects and structural engineers are like the tool designers; bricklayers, carpenters and paperhangers are similar to the tool makers.

The whole idea is a simple one: people will stay with work they like to do. If this is so, it might be worth your while to match up the available work with people who really like to do it rather than just people who can do it. It's worth a try. Who knows? You might even find somebody who likes to do maintenance.

Cuirle is a senior associate with Nicholas DeMaio Associates in Bryn Mawr, Pa.

Making the case for free trade

READER'S PLATFORM

By Scotty McArthur

The strongest arguments in the heated debate over U.S. trade policy concern, naturally, what decisions would be best for the American consumer. Protectionists in the U.S. Congress urge import quotas and tariffs to guarantee jobs. President Reagan, however, insists that such trade barriers would raise prices but would not forestall the adjustments needed by our older industries.

The billion-dollar annual cost of protecting the textile industry and the hundreds of dollars added to U.S. car prices by limiting Japanese imports are well known. What has not been addressed by either side is the impact of protectionism on the millions of consumers who use computers and high-tech components daily.

Journalists chronicle the computerization of America — the revolution in mass markets, corporations and government bureaucracies caused by technological changes in everything from welfare to airline tickets. Economists, in turn, explain that the cost of computing power has declined annually at 13% for 15 years, pushing up industrial productivity.

More difficult to examine, however, is the vast contribution that microelectronics has made in savings to small businesses and to the home.

There are now 8.8 million personal computers in the country that are used for routine tasks such as store inventories, education programs, farm management and tax returns. Moreover, nearly all of our household appliances such as washing machines, toasters and ovens use high-tech components that were unimaginable only a decade ago. It is on this personal level that the remodeling of the U.S. culture and its lifestyle is really occurring.

> ”
>
> ***The protectionist measures proposed in Congress would increase computer prices and impede consumer access to the newest technology.***

Yet the protectionist measures proposed in Congress would both increase computer prices significantly and impede consumer access to the newest technology. Such severe consequences would result from restrictions placed on the essential "foreign-sourcing" of the parts and components that go into U.S. computer products.

U.S. high technology is the most competitive in the world. This is due in large part to the globalization of the U.S. computer industry, meaning that parts are bought or manufactured by U.S. subsidiaries in foreign countries such as Singapore, Hong Kong, Ireland and Japan.

The result has been products of the highest quality and the lowest prices from an industry that has increased its own employment annually at 10% since 1978 while helping to create six million new jobs in the U.S. since 1981.

A computer price hike would be only one effect of new tariffs and quotas. It would be followed inevitably by foreign retaliation against U.S. exports, a blow to U.S. high-tech companies that derive half of their revenues from foreign sales.

Moreover, the price changes would steadily undermine U.S. leadership in research and development because immense R&D costs can only be met if the industry remains competitive in the global marketplace.

Conceivably, large U.S. companies could eventually absorb the new costs of computers and afford to depend on high-priced foreign technology. The impact on consumers and on small businesses, however, would be dramatic.

Higher prices and less accessible technology would strike that part of our economic growth that has depended extensively on the energy of individual Americans.

In fact, the protectionists in Congress would essentially be imposing a new tax on American consumers. And the effects of this tax would be so complex that everyone would need powerful personal computers to calculate the additional costs.

The solution to the trade imbalance and to unemployment in specific industries lies in increasing overall U.S. productivity and exports, not in the complacent protection of the products that such productivity has given us since the introduction of open trade in 1945.

Abuses of that system by our competitors cannot, of course, be excused. However, the protectionist cure would not only be counterproductive to our economic future but would also be unfair to individual Americans along the way.

McArthur is chairman of the Computer and Business Equipment Manufacturers Association, headquartered in Washington, D.C.

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SOFTWARE & SERVICES

SOFTALK
John Gallant
CW Senior Editor

Lessons from a lean year

The year 1985 is one software vendors should reflect on, if only because it's a year they would probably like to forget.

Lest all perspective be forgotten, the software industry enjoyed some growth in 1985. But the fall from the dizzying peaks of earlier years was swift, and vendors ought to take some time to consider the forces behind the sudden shift in their fates.

Much of the blame for the doldrums — a mild term that will be replaced by something much harsher should the industry not rebound strongly in 1986 — has been laid on the economy, which led to slowed capital expenditures. But many insiders attributed the slowdown to more persistent and fundamental problems troubling the user community.

No problem is more fundamental than productivity. Thomas Nies, chief executive officer of Cincom Systems, Inc., expounded on this theme during several speaking engagements throughout the year. Nies was notable among the growing community of users and vendors that has recognized the impact that stalled software development productivity growth has had on the industry and on U.S. business.

If software vendors cannot address their productivity problems and provide the tools with which users can substantially boost their productivity, growth in both the hardware and software sectors may falter for years to come. When it comes to productivity,

See LESSONS page 16

Software running for office

Company markets governor's homemade package

By Rosemary Hamilton

LEXINGTON, Mass. — What began as a homemade software package in the executive office of the governor of Massachusetts is quickly becoming a hot item for a tiny Lexington company. While the software, known as the Governor's Executive Information System, has undergone a number of refinements since its commercial debut in mid-1985, users are bullish on it and said it greatly improves information management in their offices.

Earlier this year, the consulting firm Technology Systems, Inc. won the marketing rights to the software package. Arch O'Reilly, systems analyst in Governor Michael Dukakis' office, developed it for the office's Wang Laboratories, Inc. VS 100 minicomputer. It was designed to automate the gubernatorial office's major tasks — correspondence, scheduling and the tracking of requests, constituents, job applicants and appointees. The total package sells for $45,000, but the five modules can also be purchased separately.

O'Reilly wanted a tool to manage information better and bring an end to the massive flow of paper in Massachusetts' executive office. "I frankly have yet to see a front-office package that I would consider using," he said. "Given the chance, I said I could do better."

He set out to design his own system but needed help writing the code. On the suggestion of Wang, O'Reilly contacted Technology Systems. Realizing the potential of the package, Technology Systems struck a deal with O'Reilly and the commonwealth of Massachusetts, which will get royalty fees on each package sold. O'Reilly estimated that Massachusetts could make up to $300,000 by the end of next year.

To date, the governor's office in the state of Washington has purchased the entire package, and the executive office of the state of Illinois is considering purchasing the system. MIS directors from both offices said they were impressed with the software although each said it would have to be tailored to meet their specific needs.

John Boyd, MIS director in Washington Governor Booth Gardner's office, said the Governor's Executive Information System should be a major improvement there because when he began working at the office it had been operating "not much differently from the territorial days."

Boyd's office purchased all five modules, but only the scheduling and calendar module is up and running. Yet, Boyd said, "There's a tremendous change already in how much more organized we are."

> ***'There's a tremendous change in how much more organized we are.'***
>
> — John Boyd
> Washington Governor
> Booth Gardner's office

He also said a number of modifications had to be made because the original Massachusetts version is geared toward a larger, more departmentalized organization. As a result, the modules function as standalones. Boyd requested such functions as a global search across all five modules and interfacing between the scheduling requests and calendar so that information can be quickly merged from the request files to the governor's schedule.

Similarly, Governor James Thompson's office in Illinois is optimistic about the package although it has yet to sign a contract. "It is our intention to purchase it. We were really impressed," said Randell von Liski, director of MIS. "There are some functions, like scheduling and constituency tracking, that are unique to a governor's office, and they seem to have it down really well."

The gubernatorial market is a limited

See SOFTWARE page 16

INSIDE

TSI International introduces the PC Option to its Key/Master data entry system/16

NEW THIS WEEK

- Software Solutions ships Dataease 2.5
- For more on this and other new products, see pp. 37-40.

INSTANT ANALYSIS

"Sex and software maintenance have two major differences. In the sex business you may get rich. In maintenance, you may hardly make a living. If you have tried maintenance, you know the second difference: Sex is exciting, while maintenance is avoided and even hated."

— Girish Parikh,
from his book
There is a Fortune to be Made in Software Maintenance

Symbolics 3600 family gets Ada programming package

By Paul Korzeniowski

CAMBRIDGE, Mass. — Symbolics, Inc. has announced an Ada programming environment for its 3600 family of symbolic processing systems.

The Symbolic Ada Programming Environment includes an Ada compiler and Ada software development tool kit. The package meets the Minimal Ada Program Support Environment, a rating that falls in the middle of the U.S. Department of Defense's three-step scale of an Ada programming environment's capabilities.

The environment includes an intelligent editor, a window-oriented debugger, support for creation of on-line documentation, a user interface tool kit and program metering tools.

Joseph Morin, Symbolic's Federal Systems Group manager, claimed that a chief benefit of Symbolic's Ada offering is its integration with other Symbolic packages. The Symbolic Ada Programming Environment can call and execute programs written in Symbolic Fortran, Pascal, Prolog and LISP programming languages.

The company plans to enhance the package's editor so that portions of an Ada program can be modified without having to run an entire program. Morin estimated that this capability would be added during the summer.

The environment costs $12,500.

Expert capacity planning tool bows

By James Connolly

NEW YORK — A consulting firm that specializes in capacity management, International Systems Services (ISS) Corp., has announced its first software package, which includes a microcomputer-based expert system for managing IBM mainframe system growth.

ISS Three reportedly was designed for use by experienced capacity planners and others who need to analyze current and future computer capacity requirements. The package consists of two components, a mainframe tool known as MVS Analyzer and a microcomputer program known as Capacity Planner. Designed to work together, the two components are available individually.

MVS Analyzer reportedly extracts, summarizes and reports on system activity for IBM MVS/SP and MVS/XA operating systems and provides automatic input to the Capacity Planner through Digital Communications Associates, Inc. Irma and Irma-compatible micro-mainframe links. MVS Analyzer is said to interface with other mainframe performance measurement systems and to provide automatic analysis of IBM's SMF, RMF, CMF and IMS log data.

Capacity Planner is an expert system using several hundred rules based on the experiences of ISS consultants regarding the capabilities of various IBM and IBM-compatible medium- to large-scale systems.

A company spokesman said that in a typical application, a planner would insert variables such as projected changes in a user department's transactions. Capacity Planner would then analyze those figures and the company's current configuration and would recommend upgrades or new configurations for CPUs, I/O and memory. The system is said to provide several "what-if" opportunities, including least-cost and least-change options.

The mainframe module costs $10,500, while the micro package for IBM Personal Computers and compatibles with a minimum of 512K bytes of memory costs $18,000. Optional modules for interfaces, with measurement products such as Morino Associates, Inc. MICS, cost from $2,000 to $3,500.

Software runs for office

From page 15

source of revenue for Technology Systems, since it can only produce a maximum of 50 clients. And not all the governor's offices seem interested. John Martin, systems manager at Governor Robert Kerrey's office in Nebraska, said the Technology Systems software would "duplicate the system we've developed ourselves." The office has been writing software for a Wang VS 45 that was installed in November.

The state of New York, which has networked IBM Personal Computers in Governor Mario Cuomo's office, is not interested. A move to that package would require an entirely new system, something that is not in the budget. The software "sounded good, but we're not looking for a system right now," said George Kash, chief of data processing services.

Realizing the limits, Technology Systems is also making a pitch to mayoral offices nationwide. As of last week, the company had two mayoral customers: the cities of Lowell, Mass., and San Jose, Calif.

Sue Roux, a secretary in the city manager's office of Lowell, sums up the office's experience with the software as "great." Prior to the system's installation in September, Roux's department kept track of city board and commission appointments manually. Now, Roux can call up a commission's file, and the system will display members as well as the dates when seats will be vacated.

Lessons from a lean year

From page 15

every vendor — from IBM to the smallest manufacturer — has far to go.

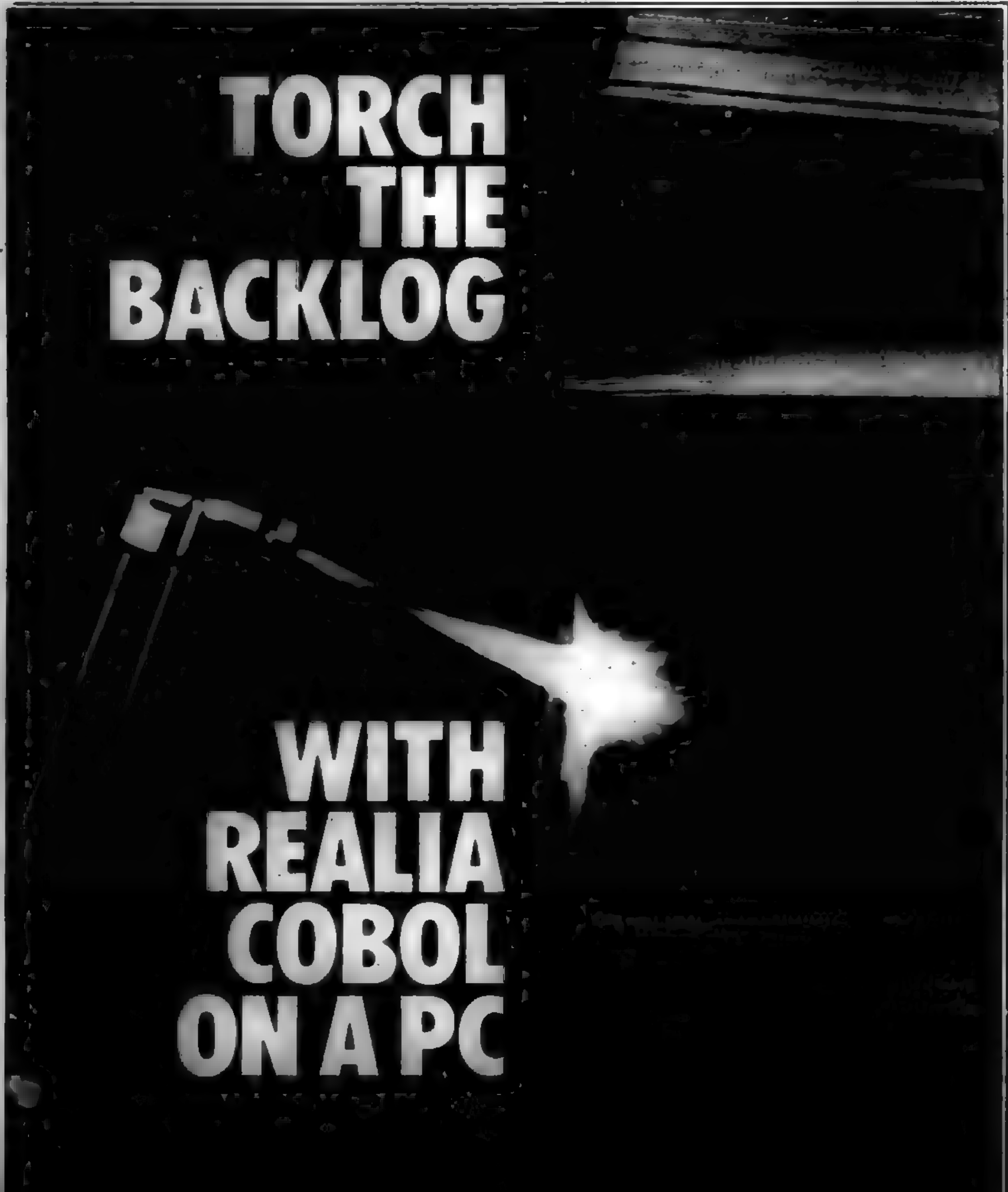
In a recent letter to this author, John Maguire, chairman of Software AG, blamed "data base management system and fourth-generation language performance problems that were recently uncovered" as factors in the slowdown. Maguire's point is well taken.

The debate over the capabilities and applications of relational DBMS and fourth-generation languages continues — and continues to confound users. Recent *Computerworld* articles on the technologies prompted vigorous responses from proponents and opponents. That users have shied from embracing these emerging technologies is hardly surprising.

It is time for vendors to spell out clearly the current and planned-for capabilities of these products and to come to grips with the fact that misguided marketing campaigns that trumpet the latest buzzwords often backfire. If the air can be cleared, users will feel less uncomfortable with the technologies and may see their way to purchasing these as-yet-incomplete, but evolving, products.

Scott Smith, vice-president of the Gartner Group, Inc., recently highlighted another nagging problem that has caused users to hold off on software purchases. Smith cited problems in the installation and delivery of announced products from major vendors. When users hear of such problems, they become leery of investing in major, functionally complex systems. Users need tested, tried solutions, and any perceived gain a vendor wins by preannouncing a product will be offset by user problems and negative publicity.

As the new year approaches, software vendors would do well to start getting their houses in order. It may be easier now for vendors to blame the economy for their woes, but it may prove painful in the future.



TSI data option uses IBM micro

By John Gallant

NORWALK, Conn. — TSI International has unveiled an option to its mainframe Key/Master data entry system that supports the use of an IBM Personal Computer as a data entry station.

According to James Russo, director of marketing for TSI, users can build a data entry application with the Paint-The-Screen portion of Key/Master and download it to the micro with the new PC Option. The application is automatically reformatted for the micro and can be used to capture data that is then uploaded in a format useful to the mainframe application.

Russo said the downloaded application can be cross-loaded to other Personal Computers, either physically through a diskette transfer or via a local-area network. Most verification and editing of data can be performed at the micro level, and further data checking can be performed on uploaded data at the mainframe. The downloaded application handles all security.

The micro, Russo claimed, frees data entry personnel from the constraints of mainframe system availability and response time, and it can relieve the mainframe of most editing and verification tasks.

The PC Option is compatible with all Key/Master systems. It runs on an IBM Personal Computer, Personal Computer XT or AT. One micro data entry station must be equipped with a Digital Communications Associates, Inc. Irma communications board for mainframe communications. The PC Option costs between $12,000 and $15,000. Key/Master costs between $18,000 and $30,000.

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3317-9INS

MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Schemes fail to stop copies

While the technical problems in software protection remain unsolved, the need may be dropping — at least in corporations.

On the technical side, clever people keep coming up with schemes that quickly crash and burn.

Two years ago Whitesmiths, Ltd. proposed supplying each package with a hard-to-duplicate decal that could be affixed to the authorized machine. This concept vanished without much interest from other vendors.

Mother Jones's Son's Software went a step further. "Violate this agreement and our attorneys will see to it that life on earth, as you know it, is completely ruined," the license warned. "You agree that, 30 days after you violate this agreement, ownership of your eternal soul automatically passes to us."

Among suppliers of more conventional copy-protection technology, no one has gotten tremendously rich. Vault Corp., one of the two best known suppliers, recently entered Chapter 11 bankruptcy.

It's old news that today's anticopying setups collapse under pirate attack but can thoroughly annoy legitimate users. Responding to user complaints, Micropro International Corp. and many smaller vendors have dropped copy protection during the past year.

As in a host of other cases, this topic divides manufacturers into two groups, with the big guys bucking the trend against copy protection.

A year ago, the heads of Lotus Devel-

See SCHEMES page 20

Micro-DEC 'pipeline' out

Software aids in writing distributed applications

By Eric Bender

NEW YORK — Software that sets up a "generic pipeline" between personal computers and large Digital Equipment Corp. systems was introduced recently by Datability Software Systems, Inc.

Datability's Remote Access Facility (RAF) is intended for use by application designers writing distributed programs who typically find that most of their efforts go not into writing large system or micro code but into establishing a link between the two systems, Datability President Ronald Howard said.

RAF gives IBM and DEC micro users a number of capabilities on a remote computer, including automatic contact and log-in, direct access to files, subroutine calls and remote execution of programs.

The software also lets the micro access several remote computers in a network, Howard said. Additionally, RAF offers a DEC VT100 emulation mode, with the ability to switch, with one keystroke and without losing context, between VT100 and personal computing operations.

When logged into the host, the personal computer user can access files just as if they were stored locally, Howard said. RAF also intercepts references to remote files and processes them in the same way that Microsoft Corp. MS-DOS processes local files, allowing users to employ standard MS-DOS commands such as TYPE.

"Because RAF is so completely integrated into MS-DOS, users do not have to learn special programs on their PCs or the remote computer," Howard claimed.

Application programmers can write micro programs that call subroutines on the

See MICRO page 20

INSIDE

Multimate International introduces a training program for users of its software/20

NEW THIS WEEK

- Epson introduces its IBM Personal Computer-compatible desktop line
- Apple upgrades Appleworks
- For more on these and other new products, see pp. 37-40.

Ultramicro floppy

Maxell Corporation of America has developed an ultramicro floppy that measures 2½ in. — less than half the length of a conventional minifloppy disk. First demonstrated at the Comdex/Fall '85 trade show last month, the 500K-byte disk was designed for what Maxell said it hopes is a new era of "extremely small and compact" personal computers.

Irma makes for the fast lane

By Rosemary Hamilton

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) is shipping a version of Irma, its micro-mainframe board, that is said to be up to 100 times faster than the original product.

The $1,195 board includes two of DCA's personal computer file-transfer programs, Irmalink FT/TSO and FT/CMS. With the additional software, data can be transferred at a rate of up to 40,000 char./min.

In addition to the personal computer software, the new package includes a free copy of the associated host software. Users who purchased Irma between Aug. 1 and Nov. 15 can receive a free upgrade to FT/TSO and FT/CMS.

The new version costs the same as the

See IRMA page 20

INSTANT ANALYSIS

"A lot of add-in packages have been developed with the first-time user in mind, but the person who really recognizes their potential is the accomplished user."

— Pete Higgins, Microsoft's group product manager for planning products

Micro users get programming answers through phone service

By James A. Martin

ATLANTA — Micro Support Resource Corp. announced a telephone service that answers users' questions concerning microcomputer software programs.

Users of the IBM Personal Computer and compatibles with a Micro Support Resource service contract can call toll free to ask procedural and operational questions regarding such micro software programs as Lotus Development Corp.'s 1-2-3, Ashton-Tate's Dbase III and Framework, Micropro International Corp.'s Wordstar 2000 and Samna Corp.'s Samna + and Samna Word III.

A support representative enters the caller's questions and a description of the problem into an IBM System/36. Micro Support Resource's system, called Magic Answer Extractor (MAX), then prompts the representative with further questions for the customer. When the questions are answered, MAX suggests a solution. If none is available, the problem is forwarded to a Micro Support Resource analyst. Once resolved, the problem and its solution are stored in the System/36 memory.

MAX can handle about 80% of all questions, with the rest researched and answered by in-house staff, said Micro Support Resource President Deborah Fain. "Our system eliminates the need to talk to a machine but also eliminates the need for us, or for our customers, to maintain a support staff that is expert in every software package," Fain said.

The annual cost of a Micro Support Resource contract is based on the number of packages in use. A single-user contract for Lotus' 1-2-3, for example, costs $104.

Chorus unveils image data base management packages

By Rosemary Hamilton

MERRIMACK, N.H. — Chorus Data Systems, Inc. announced two new versions of its image data base management system for IBM Personal Computers.

The Photobase Signature System, introduced last year, was designed to match signatures for such tasks as check clearing and the upkeep of personnel records. It is sold as a $4,795 add-on package or as a $15,495 workstation, which also includes an IBM Personal Computer AT with a 40M-byte hard disk, tape backup and a monochrome monitor.

Each stored signature requires about 3K bytes of memory. Approximately 9,000 signatures can be stored on a 10M-byte hard disk.

In early 1986, Chorus plans to roll out an optical disk version and one that uses color photos, although specific pricing has not been released yet, according to President Roy Clites. Outfitted with a 100M-byte optical disk drive, the system should sell for about $5,000 more than the basic configuration. The color package is expected to cost at least $1,000 more than the original Photobase.

Photobase is made up of a $500 black-and-white camera, two add-on boards and software. Once a photo is taken of a person's signature, it is converted to digital form. The data can be merged with one of three data base management software programs — Dbase III by Ashton-Tate, R:Base 5000 by Microrim, Inc. or the IBM Filing Assistant.

Chorus has found other customers looking for systems that would store other kinds of data requiring more storage space and color graphics.

See CHORUS page 20

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computer-based training. Technical support is provided for our mainframe, minicomputer, and microcomputer users, and documentation comes with your system.

Announcing Version 5

Multimate training aid out

EAST HARTFORD, Conn. — Multimate International Corp. introduced a three-part training program for users of its Multimate word processing software. Multimate also announced that it will expand its authorized training center program.

The courseware was developed in response to requests from both corporate users and Multimate authorized training centers, a spokesman said. Developed in conjunction with the Center for Professional Computer Education, the program provides materials to train both new and experienced users.

The program consists of three skill-level packages: basic, intermediate and advanced. It is broken down into 19 lessons for presentation in three six- to eight-hour courses. The basic course takes the student from an introduction to word processing up through advanced input and editing. The intermediate course covers such functions as advanced printing, spell checking, menu bypass and IBM PC-DOS commands. The advanced course includes line and box drawing, column manipulation, key procedures and Multimate's On-File Information Manager.

Each course costs $595, but the first two levels can be purchased together for $995; all three cost $1,395. Multimate also sells a set of 35mm slides for $395 and two-color overhead transparencies for $595 that can be used as classroom aids. A 96-page demonstration kit is available for $10, and a booklet of sample courseware pages is free.

Micro-to-DEC 'pipeline' debuts

From page 17

remote computer, with RAF "trapping" the call on the micro and passing the request and parameters to the remote unit for processing, Howard said. When the subroutine has been completed, RAF passes any changed parameters back to the micro, where the program then continues.

RAF costs $395 per micro plus a mainframe charge ranging from $2,500 to $10,000, depending on the size of the system. Volume licensing is available for the micro software, with a minimum of 50 copies offered at $300 each, with additional copies then costing $125.

The software works through a standard RS-232 line and supports speeds to 19.2K bit/sec. Supported hosts include DEC VAXs and Decsystem-20s. Support for Ethernet networks is planned for delivery at the end of first-quarter 1986.

Chorus unveils image managers

From page 17

Clites said the company has attracted real estate customers, who store photos of properties, and manufacturing clients, who store photos of components or tools. In both cases, an average photo needs 10K bytes of memory, Clites said. The color, he said, is for "anyone who wants pizzazz."

Irma makes for the fast lane

From page 17

original Irma board because "we realized that users really needed to transfer at a much faster rate," a company spokeswoman said. For users who bought Irma equipment before Aug. 1, the file transfer programs cost approximately $115 each on a single-user basis.

Schemes fail to stop copies

From page 17

opment Corp., Ashton-Tate, Microsoft Corp. and Quadram Co. jointly sent out a letter to other vendors inviting them to join the Association of Data Processing Service Organization, Inc.'s efforts to develop a lock-and-key scheme.

In addition to safeguarding vendors' interests, the proposal was supposed to offer "a vast array of benefits" to legitimate users, including the ability to make numerous backup and archival copies, to run packages on a diskless system off a local-area network and to check out trial offers of software.

But the scheme flopped at user sites, where it just seemed more trouble than it was worth.

Hardware-based schemes may yet emerge if system vendors get into the act. So far, the arguments to add a special port to each machine apparently have not been compelling.

The risk of antitrust lawsuits also worries vendors. But major software suppliers see meeting this challenge as a primary responsibility to their stockholders, and they'll continue to study it very seriously.

In large corporations, though, the concern may be overstated, as unauthorized duplication seems to be dropping to minimal levels.

Perhaps it's the prodding of a few highly publicized lawsuits, perhaps it's just a general raising of consciousness, but companies are establishing and enforcing serious anticopying guidelines.

Maybe standard business practices finally will succeed where technology failed.

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COMMUNICATIONS

WIRE TAP
Daniel Minoli

Diagnosing network ills

Networks pump the lifeblood of many companies, making it important always to maintain optimal network performance.

Once such a network has been installed, someone must monitor performance to ensure that grade of service goals are met and to assist capacity planning efforts. This capability often falls upon the shoulders of an MIS or telecommunications manager.

There are several approaches available to the data communications manager for monitoring network performance.

A typical gauge of network performance is response time. Ask a user how his network is performing, and often he will say, "Poorly." Users' perceptions do not reflect actual performance. Line level response time analyzers have been engineered to assist the network planner in assessing real response time. They measure the time it takes to send a message back and forth to the host, compile aggregate data such as average response time and list exceptionally long or short response times.

One problem with these devices is they only monitor one line at a time. A few small companies have begun to offer analyzers capable of monitoring eight or 16 lines.

Recently, personal computer devices

See DIAGNOSING page 24

Minoli is a member of the Bell Communications Research (Bellcore) network architecture planning group. Opinions in this column are strictly the author's and do not represent the view of Bellcore.

DEC unwraps net manager

Monitors Ethernet communications paths

By Paul Korzeniowski

MAYNARD, Mass. — Digital Equipment Corp. has announced NMCC/VAX Ethernim, a network management and diagnostic tool that works on Ethernet local-area networks.

The package supplies three functions: diagnostic capabilities, the monitoring of individual network nodes and storage of network information in a data base, according to Gary Otterson, assistant manager of network product marketing.

NMCC/VAX Ethernim runs as layered software on DEC's VAX/VMS operating system and monitors Ethernet protocol and Decnet Phase IV network software, the latest release of Decnet.

The network management package performs tests on four layers of DEC's implementation of the International Standards Organization's Open System Interconnect seven-layer network model: layer one, physical link; layer two, data link; layer six, presentation layer; layer seven, application layer. For non-DEC equipment on a network, the package tests only the lower two levels.

The package isolates faults and checks connections between nodes. The on-line software tests communications paths, gathers network information and creates a real-time graphics display of a network. It can operate on any network that uses DEC's Deuna Ethernet adapters.

A manager can test the functionality of a network with a single command that initiates a probe of each node on the network and determines the integrity of the network backbone.

NMCC/VAX Ethernim automatically alerts communications managers whenever changes or additions are made to the network. The software also records other key events such as Decnet software updates and hardware controller changes. The package supplies on-line Help for every screen that a user works with.

Data concerning network performance can be entered into a data base that produces usage and performance reports.

The package sells for $10,500 for the VAX 8600 and $7,000 for all other VAX systems.

NEW THIS WEEK

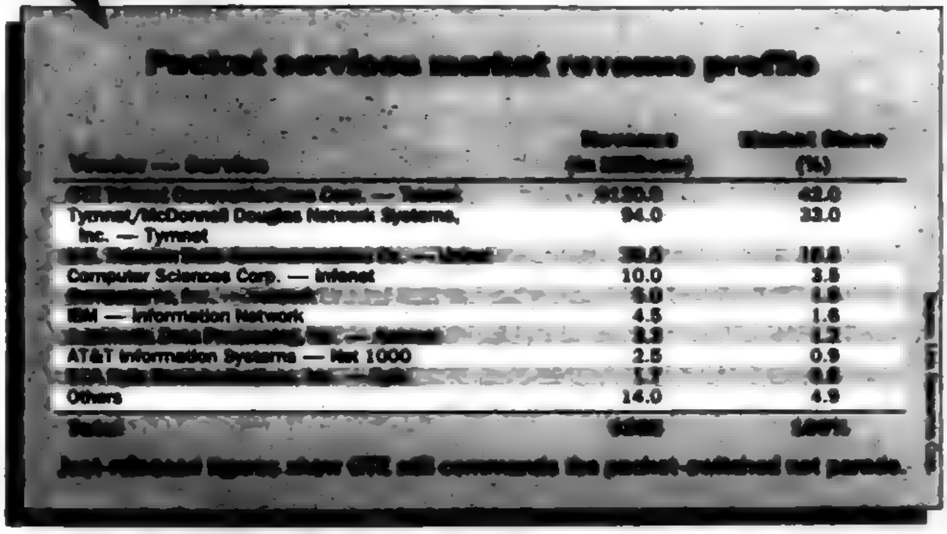
- NCR Comten upgrades ACF/NCP
- For more on this and other new products, see pp. 37-40.

INSTANT ANALYSIS

"No two companies produce the same product, so no two MAP networks will be the same."

— Marcia Brooks, an IDC analyst

DATA VIEW



Packet services market revenue profile

Vendor — Service	Revenue (in $Millions)	Market Share (%)
GTE Telenet Communications Corp. — Telenet	$120.0	42.0
Tymnet/McDonnell Douglas Network Systems, Inc. — Tymnet	94.0	33.0
[illegible] — Uninet	30.0	10.5
Computer Sciences Corp. — Infonet	10.0	3.5
[illegible]	5.0	1.8
IBM — Information Network	4.5	1.6
Automatic Data Processing, Inc. — Autonet	3.3	1.2
AT&T Information Systems — Net 1000	2.5	0.9
[illegible]	1.7	0.6
Others	14.0	4.9
Total	$285	100%

Just-released figures show GTE still commands the packet-switched net parade.

Report calls for AT&T, regionals' growth in CPE market

Monitors Ethernet communications paths

By Paul Korzeniowski

WASHINGTON, D.C. — After a slow start, AT&T and the former Bell operating companies are coming back strong. In the relatively low-growth market for private branch exchanges and key telephone systems, AT&T and the new regional companies are gaining market share at the expense of independent, non-telephone-company vendors.

That is the conclusion of the North American Telecommunications Association's (NATA) report titled "1985 Statistical Review: Annual Market Study of Telecommunications Equipment Industry." NATA is a Washington, D.C.-based trade association that represents roughly 650 manufacturers, suppliers and vendors of telecommunications equipment.

"Despite steady, albeit slow, growth for customer premise equipment markets as a whole, interconnect dealers will account for a declining share of annual customer premises equipment sales through the end of the decade," NATA reported. "With these declines, the process of market consolidation, which began in earnest the first half of 1985, will continue at least into 1987, reducing the number of independent interconnect dealers drastically." During the same period, AT&T and the former Bell companies will increase their share of annual customer premises equipment (CPE) sales. By 1989, they will account for almost 60% of all CPE sales, NATA predicted.

The survey stated that the key system market — small telephone systems — will remain flat until 1989 with approximately $2.3 billion in annual sales. The PBX market will rise slightly from $2.7 billion in 1984 to $3.3 billion in 1989.

Aggregate sales of CPE by interconnect vendors will decline from 52.5% in 1984 to 34.9% in 1989. The former Bell operating companies' share of these markets will rise from 12.5% in 1984 to 25.2% in 1989; AT&T's share will increase from 26.6% to 32.3% in 1989. These percentages are for distribution only, not actual manufacturer sales.

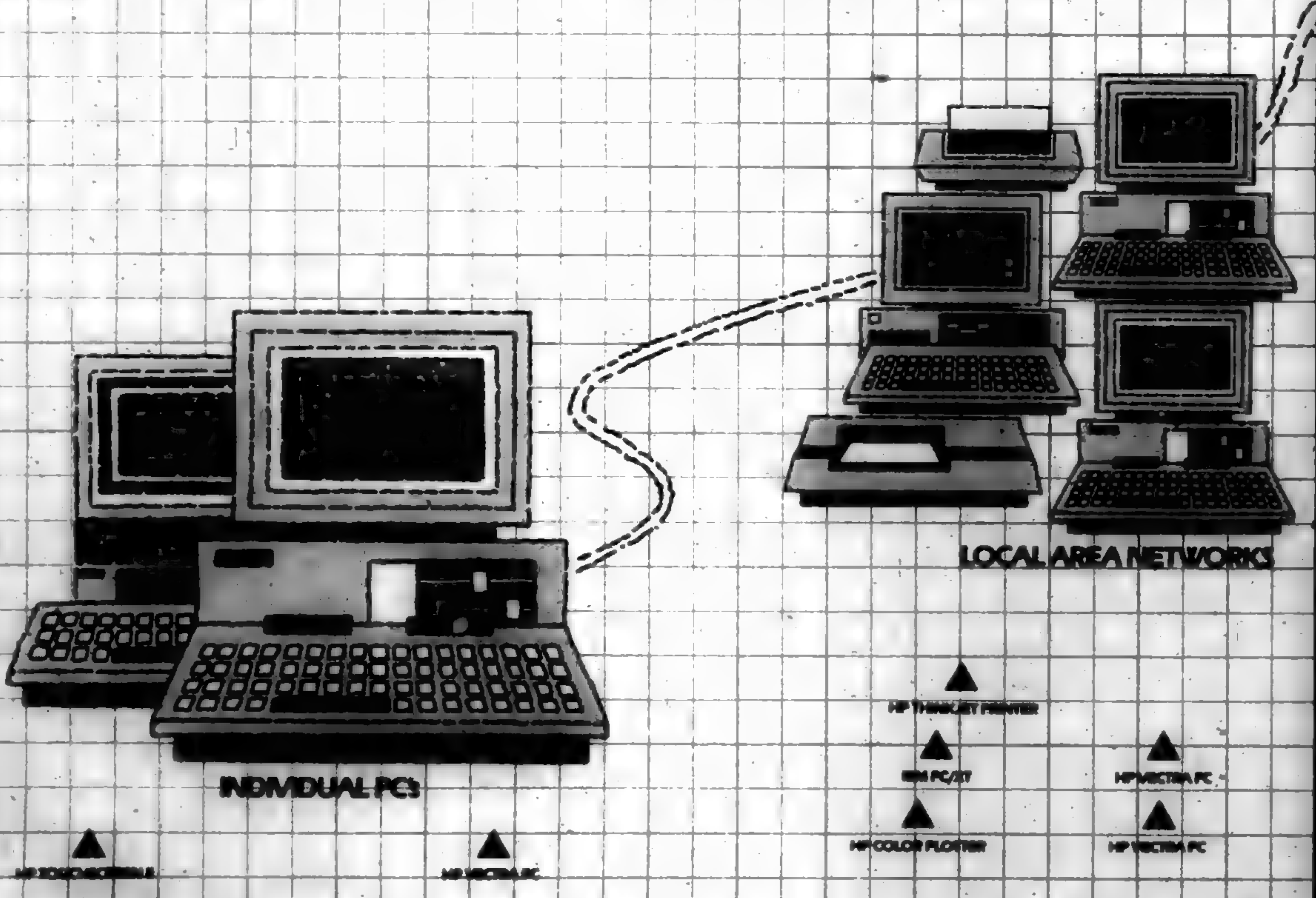
In the PBX market alone, interconnect's share of annual sales will decrease from 50.1% in 1984 to 33.4% in 1989. The former Bell operating companies' share will increase from 10% in 1984 to 25.7% in 1989. AT&T's share will also increase, jumping from 27.4% in 1984 to 31.5% in 1989.

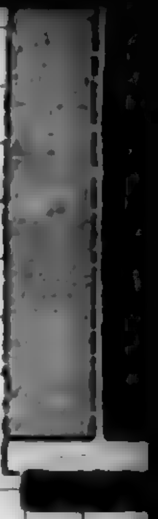
Because there are fewer products sold through their channels, interconnect vendors' sales and revenues will drop from a 1983 high of $3.9 billion to $3.2 billion this year and remain flat for the rest of the decade.

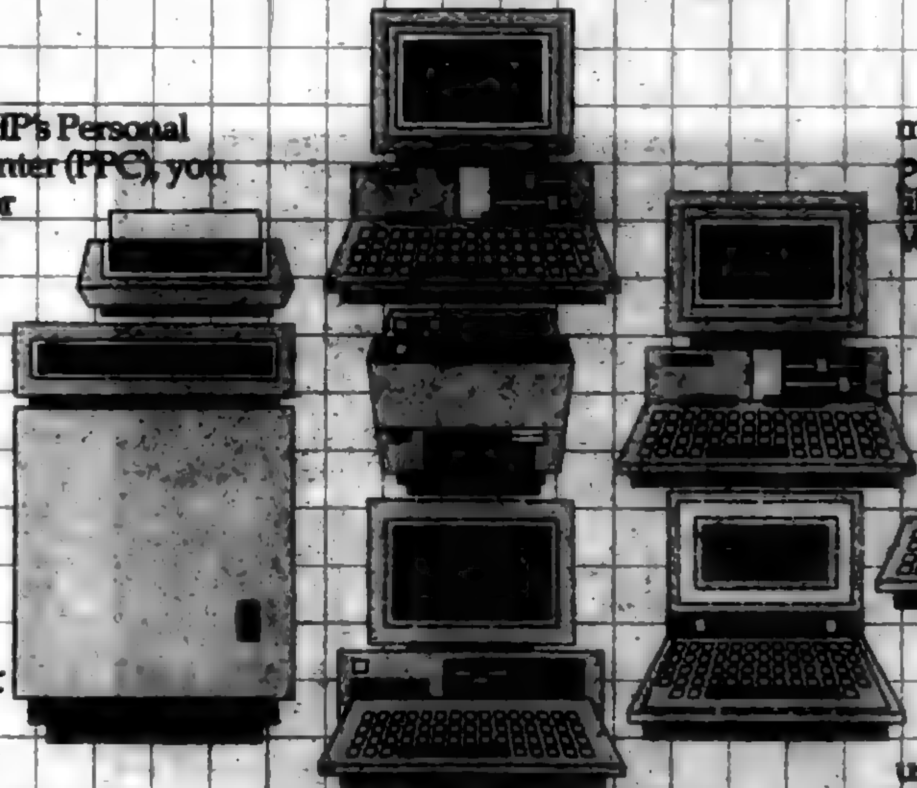
"The interconnect industry is going through a period of consolidation and retrenchment," according to the study. "The number of companies competing in the market is expected to decline over the next two to three years, leaving only the best managed, those with the clearest vision for exploiting the continuing shift toward office automation and those satisfied with pursuing a geographical or technological niche. Survivors will have to reevaluate their roles . . . and transform their companies from sales-driven to service-based operations."

"What if...

you could grow from one PC to a network of a thousand without losing control?"







DEPARTMENTAL SYSTEMS

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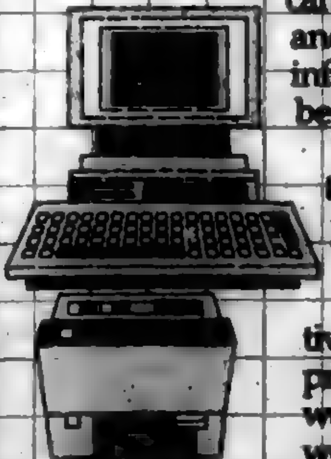

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Diagnosing network ills

From page 21

have been introduced for this function.

Vendor-developed or user-developed personal computer interfaces for data capture and statistical analysis are available. The cost of a personal computer-based one-line analyzer ranges from $3,000 to $6,000.

However, response time analyzers are not sophisticated enough to measure actual user-experienced response time fully. They make assumptions based on information they receive from the controller instead of pinpointing actual response times.

Devices that pinpoint actual response time are available from a few small companies. These use light-detecting sensors to monitor the send and receive lamps on typical IBM 3278-type display terminals. User-experienced response time is displayed numerically on an LED readout.

IBM supplies its customers with host software packages that monitor network response time.

Next up the ladder are real-time network performance and diagnostic systems, which typically run on a dedicated minicomputer, and can cost approximately a quarter of a million dollars.

Typically, response time, negative polls and Electronics Industry Association pin alarming are monitored. Color displays are often used to present some of the data.

Besides the high cost, one of the main drawbacks with these systems is that data is accessible in a sequential data base rather than in a relational data base. Sequential data bases are slow. A user must work through a tree structure, going down the tree one node at a time, and backtrack up the tree when a problem is not found in a given branch of the network.

What the telecommunications manager needs is a way to address the pertinent trouble data in a direct, relational way, along with expert system software that would condense and present the thousands of network variables in an easy-to-follow format.

The most sophisticated approach to network monitoring involves diagnostic systems built around specific modem types. These systems consist of a central controller that interrogates remote modems using so-called in-band or out-band signaling. With in-band signaling, test signals are interspersed with the main data channel, as opposed to out-band signaling, which uses a separate signal channel created at a frequency above or below the main data channel frequency.

The drawback to both systems is that they need the channel to perform the diagnosis. If the link goes down, little if any diagnostics can be performed.

A more reliable diagnostic method is to perform test signaling through a physically separate channel, such as a dial-up link. This technology usually requires existing modems to be retrofitted with equipment from another vendor to enable remote modems to be queried.

Monitoring may also be done by a third party. The drawbacks of this system are the one-time start-up cost and the fact that the needs of day-to-day communications change.

Notable among these types of diagnostic systems is the mechanized loop-testing system used by telephone companies. This approach automatically accesses a customer's loop on which a problem had been reported, verifies the condition of the loop and performs a variety of diagnostic tests.

Another tool accesses private branch exchanges remotely and tests and sets stored program control software.

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SYSTEMS & PERIPHERALS

HARD TALK
Donna Raimondi
CW Senior Editor

Optical disk storage dawns

Our industry often sets up a watch for a particular technology. It happened when computers went through the stages from vacuum tubes to transistors, from transistors to integrated circuits and onto chips. It is happening now with workable parallel architecture systems.

Pundits and anxious users sit around waiting to see which vendor will be first with a product, when it will be available and — most important — how the new technology will become meaningful to users.

One of the longest watches — begun in the early 1970s — may be winding down. That watch has been for optical disk storage. Compact disks are already a fact of life for certain uses, and the much anticipated and elusive optical mass-storage device is here.

Products have been appearing that promise to provide vast improvements in the amount of material that can be stored on one disk. For example, a disk subsystem for archiving that looks like a Pertec Computer Corp. tape drive to the computer, sold by Aquidneck Data Corp. in Middletown, R.I., purports to handle the contents of 20, 2,400-ft tapes on one single-sided optical disk.

Aquidneck, which makes its living by creating custom software for large defense systems rather than by selling hardware, is somewhat surprised at the attention its less than $40,000 archiving unit has received from the public. Ninety percent of the firm's business is transacted with the U.S. Department of Defense. Its optical disk archiving unit was a by-product of a request from the U.S. Navy, which was having problems transporting disk packages from a

See OPTICAL page 28

ADP's project management system moved to Microvax

By James Connolly

ANN ARBOR, Mich. — Automatic Data Processing, Inc.'s (ADP) Network Services division has moved project management capabilities previously limited to large systems to Digital Equipment Corp. Microvax II-based turnkey systems.

The Apeca/8000 project management system was designed to provide project management capabilities for less than $75,000, which is less than the cost of comparable mainframe software alone, according to ADP officials.

A key feature of the Apeca/8000 is said to be the use of menus for access to predefined reports, graphics displays and data entry screens, which allows users without extensive computer training to concentrate on the actual project management details rather than on the details of the software involved.

The system includes 3M bytes of memory, a 90M-byte streaming tape, two 400K-byte floppy disk drives, a console terminal and a printer, the company said.

Supports critical path, earned value analysis

The Apeca/8000 project management module reportedly can support the critical path method as well as earned value analysis.

The turnkey system also includes a relational data base management system, custom menu definition and reporting modules, a standard menu interface and a command interface, according to the company.

Graphics modules, graphics terminals and plotters are optional features, ADP reported.

NEW THIS WEEK

- CIE Systems offers two multiuser business systems
- NNC Electronics introduces the Atlas minicomputer
- For more on these and other new products, see pp. 37-40.

INSTANT ANALYSIS

"We have failed to do better than our present architecture with RISC machines. We are still trying but haven't been able to do it."

— Ken Olsen, founder and president of DEC

Vendor sharpens Whetstone mini

Integrated Digital hopes to cut out of Nova niche

By Donna Raimondi

ANAHEIM, Calif. — Integrated Digital Products Corp. has released a version of its Whetstone minicomputer that the vendor claims can execute 20 million instructions per second (MIPS).

The Whetstone II, a Data General Corp. Nova-compatible machine, is said to be 50% faster than the previous Whetstone Model XS-075.

The increase in speed is a result of very large-scale integration and reduced instruction set computer architectures, the vendor said.

The Whetstone II was designed to help the company break out of the Nova niche market, a spokesman said.

The 7-year-old firm's previous products were OEM systems for the Nova market that ran under Point Four Data Corp.'s Iris operating system and off-board cache memory systems.

Runs under Iris, other Nova operating systems

The Whetstone II machine can run under Iris but also supports other Nova operating systems such as Information Processing, Inc.'s Bis-Cobol; Integrated Digital's VMOS; and Dynamic Concepts, Inc.'s BITS.

Up to 1M byte of main memory can be supplemented by as many as 32M bytes of intermediate-speed memory located in an off-board cache, spokesmen for the company said.

The Whetstone II is said to provide direct memory access (DMA) execution overlap, with a DMA transfer time of 800 nsec.

The unit, primarily sold to OEMs, comes with 128K bytes of main memory, Integrated Digital reported.

It includes the chassis, a 60A power supply and documentation for a suggested retail price of $30,000, according to the company.

Humanities take a course in automation, save a bundle

Wang helps NEH cut the cost of patronage

By Donna Raimondi

WASHINGTON, D.C. — The National Endowment for the Humanities (NEH) saves the price of a million pages of paper a year. It has more than paid for its management information system through savings of time, money and effort since automating in 1978.

In the late 1970s, President Carter called for better management in the federal government to achieve operational efficiencies and higher productivity. In response, the NEH bought a Wang Laboratories, Inc. VS 80 office automation system, according to Carlos Rice, director of ADP Systems Office for the agency.

The agency, which gives grants in the humanities to individuals and institutions, reports directly to the White House. It had not used automation since its inception in 1965. Two contract services, used for label generation and other clerical functions, absorbed nearly $200,000 a year of the agency's budget to help administer its network of programs.

Rice was brought into the agency from the U.S. Department of Health, Education and Welfare, where he had conducted extensive studies on automation. From what he learned, he decided to buy the Wang system. Rice based his choice on observations that it was fairly easy for employees with no computer experience to learn on a VS 80, that the system could handle both word processing and data processing functions and that the cost could be recovered through MIS-generated savings. The latter point was important because the NEH had no budget for automation, he said.

Each of the 28 offices in the agency that were responsible for different activities had designed two- to six-page forms to send to potential grant applicants. The forms package that was sent to the half million potential applicants per year included five to 10 gummed labels and an acknowledgment postcard that the applicant was instructed to fill out and return to the agency. The NEH would then send the postcard back to the applicant to say that the forms were received, and the labels would be used for further correspondence.

Rice carefully examined the information requested on the forms and distilled all the requested data into one form that would serve all departments. It was possible to eliminate many of the forms' questions because the system could supply information formerly requested from the applicant. For example, a congressional district could be determined by the system immediately. In the past, it took a staff member some time to look the information up if the data was not on the form.

Rice eliminated the postcard since the system could generate a response automatically. The labels, previously sent out to all potential applicants, now are generated by the machine and go only to the approximately 17,000 people who apply. Information from the single-sheet form is put directly into the system, Rice said.

See HUMANITIES page 28

Optical disk storage dawns

From page 25

development site to its cruise missile sites without damaging the disks. "Optical disks looked like a perfect solution, because they can't really be damaged," according to George Steele, program manager at Aquidneck.

Once the units were developed for the Navy, Aquidneck's disk supplier, Alcatel Thomson Gigadisc, asked to demonstrate the unit at a couple of industry shows. The attention thus generated inadvertently pushed Aquidneck into the limelight.

In a recent interview, Steele talked about the history of optical disk storage, which has been fraught with problems. Error rates on optical storage media were too high for data storage, so a battery of researchers went to work to find better materials, he said. At the same time, developers looked for methods to reduce errors via controllers that could tolerate the media's movements as the disk turned.

The disks evolved from stamped plastic to a variety of glasses, metals and plastics sandwiched in ordered layers to create the optimum environment into which the laser could burn. The burning process — or writing on the disks — has been accomplished in a number of ways, Steele said. The medium can be pitted or bubbled. It can undergo changes in its crystalline makeup, and it can be magnetized in one direction and written on at the same time.

Despite limitations, it seems that optical disks are here to stay. They are useful for the kinds of permanent archiving and prolonged data preservation applications that facilities such as libraries, hospitals and insurance companies need.

Steele said that research continues into methods that will allow erasable disks. It will be about 18 months before someone comes up with an erasable optical disk, he said, based on what he knows about the research that is occurring. Other vendors said that it will be at least two years before erasable disks are real. But after such a long wait, two years almost seems like a short time.

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Humanities take course

From page 25

In March 1984, the NEH upgraded to a VS 100. That move, Rice reported, was possible only as a result of the cost savings generated by the smaller system.

Today, the agency's all-Wang installation includes a central processor with 2M bytes of main memory, three 75M-byte and two 288M-byte disk drives. Also part of the configuration are 18 printers and 46 workstations, all but seven of which handle both data processing and word processing functions. The system supports the 13-member ADP Systems Office as well as up to 225 users ranging from secretaries and program officers to high-level management officials in all five operating divisions of the agency.

Before the in-house system, NEH staff individually typed and proofread courtesy letters to each grant applicant months ahead of time. Now, because all necessary information has already been keyed into the system, these same letters are prepared with a lead time of a few hours.

The system augments daily a series of special checks and balances built into the multitiered process that leads — in about one of four cases — to the awarding of a government-sponsored grant for projects in the humanities.

With all essential information on the grants in a central data base that was designed in-house, the agency can retrieve information in many more ways than before. It can, for example, perform comparative analyses of the active proposals.

The typical grant application requires about four months to move through a full cycle. "No one applies for a grant without following through on its status," Rice said. "Because we get so many inquiries from grant applicants about the progress of proposals, we have deployed terminals throughout the agency to handle this heavy volume of requests."

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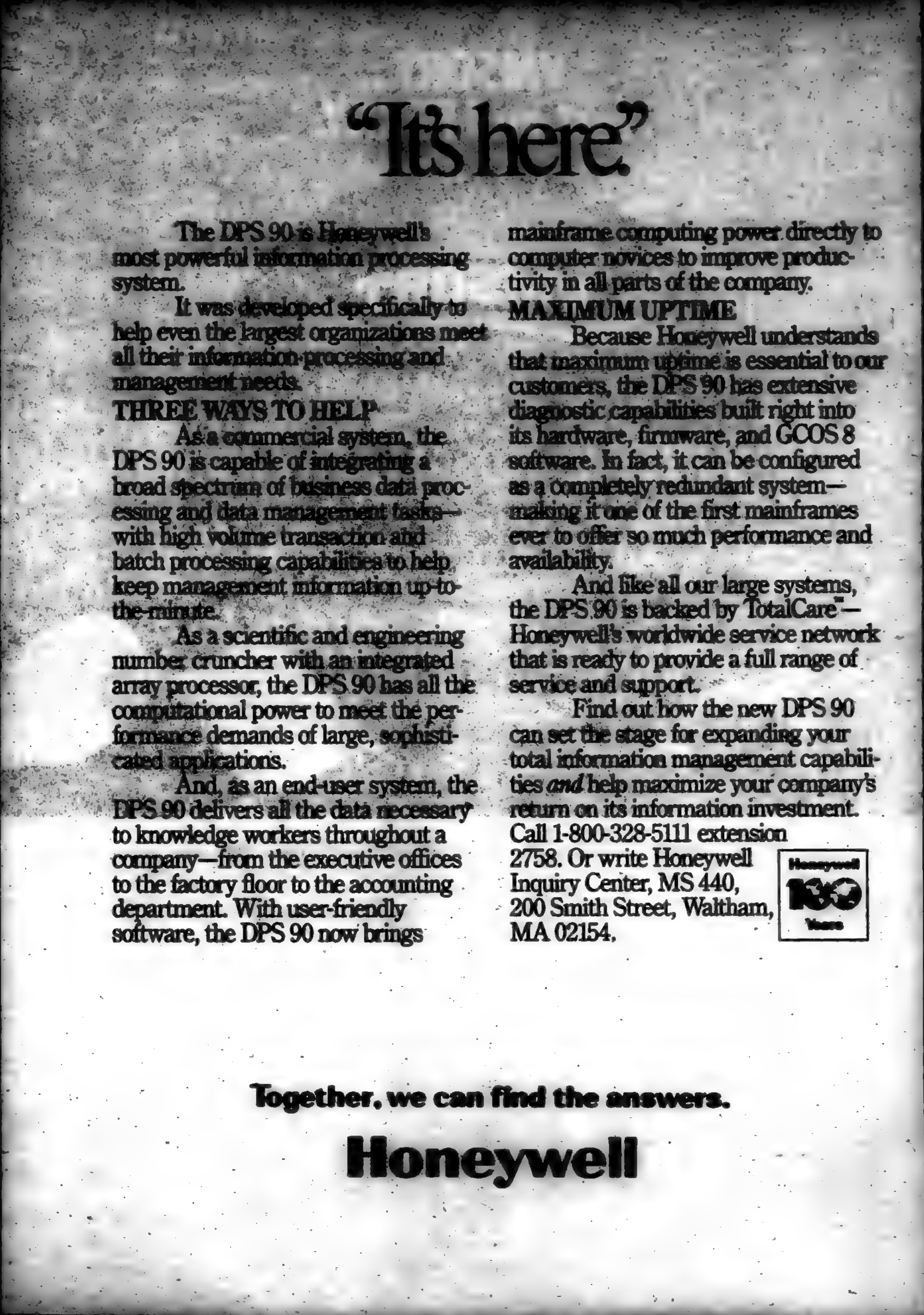

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One-time passwords fortify system security

Security problems associated with static passwords force DP managers to consider alternatives. Randomly generated one-time passwords may plug the gaps in security ramparts.

By Raymond Wong

Most end-user authentication techniques for computer systems rely on something users know (such as a password or a piece of personal information), something they have (a key or a card) or something they are (a fingerprint or voice print). For example, in using a plastic card and a personal identification number to gain access to a bank's automated teller machine, you are using something you have and something you know.

The password has been the most popular method of authenticating users for remote access to host computer systems. Passwords are inexpensive and do not require an additional purchase, since they usually come as part of a system's operating system. They appear easy to administer and require little of the user.

Yet many security problems are associated with passwords. These problems force DP managers to consider alternative solutions carefully. Among these problems are the following:

- Passwords are fairly static quantities; they do not change for some time. The longer a password is valid, the greater the probability of its being compromised.
- Passwords are subject to careless handling by users. How often have we heard about users writing their passwords on a sheet of paper and taping them to their terminals or lending their passwords to a coworker?
- Passwords are vulnerable if the communications link between the user's terminal and computer is not protected either physically, through the use of concrete conduits or other special line shields, or by using data encryption between the end points of the link. An unprotected link is subject to electronic eavesdropping.
- Passwords are often chosen by users to be easy to remember. How often have we heard of using spouses' names, telephone numbers and other information that has high correlation with a user's personal background? This allows a person who has some knowledge of a user to make intelligent guesses at the user's password.
- Some passwords are found in dictionaries or directories. This allows a resolute hacker — even one unfamiliar with the user — to make an exhaustive search attack on the password.

Old concept, new use

In recent months, a number of user authentication products have appeared on the market that attempt to address the problems associated with passwords. These products are based on the concept of a one-time password.

Unlike typical passwords, a one-time password is no longer valid after it has been used once. Since successive one-time passwords are randomly selected, a user authentication system based on this method can be used reliably over unprotected communications links.

An eavesdropper can record all one-time passwords used in the past but still have no information to determine the next valid one-time password. In addition, this technique does not have the problems associated with guessing and exhaustive search attacks.

Though new to the computer arena, one-time passwords have been in use for a number of years. The government, for example, chose one-time passwords to identify friendly aircraft because they offer the greatest level of protection. But they can be awkward to implement.

Traditionally, each party in the authentication needed a list of randomly selected passwords. This poses problems in a computer system environment, where a computer user must be authenticated by a central host.

First, the list must be securely generated and distributed to the users and to the central computer.

Raymond Wong is manager of special projects for the data security division at Sytek, Inc., Mountain View, Calif. He is a member of the ANSI X.9E9 Key Management Working Group, which sets security standards for the financial community. His own patent for a personal authentication device is pending.

Second, the list must be securely stored — a minor difficulty at a central site but a formidable challenge for portable units used by personnel in remote sites.

Third, both the user and the central computer must know which is the next valid one-time password. In effect, the parties must synchronize their use of the list of one-time passwords while not giving away the password system itself.

Challenge-response

New products solve these problems by using a challenge-response protocol between the central computer and the user. Each authorized user receives a personal password generator, a portable device that does not store a list of one-time passwords but instead generates a password on demand.

After the end user identifies himself to the host computer by inputting his user name, the computer responds with a "challenge number." The user's personal password generator responds to the challenge number by generating a one-time password that the user can key in to gain access.

Each user should operate with a different set of one-time passwords. Also, for the same challenge number, two personal password generators must not compute the same response. Therefore, each user's personal password generator must be unique in some way.

Keeping secrets

The most common method of ensuring this is to use a cryptographic algorithm to generate each response to a challenge number. In this method, each user's password generator has a different secret "key" — a set of data used in the response computation.

The password generator then assigns a password based on the algorithm and the key data. The combination of the two ensures that the responses generated are unpredictable and that different password generators will not return the same one-time password for a given challenge number.

A number of products have been introduced that are based on a challenge-response protocol and a personal password generator. With these products, the user either manually inputs the challenge number into the generator as the challenge number is output on the computer screen or reads that number off the screen, using an optical character reader on the hand-held password generator. The password generator then returns the one-time password on its own display for input into the computer.

Products differ in some other areas. Some require the user to input a personal identification number in order for the password generator to calculate the response correctly. Others differ by how many digits comprise the challenge number and the response. A lengthy number boosts the probability that a randomly generated challenge number will not be issued twice.

If this is not sufficient for a site's security needs, some products allow the host computer to track which challenge numbers have been issued to which users and to suppress repetition — a variation on random generation.

There are, of course, other alternatives for enhancing the security of static passwords. Callback systems and exhaustive data encryption offer some advantages.

But solutions such as these have their own vulnerabilities. Some determined hackers have defeated callback security systems by call-forwarding the telephones of authorized users. And encryption only answers one of the weaknesses of static passwords — vulnerable communications links.

One-time passwords are now being used for remote access to host computers by several types of installations: the U.S. Department of Defense, large corporations with sensitive data that must be accessed by remote locations and financial institutions that use them both to authenticate employees involved in transferring large sums electronically and to identify large customers wanting dial-in access to accounts or financial data.

Not every installation requires the level of security provided by one-time passwords. But for those that do require extra security for remote access to hosts, one-time passwords provide added protection at relatively low cost. ■

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A security checklist

By August Bequai

The Chamber of Commerce of the U.S. reports that losses from computer crimes cost companies more than $100 million annually. Some law-enforcement sources place this figure as high as $1 billion. Experts note that more than 80% of these crimes could be detected and prevented if companies were to establish adequate security protection.

No security program is safe from clever criminals. Management, however, can and must play a role in preventing and detecting computer crimes.

Managers should use the following checklist to help formalize their security needs.

PERSONNEL SECURITY

☐ Always perform background checks for prospective DP employees.
☐ Conduct periodic background checks for all employees with any access to the computer facility.
☐ Bring employee-related problems to the attention of the appropriate supervisors.
☐ Establish a program for handling employee-related problems.
☐ Brief security personnel on all laws and regulations regarding employees.

HARDWARE SECURITY

☐ Correlate meter hours with utilization hours.
☐ Review maintenance activities.
☐ Verify all downtime.
☐ Check incoming work against the list of authorized users.
☐ Conduct periodic spot checks to ensure minimum abuse of the system.
☐ Identify all terminals.
☐ Check all hardware changes, repairs and modifications.

SOFTWARE SECURITY

☐ Place unused tapes in their containers.
☐ Select a reputable contractor to clean disk packs.
☐ Maintain detailed utilization records.
☐ Prepare and maintain backup tapes and disks.
☐ Locate the tape library in a secure area.
☐ Store tapes away from magnets.
☐ Employ key words or passwords wherever possible. Change these words frequently.
☐ Employ data scrambling and cryptographic devices.
☐ Verify and record modifications to software.
☐ Employ tests.
☐ Keep a log of all personnel who have access to sensitive data.
☐ Record unauthorized attempts to access the system.
☐ Control and log access to sensitive areas by maintenance personnel.
☐ Use escorts for any personnel who have not been cleared.
☐ Supervise vendor activities.
☐ Request that vendors screen employees who have access to sensitive data.

DATA CONTROLS

☐ Keep updated inventories of all records.
☐ Check the accuracy of the backup system.
☐ Maintain backup source data.
☐ Record and classify all programs.
☐ Investigate all stoppages.
☐ Maintain duplicates of all documentation. File duplicates in a seperate facility. Take periodic inventories.
☐ Allow only approved program changes.
☐ Classify data in terms of its value.
☐ Segregate tapes, disk and cards.
☐ Make storage areas secure and fireproof.
☐ Educate system personnel in data security.
☐ Set user input controls.
☐ Monitor output.

TERMINAL SECURITY

☐ Control terminal access.
☐ Employ guards and physical barriers to control access to terminals.
☐ Guard portable terminals from theft and misuse.
☐ Control access to key-word and lock-word files.
☐ Monitor time-sharing systems for proper use.
☐ Test the system for electronic interceptions. ■

August Bequai is a Washington, D.C., lawyer. His seventh book, Techno-Crimes *(D. C. Heath, Lexington, Mass.), will be released in 1986.*

WE CHALLENGE ALL COMERS TO A LASER BATTLE.

DIGITAL'S NEW LN03 IS FAST AND AFFORDABLE.

Until now, laser printers fell into the category of pure science fiction for most applications. Those that could handle even a modest work load cost more than the moon and stars. And those that were affordable just couldn't keep up with a busy office.

Now there's Digital's new LN03. The most productive laser printer you can buy for less than $7000. A lot less. In fact the LN03 costs little more than half that. Yet it leaves every laser printer in its price range in the dust.

For pure speed, nothing in the price range can beat the LN03. At 8 pages per minute – or 333 cps – it can handle the volume of a busy office with ease.

It also prints true compound documents, with business graphics and text on the same page, in a single pass. And it prints on virtually any cut sheet paper, including overhead transparencies. All of which makes it ideal for almost any multi-user environment.

IT WON'T WASTE YOUR TIME.

The LN03's real edge in speed and productivity comes from its paper handling capacity. With 250 page input and output trays, the LN03 can print thick documents – pre-collated – without reloading. Try that with any other laser printer in the class and someone will end up changing the paper 10 times or more, reverse collating every page by hand, and babysitting the entire process. Which is counterproductive to the whole idea of office automation.

BETTER QUALITY THAN LETTER QUALITY.

The LN03 also gives you advantages over daisywheel and dot matrix printers, too. Because one LN03 can do the job of the two conventional printers you're probably using now.

In fact it can do *more* than *both*. For a lot less money.

For starters, it forms characters precisely with 300 x 300 dot resolution. Characters that are not only far cleaner than your dot matrix printer, but even better than your letter quality printer. You may actually have trouble telling the difference between text that's been printed on the LN03 and text that's been professionally typeset. In fact the LN03 characters are so well formed, they're recognized by Optical Character Readers with no problem at all.

To give your documents a professional appearance, the LN03 lets you pick and choose from a virtually unlimited variety of typefaces, sizes and styles. And they've all been developed especially for the LN03 by Compugraphic Corporation, the world's recognized authority on computer-generated typefaces.

Two resident typefaces give you no fewer than 16 different sizes, styles and pitches, while optional ROM cartridges let you add just about any face or font you might consider. Including your own custom designed faces. You can even down-line load your own character set or custom designed graphics fonts to print your logo, letterhead or forms. If you like, the LN03 can print sideways, down the length of the paper as well as across, to accommodate spreadsheets, compiler listings, graph captions or other special effects.

In short, the LN03 gives you a remarkable combination of print quality and versatility. So every piece you print makes a great impression.

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FASTER AND MORE FLEXIBLE THAN DOT MATRIX.

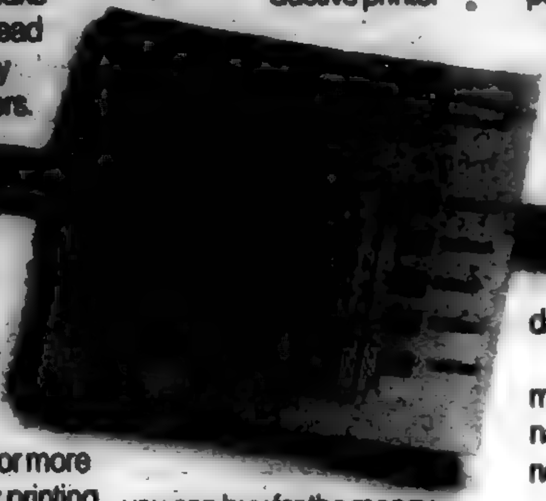
The LN03 doesn't stop with better-than-letter-quality quality. It also gives you the advantages of dot matrix printing. And then some.

At 8 pages per minute, the LN03's speed approaches that of a line printer. The fact is, it's faster than both your dot matrix and daisywheel printer working together.

Crisp business graphics are a snap. And unlike either of your conventional printers, the LN03 can mix graphics and true letter quality on a single page. In a single pass.

Noise is a barely audible 55 dB. Far quieter than any impact printer. No louder than your copier. So the LN03 won't distract and annoy workers even in an open office.

The LN03 will even make transparencies for overhead projectors. Try that on any of your printers.



Finally, the LN03 is one of the least expensive printers you can own, with a cost-per-page of just 3.2 cents. That's a savings of 20% or more over dot matrix printing. And substantially more compared to your daisywheel printer.

So, an LN03 really makes a lot of sense. You get better economy. More flexibility. Additional capabilities. A professional look. Which makes the LN03 the most productive printer you can buy for the money.

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NEW PRODUCTS

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Epson rolls out desktops

Equity micro line boasts 16-bit IBM compatibility

Epson America, Inc. of Torrance, Calif., has introduced the Equity line of IBM-compatible 16-bit desktop computers.

Equity I is IBM Personal Computer compatible. The base configuration, priced at $995, comes standard with an Intel Corp. 8088 microprocessor; 256K bytes of random-access memory (RAM), expandable to 640K bytes; a 360K-byte, 5¼-in. floppy disk drive; an IBM Personal Computer AT-type detachable keyboard; a built-in Centronics Data Computer Corp. parallel printer port; an RS-232C serial port; and Microsoft Corp. MS-DOS 2.11 and GW-Basic.

The two other available configurations — dual floppy disks or a single floppy with a 20M-byte internal hard disk — are priced at $1,295 and $2,195, respectively.

Equity II is IBM Personal Computer XT compatible. It comes in two basic configurations: the base system, priced at $1,695, includes a single 360K-byte floppy disk; the other option, priced at $2,895, includes one floppy and a 20M-byte internal hard disk.

Equity III is IBM Personal Computer AT compatible. Two modes of operation allow the system to act as either a single-user or multiuser processor. The basic configuration costs $3,495 and comes with a single half-height, high-density, double-sided 1.2M-byte floppy disk drive. A second configuration costs $4,495 and adds a half-height, 5¼-in. 20M-byte internal hard disk.

Equity I is Epson's first entry into the Personal Computer-compatible market.

Equity III features an Intel 80286 microprocessor, eight IBM-compatible expansion slots, both floppy and hard disk controllers, 640K bytes of RAM, a detachable IBM Personal Computer AT-type keyboard, parallel printer port, an RS-232C serial port and a real-time clock/calendar. Microsoft's MS-DOS 3.1 and GW-Basic are included.

There is a full line of Epson components and peripherals available for the Equity line.

Equity I is available now. Equity II and Equity III will be available in February.

CIE systems now support eight, 64 users

CIE Systems, Inc. of Irvine, Calif., has expanded its family of multiuser business systems with the introduction of eight-user and 64-user models.

The CIES 680/30-25 was designed for up to eight users. The standard configuration includes the AT&T Unix, Ryan-McFarland Corp. RM/COS or Pick Systems Pick operating system, a 25M-byte Winchester hard disk and a 500K-byte, 5¼-in. IBM-compatible floppy disk drive.

The 680/30-25 is equipped with an 8-MHz Motorola, Inc. 68000 CPU and 512K bytes of internal memory, expandable to 768K bytes. Winchester storage can be expanded to 50M bytes. An optional 60M-byte streaming tape drive is available. A 9-slot Intel Corp. Multibus chassis with a hinged card cage provides access to expand the system with Multibus-compatible controllers and interface cards.

The system can support two parallel printers with speeds up to 600 line/min.

The 680/30-25 is priced starting at $5,995 for a standard single system.

The CIES 680/250 was designed for up to 64 users. The standard configuration includes either the Pick or RM/COS operating system and 337M bytes of on-line disk storage expandable to 1.3G bytes. The standard 2M-byte memory can be expanded to 4M bytes for Pick users and up to 8M bytes for RM/COS users.

The 680/250 incorporates a 16.6-MHz Motorola 68020 CPU with on-board memory. The CPU is implemented under the Intel local bus extension to facilitate 19M byte/sec. data exchange and manipulation between the CPU and memory.

The system has three intelligent Intel 8088-based I/O controllers with 64K bytes of on-board random-access memory each. There is also an intelligent disk controller and a 1,600 or 1,600/3,200 bit/in. ½-in. tape drive. Options include an IBM-compatible 5¼-in. floppy disk drive and a 60M-byte, 90 in./sec. streaming tape drive with start/stop operation.

The 680/250 is priced starting at $59,995 for the standard configuration.

High-capacity Atlas 130 debuts

NNC Electronics Corp. of Huntington Beach, Calif., has unwrapped the Atlas 130 to expand its product line of high-capacity, multiuser, multitasking computer systems.

Atlas 130 features a 130M-byte unformatted hard disk with a 25-msec access time; 10 software-selectable serial ports with speeds up to 38.4K bit/sec.; one parallel Centronics Data Computer Corp. interface port; 576K bytes of CMOS dynamic random-access memory; an 8-in. look-alike 5¼-in. 1.6M-byte floppy disk; and a full start/stop, 6,400 bit/in. cartridge tape drive capable of holding 18M bytes per tape cartridge.

Atlas 130 runs Phase One Systems, Inc.'s Oasis 8 multiuser operating system. It includes a switched fused 110-Vac convenience receptable, a 50-pin connector for an external 8-in. floppy drive and an additional 50-pin connector.

Atlas 130 costs $11,400, including the cartridge tape unit.

Dataease 2.5 offers improved functions, fewer keystrokes

Software Solutions, Inc. of Trumbull, Conn., has introduced an enhanced version of its Dataease data base management program, offering a new procedural language and beefed up financial and scientific functions.

Dataease 2.5 comes with the menu-driven Dataease Query Language, which provides users with prompts and Help messages, and the ability to give commands with fewer keystrokes, according to a company spokesman.

The software also has the high-level query language used with the earlier Dataease version, the spokesman said.

The purpose of both packages reportedly is to appeal to a full range of users.

New functions include calculation of present value and rate of return. Other features include a library report template for quick generation of reports, a speed-view function for related file records and an interface to Lotus Development Corp.'s 1-2-3 application program.

Designed for the IBM Personal Computer and compatibles, Dataease 2.5 is priced at $600. Current Dataease users can upgrade for $50. Subscribers to Serviceease, the company's support program, can upgrade for free.

Geisco service to exchange companies' data electronically

General Electric Information Services Co. of Rockville, Md., has introduced the EDI Express system, an applied teleprocessing service designed to provide the electronic exchange of business documents between companies.

Electronic data interchange replaces traditional business procedures in which purchase orders, invoices, bills of lading and other business documents are typically printed out on one company's computer system, mailed and re-entered into the computer system of a vendor or a customer. With electronic data interchange, the entire process is electronic and the document transfer is almost instantaneous.

The EDI Express system allows documents to be automatically translated to industry-standard formats, stored for retrieval and dispersed to multiple recipients.

Some of the EDI Express system's capabilities include electronic mailboxing, compliance checking, optional access modes, format translation, special editing, transaction billing and status reports.

EDI Express is priced on the basis of the number and size of the documents handled, whether special functions like translation are performed and the time of day transmission occurs.

NEW PRODUCTS/SOFTWARE & SERVICES

Systems software

Burroughs Corp. introduced the **Data Transfer System**, a software package that links its B20 microcomputers to its entire line of mainframes, from the B1000 to the top-of-the-line A 15.

The system is made up of two software modules — one that runs on the micro and the other on the mainframe. Data can be transferred to and from both environments. Micro data can be merged with mainframe data, and mainframe data can be downloaded into micro software programs.

The mainframe module costs $50 per month or $1,500 for a one-time 48-month extended license. The micro module costs $525 for the first 10 B20s. The module for each additional micro costs $55.

Burroughs, Burroughs Place, Detroit, Mich. 48232.

•

Chicago-Soft Ltd. has enhanced **Netspy**, its network performance monitor, to monitor CICS host and network response times without having to run CICS in a systems network architecture definite response mode.

Other functions include an ability to record response time and traffic statistics per application and per terminal; to measure last, worst and average response times; and to monitor user service levels.

A perpetual license costs $12,500, the vendor said.

Chicago-Soft, Suite 2, 738 N. LaSalle St., Chicago, Ill. 60610.

Productivity aids

Incatec International, Inc. has introduced **Documaster**, a software program that can produce programmer manuals from code designed for AT&T Unix-based computer systems.

It prepares a file from programmer's code, making it ready to be TROFFED or NROFFED under Unix to a laser or letter-quality printer.

Documaster runs on Digital Equipment Corp. VAX, Convergent Technology, Inc. and other Unix System V or University of California at Berkeley 4.2 systems or on IBM Personal Computers and Personal Computer XT running Xenix.

Single site licensing is available for $495.

Incatec, Suite 818, 7700 Edgewater Drive, Oakland, Calif. 94621.

Application packages

CVNC and Personal Machinist, two numerical control applications packages have bowed from **Computervision Corp.**

CVNC integrates with the vendor's CADD 4X software, allowing programmers to work from any geometry in the computer-aided design and drafting design data base and then interface with software for downstream applications. CVNC is available for CDS 4000 and Designer V-X systems.

The Personal Machinist is a design and manufacturing system for the IBM Personal Computer AT with 512K bytes of memory. It operates stand-alone, as part of a network or combined with other Computervision systems.

CVNC comes in three modules: 2-axis turning for $15,000; 2- and 2½-axis milling for $15,000; and milling/turning for $25,000.

The Personal Machinist prices are $20,500 for a standard system and $21,700 for an advanced system.

Computervision, 15 Crosby Drive, Bedford, Mass. 01730.

Data base management systems

Relational Technology, Inc. has announced **Version 4** of its **Ingres** relational data base management and applications development system.

Version 4 allows users distributed access to all Ingres data bases connected in a computer network.

Enhancements also include function key support, Help facilities and a menu-driven facility for the query languages. It supports both SQL and QUEL query languages within the VMS and AT&T Unix environments.

Ingres Version 4, available in February, is priced from $7,500 on the DEC Microvax to $90,000 on IBM mainframes.

Relational Technology, 1080 Marina Village Pkwy., Alameda, Calif. 94501.

Languages

Century Analysis, Inc. has unveiled **ADF/10**, an applications development language for NCR Corp. mainframes running VRX that reportedly lets users develop programs interactively and test code interpretively.

The software converts source modules into executable object code without the need to compile or link edit files.

ADF/10 contains macro commands that provide on-screen prompts that guide users through the coding process with questions pertaining to the specific application.

ADF/10 costs $10,000.

Century Analysis, 114 Center Ave., Pacheco, Calif. 94553.

Software

Apple Computer, Inc. has introduced **Version 1.2** of its **Appleworks** integrated software package for the Apple IIe and IIc personal computers.

Appleworks combines word processing, data base management and financial modeling. The new version supports Apple's Unidisk 3.5 disk drive and Apple II Memory Expansion Card.

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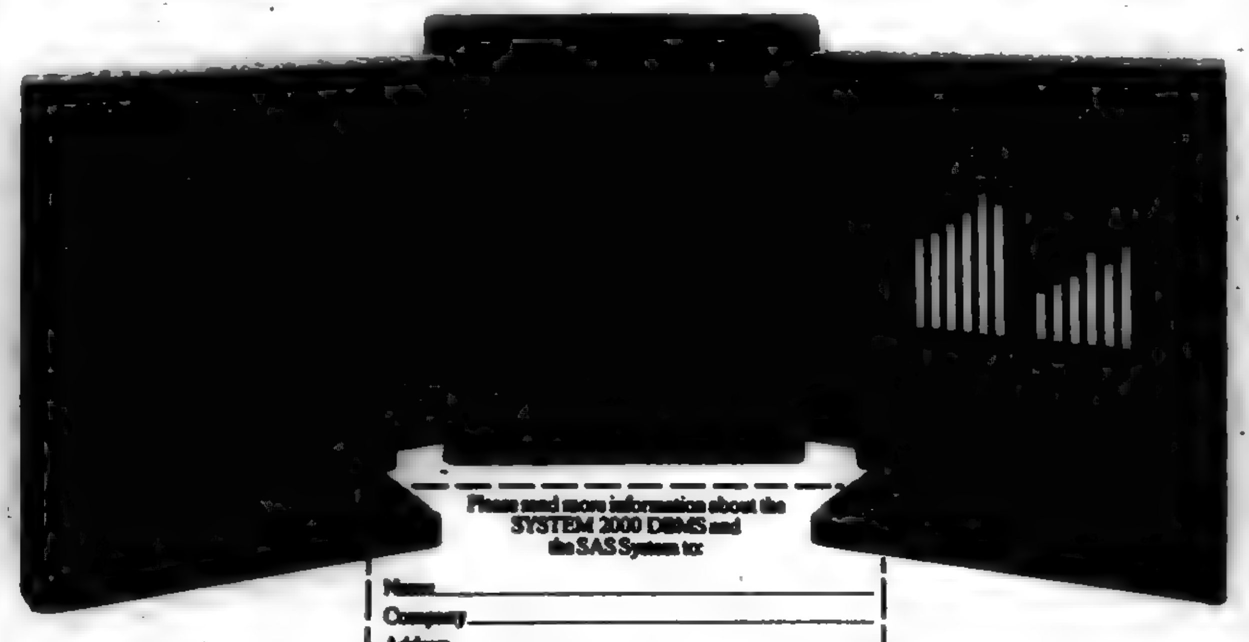

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NEW PRODUCTS/MICROCOMPUTERS

Appleworks 1.3 allows users to access Unidisk 3.5, format a 3½-in. disk from within Appleworks, use the Memory Card or the Extended 80-Column Card as a random-access memory disk and work with Catalyst 3, Quark, Inc.'s mouse-based program selector. It costs $250.

Apple Computer, 20525 Mariani Ave., Cupertino, Calif. 95014.

Systems

A turnkey **digital optical disk-based document image storage and retrieval system** designed for use with an IBM Personal Computer was announced by **Acctex Information Systems, Inc. and Talus Corp.**

The workstation consists of a Personal Computer-based 5¼-in. 100M-byte writable optical disk system with a desktop scanner/digitizer for document-image input, a full-page monitor for document display, a laser/graphics printer for image printing and the Cosmos Revelation relational data base software package.

The system costs $39,900.

Acctex, Suite 600, 131 Stuart St., San Francisco, Calif. 94105.

■

NCR Corp.'s Personal Computer Division has introduced **InteracTV-2**, an enhanced version of its InteracTV interactive videodisk system.

The system allows simultaneous display of video images and computer-generated text and graphics while offering dual-channel sound.

The system combines a color graphics board, a video controller board, an analog red-green-blue monitor, cabling and Interactive Training Systems, Inc.'s ITS Authority software with an NCR PC8 personal computer.

A system, including personal computer, 256K bytes of internal memory, dual floppy disk drives, monitor, videodisk player, speakers and software, costs about $8,500.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479.

Communications

Cygnet Technologies, Inc. has introduced **Get**, an electronic mail search and retrieval program for IBM Personal Computers and compatibles that works underneath other applications.

Get comes with the specifications to check the mailboxes of seven major on-line services and will flash a mail-waiting message in the upper right corner of whatever program the user is working on.

Get will be available for $49.95 in January.

Cygnet Technologies, 1296 Lawrence Station Road, Sunnyvale, Calif. 94089.

■

Software Ventures Corp. has introduced **Microphone**, a communications package for Apple Computer, Inc.'s Macintosh said to automate the telecommunications process.

The package lets users build macros either by activating a "watch me" mode in which the program records a session's keyboard commands and system prompts or through a Script window that displays a set of functions that users can link. A "start-up" mode conducts an entire session from logon to logoff without user intervention.

Microphone is priced at $74.95.

Software Ventures, Suite 220, 2907 Claremont Ave., Berkeley, Calif. 94705.

Storage

Quadram Corp. is offering a line of full- and half-height hard disk drives, including **Quaddrive Models 10MB, 20MB and 72MB**, for the IBM Personal Computer, Personal Computer XT and AT.

Quaddrive 10MB is an internal 3½-in. drive in a 5¼-in. form factor with 10M-byte formatted capacity. Average access time is 75 msec. It includes an upgradable controller card which can be configured for use with larger disk drives. The 20MB, also an internal half-height drive, provides a 5¼-in. form factor, 20M-byte formatted capacity and 85-msec average access time.

The 72MB is a 5¼-in. internal full-height disk drive with 72M-byte formatted capacity. It has a 28-msec average access time and can be used with local-area network file servers.

The 10MB sells for $945. Quaddrive 20MB prices are $1,195 for IBM Personal Computer and Personal Computer XT versions and $1,095 for an AT. For the Personal Computer and Personal Computer XT, Quaddrive 72MB costs $3,995, while an AT version lists for $3,795.

Quadram, One Quad Way, Norcross, Ga. 30093.

Software

Computer Vectors, Inc. has introduced **Version 4 of Rcom**, its communications software package for IBM Personal Computers and compatibles.

Version 4 includes Digital Equipment Corp. VT100 terminal emulation and a user-definable terminal table allowing users to establish their own terminal support.

Rcom allows the personal computer user to connect to another personal computer, to communications networks, services and data banks or to a mainframe computer.

Rcom is priced at $69.95.

Computer Vectors, Suite 206, 22661 Lambert St., El Toro, Calif. 92630.

■

NCR Comten, Inc. has announced **Version 3 of the Comten Advanced Communications Function/Network Control Program (ACF/NCP).**

Comten ACF/NCP resides in a Comten 3650, 3690 or 5620 communications processor and performs network routing functions.

Version 3 includes value-added and IBM ACF/NCP Version 3-compatible functions such as switched-line

Continued on page 40

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NEW PRODUCTS/COMMUNICATIONS

Continued from page 39

IBM Binary Synchronous Communications 3270 terminal support.

The license fee is $1,440. The monthly continuing license fee is $360.

NCR Comten, 2700 Snelling Ave. N., Saint Paul, Minn. 55113.

Multiplexers/modems

Artel Communications Corp. has announced the **MX8**, a fiber-optic multichannel RS-232 data link.

The MX8 can replace up to eight copper cables with a single multifiber optical cable. It can connect a host computer to terminals and peripheral devices up to three miles away.

The eight-channel MX8 multiplexer was designed for asynchronous applications at data rates up to 9.6K bit/sec.

It costs $1,650 per pair.

Artel Communications, P.O. Box 100, W. Side Station, Worcester, Mass. 01602.

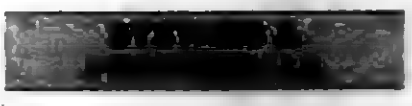
■

Equinox Systems, Inc. has introduced the **LM-8**, a local multiplexer that provides a way to pass eight channels of data and associated control signals up to a mile over a single two-pair cable.

The LM-8 can be used in pairs to connect clusters of terminals to a computer or integrated with an Equinox Data private branch exchange for switching and port-sharing applications. It uses custom very large-scale integration technology.

The LM-8 is priced at $700.

Equinox Systems, 12041 S.W. 144 St., Miami, Fla. 33186.



Turnkey systems

Integrated Digital Products Corp. has announced the **Whetstone Ally**, a mini-mainframe that accommodates up to 32 ports running under the Point Four Data Corp. Iris operating system.

The Whetstone Ally chassis accommodates standard-size 15-in. by 15-in. boards. It has nine slots, with one devoted to Integrated Digital's XS-150 CPU and one to the its I/O Pro processor. The XS-150 runs at 6.7 million instructions per second. The processor package contains the hard disk drive, tape drive and all interface boards.

Main memory can be supplemented with intermediate speed cache memory up to 8M bytes per board. The Whetstone Ally also provides direct memory execution overlap.

The Whetstone Ally is priced at $25,695 for an eight-port system with 170M-byte disk storage and 120M-byte tape storage.

Integrated Digital Products, 4208 E. La Palma Ave., Anaheim, Calif. 92807.

■

IBM has announced additions and enhancements to its **4730 Personal Banking Machine** family.

Models 51 and 52 offer security and vandal-resistant features for cash and deposit transactions in unattended 24-hour operations. Models 11 and 12 incorporate functions of Models 51 and 52 but were designed for attended operations.

The 4730 machines now support Binary Synchronous Communications with host processors as well as Synchronous Data Link Control protocols. The enhanced IBM 4736 offers express cash convenience at indoor locations.

Prices for the 4736 range from $17,000 to $19,000; prices range from $22,000 to $63,000 for the 4730 models.

IBM, Old Orchard Road, Armonk, N.Y. 10504.

Data storage

EMC Corp. has enhanced its **HXP-400** series memories for Hewlett-Packard Co. HP 3000 computer systems.

The enhancement consists of using 120-nsec dynamic random-access memory chips on the cards instead of 150-nsec chips, reducing access time.

The HXP-400 cards are compatible with HP 3000 Models 39 through 58 and come in 1M-, 2M- and 4M-byte models.

The EMC 4M-byte HXP-404 lists for $17,800; the 2M-byte HXP-402 costs $9,900; and the 1M-byte HXP-401 costs $5,500.

EMC, 12 Mercer Road, Natick, Mass. 01760.

Printers/plotters

Lexi Data & Communications has announced **Printmate**, a printer interface for Digital Equipment Corp.-compatible computers.

Printmate operates on most impact, laser and matrix printers. It utilizes the entire LQP-02 input emulation protocol.

Printmate is priced at $495.

Lexi Data & Communications, Suite 130, 2102 Business Center Drive, Irvine, Calif. 92715.

Power supplies

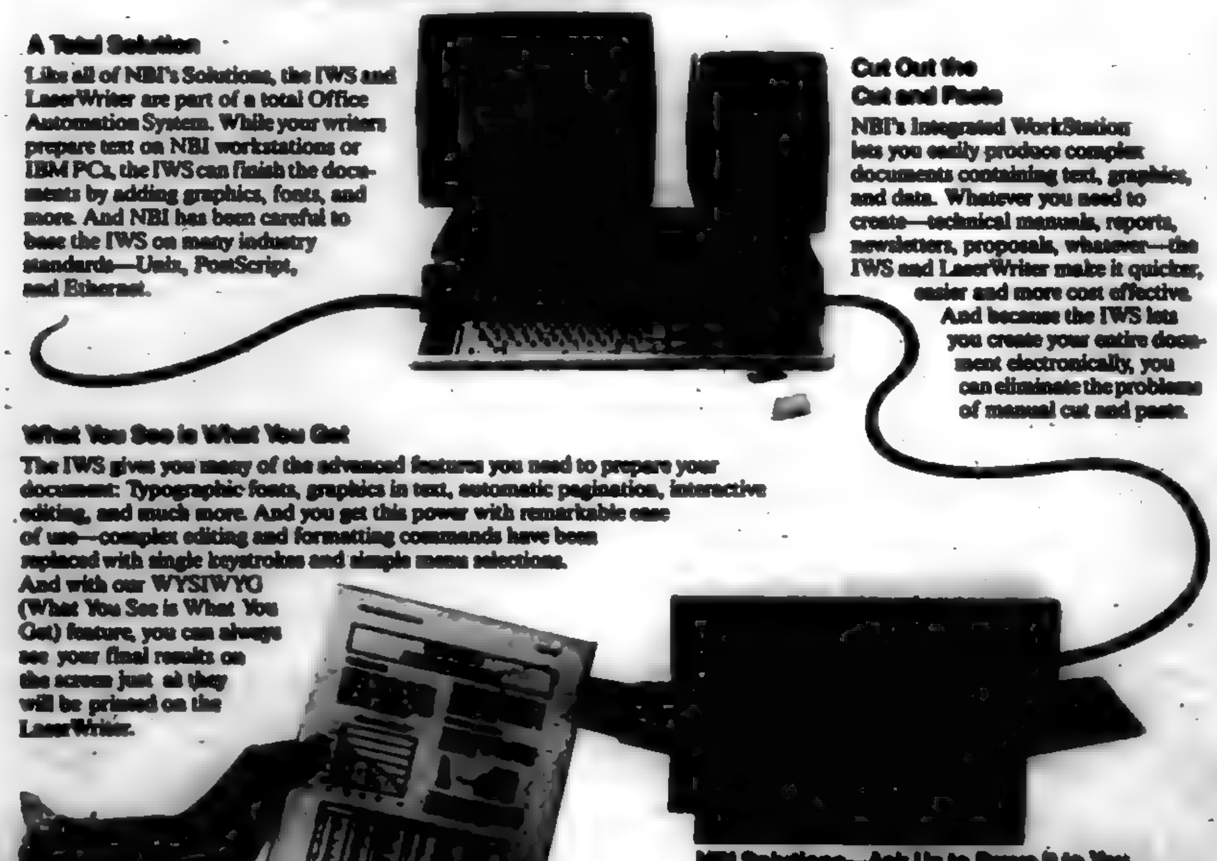
Cherokee International, Inc. has introduced the **QT6-D1** and the **QX9-H2**, two triple-output switchers.

Both units feature fully regulated outputs, input surge current limit, brownout protection and complete overload, overvoltage and reverse voltage protection.

The QT6-D1 is rated at 150W convection cooled and 175W forced-air cooled; the QX9-H2 is rated at 250W and 325W, respectively.

In 100-piece quantities the QT6-D1 is priced at $189, and the QX9-H2 is priced at $299.

Cherokee International, 8 Autry, Irvine, Calif., 92714.



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COMPUTER INDUSTRY

ACTIVE ISSUES

Seasonal sales aid micro mart

By Kathy Porteus

Gone are last year's excess inventory problems and the disruptive influence of IBM's PCjr. Unit sales of microcomputers sold through retail channels, despite being down from 1984 levels, are reportedly better than expected.

Although there is more good news than bad, analysts remain mixed about the outlook for Apple Computer, Inc., Commodore Business Machines, Inc. and Tandy Corp., which are the companies most affected by holiday sales. Personal computer manufacturers such as IBM and Compaq Computer Corp., which sell primarily to business or professional users, generally experience a seasonal swing but not nearly as dramatic as that affecting vendors of so-called "home" computers.

According to Infocorp, a Cupertino, Calif.-based research firm that monitors monthly retail computer sales, approximately 50% of computer sales for personal, nonbusiness applications occur in the Christmas quarter.

Nevertheless, John Girton, a securities analyst with Birr, Wilson & Co. of San Francisco, recently removed Apple from his buy list. "Apple's price per share [trading in the $20 range]," Girton says, "is reflecting a fairly good Christmas. . . Yet the volatility or risk level of the stock is rather high right now."

"The big question on Apple," says Michele Preston, senior vice-president

See SEASONAL page 44

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Paradyne indicted for fraud

Federal suit stems from charges of attempted bribery in firm's bid to land multimillion dollar SSA contract

By Bryan Wilkins

WASHINGTON, D.C. — Paradyne Corp., a Largo, Fla., data communications concern, was hit with a 14-count indictment against the company and seven current and former officials by a federal grand jury in Tampa, Fla.

The indictment charged Paradyne with conspiracy to bribe government officials and defraud the Social Security Administration (SSA) with regard to a 1981 contract to supply data communications terminals to the government agency. The indictment charged Robert S. Wiggins, Paradyne's chairman, with giving false testimony and obstructing justice during an SSA investigation of the contract.

The trouble-plagued contract between Paradyne and the SSA has been the focus of several investigations, including those by the Securities and Exchange Commission (SEC), the Department of Justice and the General Accounting Office — a congressional investigative arm working for congressional committees — in addition to the SSA's own internal examination.

Paradyne labeled the charges "outrageous and so lacking foundation as to be ludicrous." The company said it would fight the charges in court. Three months ago, Paradyne settled out-of-court civil charges brought by the SEC alleging "fraud and deceit" to obtain the contract.

Paradyne had vigorously defended the performance of the data terminals as meeting the terms of the contract it signed with the SSA. Officials of the SSA told Congress

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INSIDE

Sun Microsystems sues Micron Technologies for allegedly delivering faulty dynamic RAM chips/42

Harris merges its analog and digital products divisions, eliminating 100 positions in the process/44

INSTANT ANALYSIS

"Ameritech's commitment is to be the Midwest's premier supplier of communications products and services."

— Ameritech Chairman and CEO William L. Weiss, commenting on the company's decision to earmark half of its 1986 capital budget for fiber-optic and digital switching and transmission systems

INDUSTRY NOTES

AMD reports plan to restore pay cuts

Anticipating some good news this quarter, **Advanced Micro Devices, Inc.** (AMD) told employees recently that AMD pay cuts implemented earlier this year would be rescinded in January if the company experiences a sales increase and fewer losses. Prior to the company's two-week holiday shutdown, AMD spokesman Andy Rothman told *Computerworld* the company set no guidelines as to how much sales must improve or losses decrease before full pay levels could be restored. "We're talking about a reasonable sales increase and fewer losses at the operating level," he said.

See NOTES page 44

Adapso moves to ease tensions

By Maura McEnaney

WASHINGTON, D.C. — The Association of Data Processing Service Organizations, Inc. (Adapso) is attempting to ease tensions between software vendors and microcomputer users miffed over Adapso's actions to stamp out software copyright violations.

Adapso is in the early stages of forming a customer advisory board that it hopes will be able to promote better relations between vendor and user communities. According to Adapso's David Sturtevant, the board will consist of approximately 20 users representing groups like the Micro Managers Association, school districts and organized personal computer user groups.

"We have spent the last 12 months pushing the piracy issue, and we have an

See ADAPSO page 42

Software publishers snub colleague as piracy promoter

Group witholds award for best-selling program

By Peggy Watt

WASHINGTON, D.C. — The sticky specter of user-hated copy protection and software piracy paranoia reverberated through the recent snub by the national Software Publishers' Association (SPA) of a successful product.

The board of the 140-member organization of microcomputer industry developers denied Central Point Software of Portland, Ore., certification under its gold award honoring best-selling software.

Central Point's program qualified by selling more than the requisite 100,000 copies, but because Central Point's indisputably popular Copy II series was designed to enable users to copy most copy-protected disks, uneasy board members voted thumbs down "to protect the integrity of the certification program."

Felt hostility from SPA members

Central Point President Mike Brown said he felt so much hostility from fellow SPA members that he left the organization's conference, not only without the expected award, but before appearing as a scheduled speaker.

SPA Executive Director Kenneth A. Wasch said the incident was an unanticipated exception to the simple rules of the organization's new certification program. He said the board required only an impartial audit verifying sales for a product to get an award but had also left a loophole "to reserve the right to make certain judgment calls."

A copy-protection-breaking program, according to Wasch, is "not the type of program the board intended to be eligible for the award."

Brown said he is still a member of the association and supports many SPA activities but sees the snub as an overly defensive blow by developers against problems they fear but cannot fight. His product is more than a convenient utility, he said. It represents a philosophy about serving the computer user.

"Not every illegal copy made is a lost sale," he said. "There's a difference between what people are willing to own and what they're willing to buy."

Used to rejection

Central Point is not unfamiliar with rejection, having had several major distributors refuse to carry its products.

"By conventional wisdom, we shouldn't be in business," Brown said of the company that did more than $6 million worth of business this year.

"I believe piracy is wrong and a problem to be solved, but I don't believe copy protection is the way to do it," he said.

Wasch denied some observers' charges of censorship by the board. "We believe the widespread use of this product will reduce the growth of the industry," he said.

Krag Brotby, president of Vault Corp., Westlake Village, Calif., which designs copy-protection schemes and is currently involved in a court battle against another manufacturer of copy-protection-breaking programs, called the SPA's denial of an award for Central Point appropriate.

He said the decision jibes with the organization's fight against software piracy and to give certification would have been an uneasy juggle.

Sun sues Micron over chip deal

By Maura McEnaney

SANTA CLARA, Calif. — Workstation manufacturer Sun Microsystems, Inc. is seeking $5 million in damages from Boise, Idaho-based Micron Technologies, Inc. over what it claims were faulty Micron 64K-byte dynamic random-access memory (RAM) chips delivered in October 1984.

Both Sun and Micron officials would not comment on the suit, filed recently in California Superior Court in Santa Clara County and later moved to the U.S. District Court in San Jose, Calif.

The six-count complaint, which includes charges of fraud and breach of contract, claims that problems with the Micron chips caused the company to halt temporarily production of its product line earlier this year. "The shutdown resulted in temporary layoffs of Sun employees and prevented Sun from filling customer orders," the complaint said.

The suit also claims that potential customers told Micron there were problems with its 64K-byte dynamic RAM chips but that Micron still sold Sun its product. Memory boards containing Micron chips and inserted into Sun workstations failed 85 times more often than chips purchased from other vendors, according to the suit.

As a result, the suit said, the company was forced to buy chips from another manufacturer, leaving Sun with "substantial, unrecovered out-of-pocket expenses for defective equipment and lost profits and damage to its reputation and goodwill." Sun is seeking an additional $890,000 to recoup those expenses.

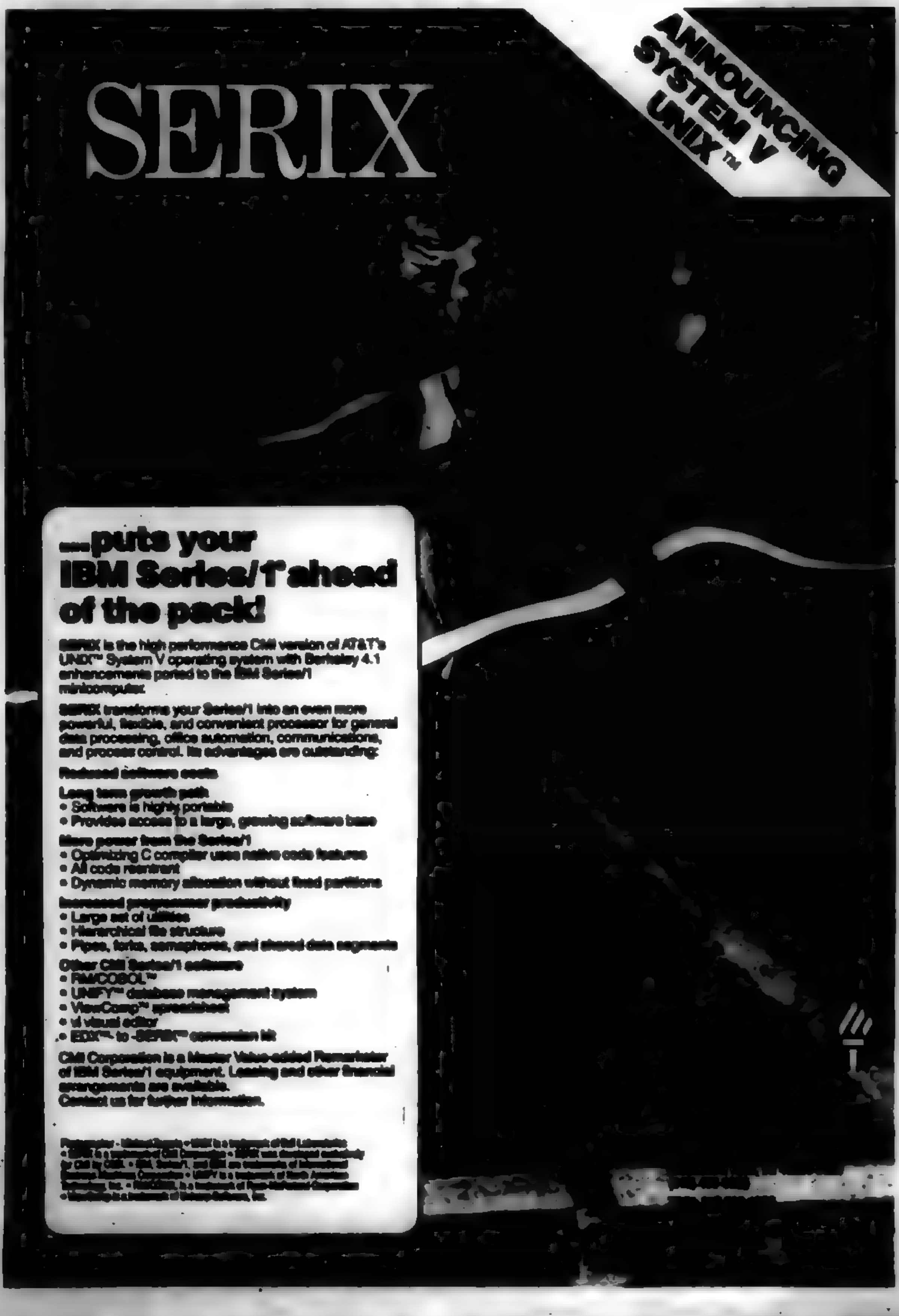
Motorola files trade secret lawsuit against Mostek

DALLAS — Motorola, Inc. recently filed a $20 million lawsuit against United Technologies Corp.'s former Mostek Corp. unit, charging Mostek with spilling proprietary trade secrets regarding 68000 series microprocessor chips while it produced them for Motorola.

Filed in U.S. District Court, the suit claims that Mostek conveyed the product information to the federal government during a 1981 contract bid and recently to Thomson S.A. during negotiations about Mostek's future. Thomson, the French-owned electronics giant, recently purchased the loss-plagued chip unit from United Technologies [CW, Nov. 11].

Motorola cut off Mostek as a second-source supplier of 68000 series chips in early November when it learned that United Technologies planned to close the Carrollton, Texas-based Mostek.

The suit requests the federal court to place Mostek's assets in a trust fund until the case is resolved.



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Adapso moves to ease tensions

From page 41

impression that the practice of copying software has been significantly reduced," Sturtevant said. But Adapso's move last year to sue users suspected of copying software created bad feelings among some users who said they feel they are already being shortchanged by vendors with shrink-wrap licenses, maintenance agreements and low product quality, he noted.

The new advisory board was designed to give both sides a chance to iron out some of their differences, Sturtevant said. "We don't want to dismiss the fact that a portion of the population is concerned about quality issues," he said. Representatives from IBM, Micropro International Corp. and Ashton-Tate are among those scheduled to address the committee, he noted.

In other action, Adapso is still waiting on a decision from the U.S. Department of Justice on its efforts to establish a set of hardware and software standards for the addition of a software security "lockbox."

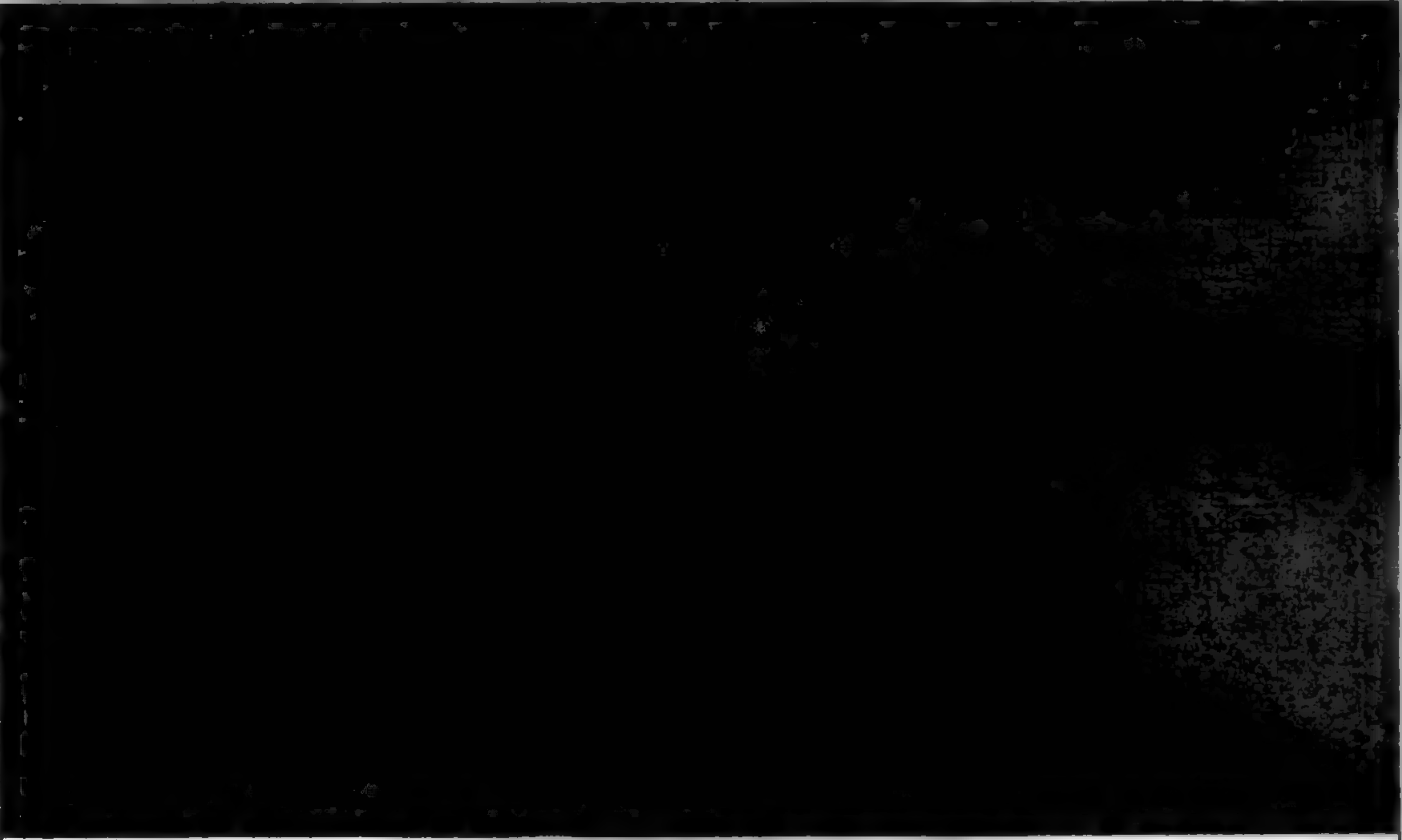
According to Adapso attorneys, the group is awaiting word from the Justice Department that its attempts to establish such standards are not in violation of any antitrust regulations. The request has been in the hands of the Justice Department for a year.

Paradyne indicted for fraud

From page 41

that they altered the original specifications of the Paradyne contract after the terminals faced initial problems in performance but said that the SSA was satisfied with the performance.

Last month, the SSA renewed a one-year contract, valued at $12.4 million for 1986, with Paradyne to support the terminals while it completes an analysis of bid proposals to install a new data communications system to be located at the SSA's processing center in Baltimore, Md.



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COMPUTERWORLD
FOCUS

Harris combines analog, digital product divisions, cuts 100 jobs

By James A. Martin

MELBOURNE, Fla. — Harris Corp. earlier this month merged its analog and digital products divisions and eliminated some 100 administrative positions in an effort to reduce costs and "avoid duplication of managements," a company spokesman said recently.

The two divisions were merged to form the New Products Division, but no change in existing product lines is expected.

The Analog Division was responsible for manufacturing analog circuits for telecommunications, multiplexers and data conversion, among several other areas.

The Digital Division manufactured CMOS microprocessors and peripherals, static random-access memory and bipolar and CMOS programmable read-only memory chips.

Production of the newly formed division will "reflect demand, which is not great because of the decline in the industry," said Jim Murphy, manager of public relations.

Unaffected by the merger were the Harris Microwave Semiconductor and Custom Integrated Circuits divisions as well as Matra-Harris, the company's joint venture concern for semiconductor production.

Notes: Lotus appoints exec

From page 41

Lotus Development Corp. appointed **Michael E. Kolowich** to a new position, **corporate vice-president of marketing.** It is the first computer industry job for Kolowich, 33, after his five years at **Boston-based** consulting firm **Bain & Co.**

■

Televideo Systems, Inc. announced its **first quarterly profit** in more than a year, earning $412,000, or 1 cent per share, in the fourth quarter ended Oct. 31. The profit was accompanied by a **revenue drop** from $30.5 million in the year-earlier period to $25.4 million, reflecting Televideo's cost retrenchment and move of nearly all of its manufacturing to the **Far East.**

For the full year, Televideo lost $19.2 million, or 46 cents per share, compared with a profit of $4.5 million, or 11 cents per share, in 1984. The company's sales dropped from $163 million to $103.1 million.

■

Proteon, Inc., a Natick, Mass.-based maker of **token-ring local-area networks**, appointed **Frances Scricco** to the position of **president and chief executive officer**, a post that had been vacant since August. Scricco is a former general manager of General Electric Co.'s commercial electronics products department. **Paul Rosenbaum**, who had been Proteon's president and CEO, left the company to "pursue other interests," Proteon said.

Seasonal sales aid micro mart

From page 41

with L. F. Rothschild, Unterberg Towbin, "is how successful its new product strategy is going to be, and I don't think we will know that for at least six months." Preston, who estimates Apple will earn 60 cents per share this quarter, says she views Apple as a trading opportunity, based on a good Christmas for the company.

According to John Dean, senior securities analyst with Montgomery Securities, Apple is having a better Christmas than the company originally expected. Dean recommends Apple because he expects that, short-term (1 to 3 months), the stock "can still move into the mid-$20s."

"Within 12 months," Dean continues, "assuming that there are solid announcements in the first-quarter time period, I think Apple can certainly move back to the $30 price point that we saw a year ago."

This Christmas, Commodore will likely sell as many computers as the company anticipated, according to Robert T. Cornell, first vice-president with Paine Webber, Inc. Commodore is selling two new products this year: the C-128, which succeeds the C-64; and Amiga, which features advanced graphics capabilities and 256K bytes of memory.

But Commodore's holiday sales mix will be "biased toward the [lower cost] C-64, which is selling surprisingly well, rather than the C-128," Cornell says. As a result, Cornell suggests that Commodore's December quarter profits will not be as robust as, for example, Apple's profit margins.

Most analysts expect Commodore, which has not posted a profit since the quarter ended December 1984, to break even in the current quarter. Regarding Commodore's outlook, Cornell maintains that the "C-128 is now more important than Amiga in terms of sales and profit dollars."

By most accounts, Tandy is staging a comeback after 18 troubled months. So far this Christmas season, Tandy has indicated that its Model 1000 is selling above company expectations. According to Preston, Tandy's stock reflects "increasing confidence in what Tandy is doing and should continue to go up."

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Virginia Commonwealth University just installed four superminicomputers (Pyramid 90x) as the basic servers on a local area network (LAN) spanning our urban campus. The LAN is connected via RJE to an IBM 3081D at a computer center 3 miles away. We have immediate openings for technical leaders in our Systems Software and Hardware sections.

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The successful candidate will know UNIX internals and networking protocols. Ability to analyze emerging software options and design for the future incorporation of computing into all academic functions is especially desired. Salary range: $29,987-40,833. Position number 00065.

COMPUTER SYSTEMS ENGINEER

The successful candidate will be familiar with board level maintenance and repair of mini and micro computers. Especially important is the ability to integrate hardware and software components into a growing, but stable system. Supervision of Operations and Electronic Repair staff is part of this job. Salary range: $27,382-37,381. Position number 00084.

Virginia Commonwealth University is located in the historic fan area of Richmond, VA within driving distance of the Atlantic and Chesapeake Bay Shores, the Blue Ridge Mountains, the Nation's Capital, and the Research Triangle. Academic Computing serves a community of 20,000 students taught by 1800 faculty in the College of Humanities and Sciences and Schools of the Arts, Business, Community and Public Affairs, Education, and Social Work.

Interested applicants should submit a resume with a cover letter indicating the position number(s) by January 31st, 1986 to:

Virginia Commonwealth University
Personnel Department
Box 2511, VCU
923 West Franklin Street
Richmond, Virginia 23284-0001

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Indiana University of Pennsylvania invites applications for permanent tenure-track and temporary positions in the Department of Finance/MIS. One position will be an assignment to the branch campus. Permanent appointment requires a Ph.D. or DBA with major concentration in Management Information Systems or related discipline [illegible] one year of completing doctorate will be considered. Doctorally qualified candidates with a strong record of publications and scholarly activity may qualify for a [illegible] Temporary appointments require an MBA and/or related experience. Training and experience in topics related to Management Information Systems are required. Courses or experience in COBOL programming, Systems Analysis and Design, Database Management Systems and Computer Technology are required. Also desirable is a knowledge of microcomputers, [illegible] distributed systems, local area networks and computer security. Responsibilities include teaching 9-12 semester hours, advising students, serving on faculty committees, assisting in the development of curriculum and participating in various academic and professional activities. Initial screening will begin January 15, 1986. Applications will be accepted until positions are filled. Send letter of application, resume, transcripts and three letters of reference to:

Chair, Search Committee
Finance/MIS Department
Indiana University of Pennsylvania
Indiana, PA 15705

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USER SERVICES CONSULTANT

Experienced academic computing consultant or DP professional for consulting/training position in User Services Clinic. Assist students, faculty, and staff at all experience levels to use computing facilities. Designs, writes and documents text user-friendly software. Assist Clinic Manager in training and overseeing students employed by User Services. Organizes and participates in user group activities.

Requires experience with IBM mainframe systems and software (VM/CMS) and with micro-computers (IBM PC Apple families). Knowledge of SAS, SCRIPT, Fortran, micro-software, file transfer, and other communications software, disk/tape experience desirable. Strong service orientation, excellent communication skills, and organizational skills required.

Please send resume and salary history to: JOHN R. PIGOTT, COMPUTER CENTER, 87 PROSPECT AVE.

Princeton University

PRINCETON, NEW JERSEY 08544

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SYSTEMS ANALYST: Respons. for the design, coding, testing, debugging, enhancement of various applications as they relate to businesses and financial institutions. Must have expertise in COBOL, RPG III, RPG II, MAPICS, G/L, A/P, A/R, Utility Programs, Loans, Bonds & Notes System. Hardware - IBM System 38. Requires: 2 yrs college in Data Processing; 4 yrs related programming exp. Pays 40K/yr, 40 hrs/wk. Mail resume to NY State Job Service, JO # 0027153, 485 Fifth Ave., NY, NY 10017. DOT 012.167-066.

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Lead Systems Analyst/Programmer for [illegible] in S.W. Ohio to manage the operation of the computer facility, [illegible] and provide technical guidance and training for four computer programmers, and provide computer software analysis and design, and computer programming support for the [illegible] requirements of the [illegible] [illegible] Requires Bachelor's degree in Business Administration with [illegible] in data processing or Bachelor's degree in Computer Science with one course in [illegible] management and finance, and 2 courses in accounting. 1 year experience as computer programmer to include programming a Harris [illegible] Computer, writing control programs for graphic devices (1 month program [illegible]), setting up and operating the FAA INTEGRATED NOISE MODEL (6 months experience), experience in FORTRAN (1 year). Must have had 1 course in COBOL. 40 hrs/wk. $2,050 per month. Send resume with this ad to Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216. Attn: JO #[illegible], L. [illegible].

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Computer Consultant - To consult with clients, analyze procedures and problems using general knowledge of project requirements. Confer with personnel to ascertain specific requirements; study data to improve production. Specify in detail logical and/or mathematical operations; conduct studies, develop new information systems. BS in Computer Science or equivalent in experience; 3 years [illegible] programming and design; large scale project design including data base design. Strong PL/I and COBOL programming background including use of DL/I/DB. Use of structured programming and design. [illegible] and TSO/SPF Development Tools. Previous consulting experience. 40 hour week, 8-5, M-F, $41,000 per year. Send resume to: Job Service of Florida, [illegible] Rd., Orlando, FL [illegible], JO [illegible].

ENGINEER - SENIOR [illegible] Design, develop [illegible] systems for use [illegible]. Design high speed digital circuitry, application of CMOS, S-TTL, ECL & Linear components, work with lasers, LED's, PIN-FETS & ADP's, utilize CAD & PCAD systems for custom design of VSLI components; [illegible] Must have Bachelor's in Electrical Engineering & 3 yrs. exp. or 3 yrs. [illegible] $43,[illegible] yr. [illegible] Mail resume to: NYS Job Service, State Office Building, Veteran's Memorial Highway, Hauppauge, New York JO # [illegible] D.O.T. [illegible].

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74 West Park Place
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(203) [illegible]

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ATTENTION ENVIRONMENTAL COMPUTER SPECIALISTS

The Environmental Protection Agency (EPA) is accepting applications for a position in the Office of [illegible] Pollution Control at Headquarters in Washington, D.C. This position requires skills in writing original computer programs using a high-level language, e.g. PL/I, or SAS [illegible], TSO and [illegible] [illegible] color graphics terminals. Applicants should be familiar with [illegible] dynamic allocation of main storage and data sets, and inverted files, and their use in projecting the [illegible] and fate of pollutants in the environment. The promotion potential is GS-9 thru GS-12 ($21,804 - $[illegible]) and will be based on your qualifications in the computer field. US citizenship is required. This is a term appointment, not to exceed two years.

Send a completed SF-171
Application For Federal Employment To:

[illegible]
EPA Personnel Division (PM-212)
401 M Street SW
Washington, DC 20460
by January 17, 1986
For Technical Information On The Position
Applicants May Contact: Karen [illegible] at
(202) 382-7280
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SENIOR COMPUTER SYSTEMS ANALYST wanted to design and develop software programs for business and financial applications; analyze complex computer systems; code, test, debug, document and implement software for use on Burroughs mainframes using GEMCOS/MCP, STOS and DMS II software for COBOL computer language. Requires Bachelor's degree in Electronics & Communications Engineering and two years related experience as a Software Engineer; $35,000.00 per year, 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #[illegible] "Employer Paid Ad".

FINANCIAL PROGRAMMER

Using knowledge of computer programming, sets data entities systems, inventory control and order processing on computer. Instructs management on use and application of system. Must have Bachelor's degree in Computer Science and 2 years experience in the field or 2 years experience as an accountant. Must speak Chinese-Mandarin dialect. Salary $27,500 per year, 5 days per week, 40 hours per week. DOT Code 012167066. Please mail resume to: NYS Job Service, 485 Fifth Avenue, New York, NY 10017. Refer to Job Order No. [illegible].

SOFTWARE ENGINEER

- To design and implement minicomputer emulation, communication and application software systems. Also, coordinate technical support for client program maintenance and data downloading/load procedures. Software will be developed for IBM S/34, S/36, S/38 and PC using RPG, C, Assembly language and various communication protocols. Requires M.S. degree in Computer Science, with knowledge of engineering. 40 hr/wk: 8:30 - 17:00; $27,000/yr. Send resume to: [illegible] Inc. [illegible] Poplar Ave., Suite 202, Memphis, TN 38119.

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Auxton Computer Enterprises, Inc. (AUXCO), a recognized leader in the data processing management consulting and software industry, is expanding its Technical Staff to accommodate its ever increasing business demands. Recently identified as number SEVEN among "The Best Little Growth Companies in America," AUXCO addresses the Telecommunications needs of Fortune 500 companies both nationally and worldwide.

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Position open for an ACP Systems Programmer/Programmer Analyst, electronic [illegible] processing. Duties include Programming and Systems Analysis using Airline Control Program (ACP), Software maintenance and modification, building ACP diagnostics to catch systems problems, systems modification required by change in hardware, disk Input/Output (I/O) routines, [illegible] hardware changes, making logic changes to the Initial Program Load (IPL) portion of system, and working with ACP [illegible]. [illegible] programming staff on special projects.

Applicant must have 2 years college and 3 years experience in Airline Control Programming (ACP) environment. Ability to work well in a group situation is a must. Applicant must also be familiar with CMS programming [illegible]. Minimum salary is to $23,000 per year for a 40 hour work week. However, additional salary up to $44,000 per year will be paid if applicant possesses additional experience.

Interested applicants should contact the Oklahoma Employment Security Commission, 3105 E. Skelly Drive, Tulsa, Oklahoma 74145, Phone: (918) 749-6661. Refer to Job Order #[illegible].

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Should be able to determine the information needs of the management and design an information system for the company. Experience of an electricity company with a strong background of generation, transmission and distribution fields is desired.

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Should have extensive knowledge of MVS/XA operating system, CICS, SNA, VTAM data structure, data bank system, simulations and determination of hardware, software and communication problems, etc. Should be able to do capacity planning and monitor system performance, trouble shooting and evaluation of latest developments in the field of hardware, software and office automation.

SYSTEM PROGRAMMER: (1)

Should have experience of system generation and maintenance of MVS/XA online processing, CICS, SNA, VTAM, Database, VSAM. Knowledge of ASSEMBLER is essential. Should be able to develop utilities for the users. Conversion experience from VSE to MVS/XA will be considered as an added qualification.

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Should have sound knowledge of database, online processing, application design, particularly in fields of generation, transmission, distribution and customer services, system development, testing, technical evaluation, review and documentation. Good knowledge of FORTRAN and/or COBOL is essential.

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Submit resume to:

Mr. [illegible]
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SENIOR SOFTWARE ENGINEER/ANALYST: Must possess MS Degree in Computer Science and have 4 years experience as systems analyst. Design and development of real-time multi-tasking process control systems for food, dairy and other related industries. Responsibilities include design and development of applications, software packages using "C", Pascal and Macro-11, Assembler Language for DEC, DEC-11, PDP-11 Computer Systems. Knowledge of DEC's RSX-11M operating system required. Position requires good understanding of computer and I/O interface hardware and demonstrated experience in real-time, multi-tasking software development. Requires knowledge of process control programming and data communications. Salary $36,000 per year, 40 hours per week, 8:30 a.m. to 5:00 p.m. Travel required. Send resume to Department of Employment Security, [illegible] St., Knoxville, TN 37901.

COMPUTERWORLD

COMPUTERWORLD's paid circulation climbed to over 126,000 this fall. Folio 400 (Folio Magazine's study of trade publication performance) placed us first in total revenue. As the industry grows, so will **COMPUTERWORLD**. It will continue to offer the high quality news coverage and editorial content that has attracted its readers. What does that mean to you, our advertisers? Good news...in the form of wide exposure.

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Executive Reports

- Jan. 13 - **Expert Systems in DP**
- Jan. 20 - **Bridging to the IBM Office**
- Feb. 3 - **Unix**
- Feb. 10 - **DP as a Profit Center**
- Feb. 24 - **Application Software Development**
- Mar. 3 - **Mass Storage Systems**
- Mar. 17 - **Managing Voice & Data Communications**
- Mar. 24 - **Personal Computer Networks**

Product Spotlights

- Jan. 27 - **Manufacturing Software**
- Feb. 17 - **2400 bit./sec. Modems**
- Mar. 10 - **32-bit Workstations**
- Mar. 31 - **Mainframe & Mini DBMS**

COMPUTERWORLD publishes every Monday with an ad deadline of 10 days prior to each issue date. The issue of January 13th will be closing January 3rd. You may send in copy to be pubset or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone.

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POSITION ANNOUNCEMENTS

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To: Dr. Gary E. Stevens
Department of Computer
and Information Sciences
Hartwick College
Oneonta, New York 13820
An Equal Opportunity Employer.

SENIOR COMPUTER SYSTEMS ANALYST wanted to analyze and resolve significant computer systems operating problems; analyze present manual or computer-based systems and to develop recommendations for improvement; develop systems related proposals, including cost analysis; and design new systems applications software and to assist in the design of complex computer systems. Requires B.S. degree in Electronics and Communications Engineering and two years experience. $34,500.00 per year. 40 hours per week. Send resumes to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #70986. "Employer Paid Ad".

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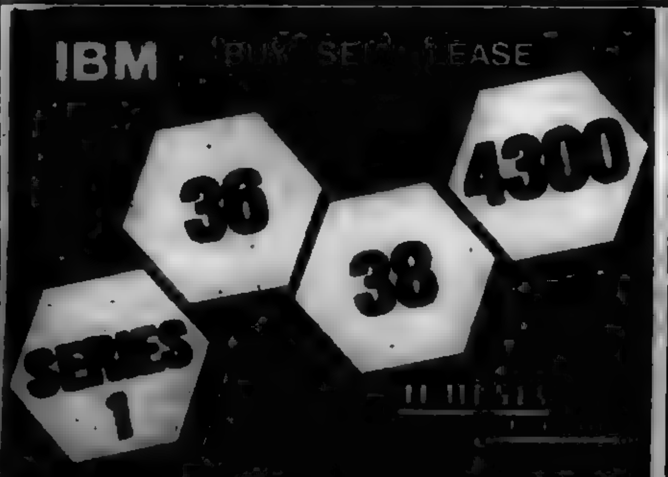

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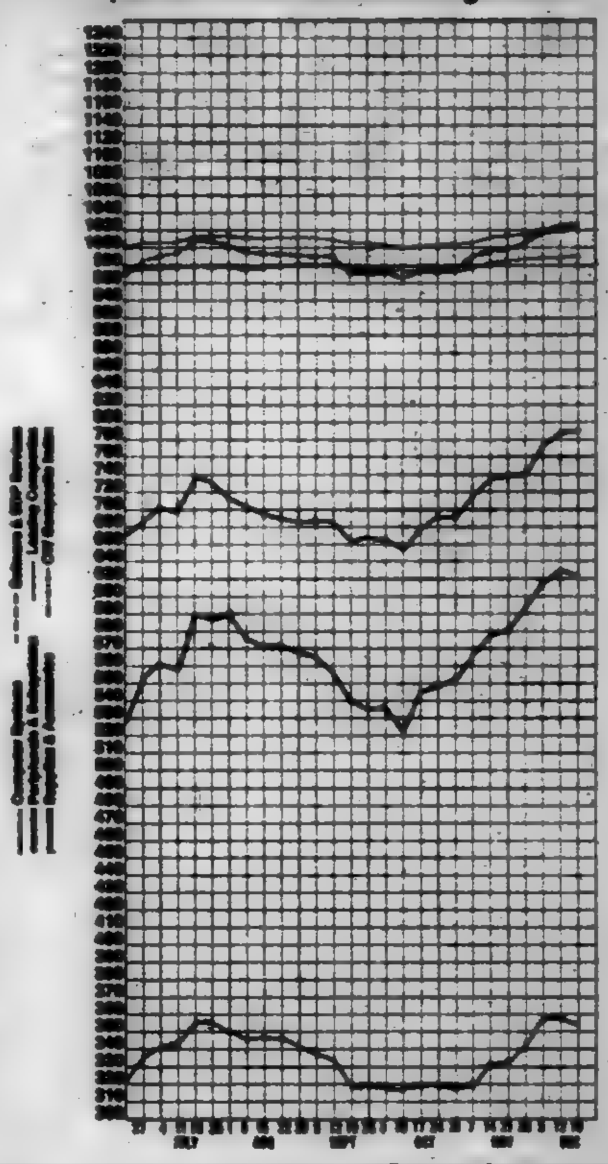

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AT&T starts dedicated net for the Defense Department/**98**

Great expectations
Cautious optimism marks analysts' views of year end/**105**

TOP OF THE NEWS

The basic IBM Personal Computer seems to be nearing the end of its active product life, but some still see a future for it. **Page 8.**

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Relational Database Systems, Inc. unwraps a fourth-generation language product. **Page 12.**

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The government should conduct more research on VDT health concerns, a congressional office concluded. **Page 10.**

■

The computer industry will take its bid to retain tax incentives to the Senate. **Page 6.**

■

ETA Systems, Inc. sold a supercomputer that has not yet been announced. **Page 103.**

■

Will IBM-compatible micros run on the Token-Ring network? **Page 96.**

■

Some unusual software packages of 1985 underscore inventiveness in the industry. **Page 93.**

■

Layoffs are "almost guaranteed" at networking products manufacturer Corvus Systems, Inc. following the troubled company's recent merger with IBM Personal Computer-compatible maker Oemtek, Inc., knowledgeable sources said. Indications are that up to 150 of Corvus' 550 workers could be laid off anytime soon. A Corvus spokesman denied the layoff rumor, but in December the company said sales for the quarter just ended were less than 50% of those of the year-earlier period, resulting in a $4.6 million loss.

■

Adobe Systems of Palo Alto, Calif., seems to be on its way to setting a de facto standard in printer communications software before there is even much competition. Adobe's Postscript, the language of choice for Apple's Laserwriter, was recently selected by DEC for as-yet-unannounced printer products, and sources indicate that Hewlett-Packard is one of those considering Postscript for its high-end laser print-

See NEWS page 7

CW EXCLUSIVE

Word power: Mass. agency shifts standard

By Rosemary Hamilton

A Massachusetts state agency's recent experience in selecting a new agencywide word processing software standard provides a rare glimpse at how an organization weighs and judges competing computer products.

The situation also illustrates the obstacles to implementation, once a switch in standards occurs, that organizations frequently face as they make the change from one basic software application to another.

The Massachusetts incident involves the state Bureau of Systems Policy and Planning and its decision to use Microsoft Corp.'s Word program as its word processing standard, replacing Multimate 3.3 from Multimate International Corp. of Hartford, Conn., now a subsidiary of Ashton-Tate. Although senior BSPP managers see Word as having superior long-term benefits, its selection, following an exacting evaluation process, caused short-term difficulties as the staff reacted to change.

"Some people still want Multimate. But we're going to make Word work," said James Corum, director of BSPP.

A division of the Office of Management Information Systems, which is governed by Massachusetts' Executive Office of Administration and Finance, the BSPP awards hardware and software contracts to vendors for the 178 state agencies in Massachusetts. It monitors vendors and provides technical advice to other agencies by determining equipment requirements.

Both Corum and Michele Dorr, the BSPP senior analyst who headed the

See MASS. page 4

VM software niche grows

IBM neglect, user need boost independent firms

By Bryan Wilkins

WASHINGTON, D.C. — Independent software companies, responding to heavy user demand, have carved out a lucrative market supplying utilities that improve the performance of IBM's VM operating system. In some cases, users are actually assisting these companies in the development of new products.

This trend, which apparently surprised IBM with its extent and intensity, has prompted the industry giant to show new strategic interest in the once-neglected product. IBM has consequently begun to deliver a wide array of VM-related products across several hardware lines, in ad-

See VM page 5

Scanner puts text on-line

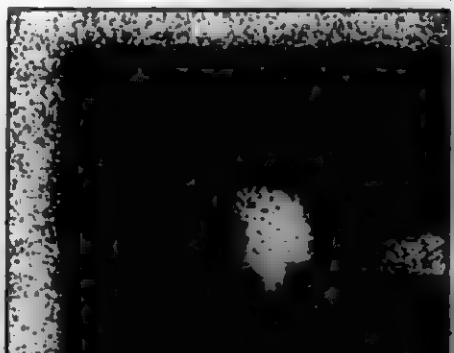
By Peggy Watt

MILPITAS, Calif. — A low-cost optical scanner that takes only 30 seconds to convert a page of standard printed text to an on-line file, formatted for most word processing programs, is set to debut this week from Dest Corp.

The scanner, called PC Scan, will be introduced along with the first in a line of accompanying software, Text Pac, that recognizes most common typefaces used in business documents. Priced at less than $3,000, the optical reader equipment supports printer output at 300 dot/in., matching the quality of most low-cost laser printers.

Future software for use with PC Scan

See SCANNER page 6



Industry climes: Forecast '86

On page 17 of this special double issue, you will find *Computerworld's* annual year-end Forecast section, in which staff editors and senior writers assess recent trends and forthcoming developments across the spectrum of computer applications.

Forecast '86, CW's traditional look ahead, focuses on concerns as diverse as the brewing winds of international trade war and the hoped-for panacea for programmer productivity ills. The special section also explores the strategies that semiconductor and mainframe makers will employ to rally in 1986. An inside look at how the slump of 1985 stranded one high-flying workstation vendor provides insights into the tough times for high technology.

Special features in this year's section include "Outlooks '86," a series of comments from leading analysts and opinion makers on the shape of things to come. Applications integration and micro-mainframe links also come under the microscope of Forecast '86. And you'll learn how emerging technologies are transforming microcomputers into more than just personal computers. The issue also sheds light on how users are coming to grips with the cornucopia of communications options. Forecast '86 shows how AT&T has focused on the computer market and how General Motors Corp.'s Manufacturing Automation Protocol will fare. And, finally, users can view the high-tech world from the perspective of Capitol Hill.

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NEWSPAPER

DP policy for federal agencies issued by OMB

By Mitch Betts

WASHINGTON, D.C. — The U.S. Office of Management and Budget (OMB) has adopted a sweeping policy document that establishes rules for the management of federal DP systems and the dissemination of government information to the public.

Many of the policies were designed to cut costs and make government computer management more businesslike. The U.S. government is spending about $15 billion a year on information systems, the OMB said.

The final version of the document, called Circular A-130, requires federal DP managers to recover DP costs from all users, share computer facilities with other agencies, acquire off-the-shelf software whenever possible and improve computer security.

The document said government officials should feel free to obtain DP services from any low-cost source in the public or private sector, not just the central DP operation within their own agencies. The OMB explained that "monopoly" DP offices inside the agencies have little incentive to control costs.

The OMB also urged agencies to charge user fees for government reports and to rely on private sector vendors of information services to disseminate government information, the latter position supported by the Information Industry Association.

The draft of the circular [CW, March 4] was highly controversial and elicited 350 written public comments, according to an OMB count. Most of the comments criticized the OMB for what was perceived as an attempt to restrict the flow of government information to the public.

Critics, including scores of librarians and some businesses, complained that private publishers and data base vendors charge higher prices and may not find it profitable to sell some little-known government reports. Critics also expressed concern that members of the public may have to buy computer equipment to retrieve government data in electronic information systems.

In response to the controversy, the OMB toned down some language in the circular but retained the basic policy decisions. The final circular stated that agencies should disseminate information only when necessary for the performance of government functions, avoid duplication, impose user charges where appropriate and disseminate information with "maximum feasible reliance on the private sector."

Research shows 20 states tax software sales

Taxes vary with states' classification of software

By Mitch Betts

In the U.S., 20 states now impose a sales tax on custom computer software programs, and 44 states and the District of Columbia levy a sales tax on off-the-shelf software, according to Commerce Clearing House, Inc. (CCH), a tax research firm in Chicago.

CCH reported that the methods states use to apply their sales taxes vary greatly because computer software is not easily categorized as tangible or intangible property, since the value of the software usually exceeds the value of the magnetic tape or disks.

States trying to tax sales of software generally classify software as tangible property, whereas other states generally classify software as intangible property or as an incidental part of a service, CCH reported. Furthermore, many states distinguish between canned or off-the-shelf software and custom software, CCH said.

State definitions vary

State definitions of custom software vary, so the term may refer to a canned program modified to meet a particular customer's needs or to a totally individualized program, CCH said.

According to CCH, the states that tax custom programs are Arkansas, Connecticut, Georgia, Hawaii, Idaho, Kansas, Kentucky, Mississippi, Nebraska, Nevada, New Mexico, Ohio, Rhode Island, South Carolina, South Dakota, Tennessee, Virginia, West Virginia, Wisconsin and Wyoming.

Alaska, Delaware, Montana, New Hampshire and Oregon do not impose any sales taxes. Of the other 45 states and the district, only Illinois totally exempts off-the-shelf programs from its sales tax, according to CCH.

The CCH study noted several states with special exemptions to their sales taxes.

For example, the states of Colorado, New Jersey and New York do not tax an off-the-shelf software product if it requires modification or if the selection of the software requires an analysis of the customer's requirements, and Georgia's tax code exempts software written to a customer's specific needs and at the customer's place of business.

Cost of leased equipment to rise

WASHINGTON, D.C. — AT&T Information Systems said recently that it intends to raise its leased business equipment rates as well as offer new long-term contracts. Prices on some types of equipment will jump as much as 20%, AT&T Information Systems said. The new rental rate would go into effect Feb. 1.

An AT&T spokesman said that the equipment subsidiary of AT&T is also considering raising residential equipment rental rates.

Brian Moir, counsel to the International Communications Association, which represents large users, said that business has known for the last two years that the rental price stability contracts would be expiring in 1986. "They've been on notice all along," Moir said.

He said users of the old equipment had three options: to negotiate new fixed-price contracts, to replace or upgrade existing equipment at new terms or to go to a third-party supplier.

AT&T Information Systems said its new policy would offer users the option of leasing from one to four years, with a longer lease resulting in lower rental costs.

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MCI Communications introduced its own version of AT&T's Megacom long-distance service for high-volume users, priced 10% less/ 99

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PAGE ONE ILLUSTRATION BY DAVE RIDLEY

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Mass. agency shifts standard

From page 1

word processing task force that gave the nod to Word, said the transition period, while rocky, will have been worth the effort. Nevertheless, according to Dorr, "there is still lots of hostility."

Word was one of three personal computer word processing packages that BSPP reviewed. Other programs considered included Multimate Advantage, an upgrade from Multimate 3.3, which BSPP was using; and Wordperfect from Satellite Software International. The task force's goal was to select a word processing package that was document oriented, could run on a personal computer local-area network and produce high-quality output. The first standard was important, as the bulk of the bureau's work involves processing lengthy documents such as requests for proposals.

In mid-1985, the office decided to standardize on a networked, microcomputer-based system. BSPP was using a stand-alone word processing machine from CPT Corp. and six microcomputers (three Sperry Corp. Personal Computers, two IBM Personal Computers and one Eagle Computer, Inc. Personal Computer) that ran Multimate 3.3, said Harold Levinson, BSPP systems analyst and member of the word processing task force.

Because of the role BSPP plays in the Commonwealth of Massachusetts in shaping official computer practice, Corum felt his agency should project an image of high-tech sophistication. "It was ridiculous that we of all people weren't standardized," he said in a recent interview. During the past six months, the bureau got rid of the CPT machine and ordered 12 more personal computers — a mix of IBM and Ericsson Information Systems, Inc. models — as well as a Banyan Systems, Inc. file server. (The office had previously installed a Corvus Systems, Inc. Omninet local-area network but had not really used it, according to Levinson.)

Meanwhile, BSPP was also evaluating word processing packages, but this process proved to be more of a headache than the hardware and peripheral selections.

The bureau had an Oct. 1 deadline for a word processing software decision. In late September, the staff met to announce its selection, but "it didn't work out well," Dorr said. "Nobody agreed." The support staff, made up of five secretaries, "wanted to stay with Multimate. While they were set to stay with what they knew, there were others who were determined to change," Dorr said.

Since the deadline was closing in, the office agreed to form a task force, which met on Sept. 20. To save time, the eight-member group was split in three groups, and each was assigned one package to review. The support staff, which had been included on the task force and was pro-Multimate, was given Multimate Advantage to review. "That was my first mistake," Dorr said.

Agency evaluation

Word	
Document oriented	✓✓
Runs on a local-area network	✓✓
High-quality output	✓✓
Easy to learn	X

✓✓ Very good; ✓ Good; X Not satisfactory

Advantage	
Document oriented	X
Runs on a local-area network	*
High-quality output	✓
Easy to learn	✓✓

* Not available at time of initial evaluation.

Mass. Bureau of Systems Policy and Planning chose Word over Advantage.

On Sept. 26, the task force reconvened. Wordperfect was eliminated, and both Word and Wordperfect won the same number of votes.

Even though Wordperfect would have been easier to learn than Word, it has certain features that do not suit BSPP, according to Dorr. While it does have automatic indexing and automatic renumbering of paragraphs, the task force also found that it was difficult to read and edit the codes in a document. For instance, a half line of text that is boldfaced, underlined, centered, marked for automatic paragraph numbers and for table of contents generation had five full lines of code preceding it. Since everyone from secretaries to senior analysts would be using the word processing software, this was a drawback. In addition, Dorr said, "We found that you couldn't vary the space between columns. That made it hard to do tables. And there's lots of statistical stuff here."

On Sept. 30, the task force met again. A 70-year-old support staff member switched her vote to Word, claiming that while she personally perferred Multimate, Word would be better for the office, Dorr said.

Multimate, Dorr said, would have been much easier for the office in the short run because a user "can be up and running in a day." With Word, however, "the learning curve is long and slow," she said.

However, Word is document oriented, a big plus to the bureau, whereas Multimate is page oriented. Dorr said it could take as long as 45 minutes to reformat a 35-page request for proposal with Multimate.

Furthermore, the Word package selected runs on a local-area network. When this decision was made in October, the task force was not aware of a Multimate package that ran on a local-area network, although Levinson said one had been announced.

The task force also had some complaints about Word. It does not have the convenient document summaries that Multimate has, and it does not indicate on what line of text the cursor is. "There's a trade-off to everything," Dorr said.

Training began the second week of November, and so far, "nothing has gone the way we wanted it," Dorr said.

First, an outside training session at a retail store in Boston, Businessland, was not successful. Although Dorr did not attend the second day of the two-day session, she said she suspects that it was "a little bit of the trainer getting bogged down and a little bit of resistance coming from our end."

Back at the office, a backlog started to develop, so some staff members started using Multimate again. Businessland agreed to offer another session free of charge, but it was never held because of scheduling difficulties.

Corum hired an outside consultant to come in for a one-month period and train staff members one on one. Dorr said the office is planning to go slowly with future training.

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Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (5 issues), May (5 issues), July (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed: write to Circulation Dept. for subscription information.

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Computer industry arms for Senate battle over tax reform

By Mitch Betts

WASHINGTON, D.C. — The computer industry, seeking changes in the tax reform bill passed by the U.S. House of Representatives, will urge the Senate Finance Committee to restore permanently the 25% research and development tax credit and to reduce corporate tax rates to 35% or 33%, an industry lobbyist said.

Ted A. Heydinger, vice-president of the Computer and Business Equipment Manufacturers Association (CBEMA), said that CBEMA supported the House bill and helped to line up the votes needed to pass it — despite its reservations — to keep the tax reform effort moving forward.

Besides seeking a few changes in the House bill, Heydinger said, the computer industry will try to avoid losing any ground in the Senate. For example, he said, CBEMA will fight any proposals that tax R&D expenditures as income under the corporate minimum tax.

The House of Representatives passed the bill — which curbs or eliminates many business tax credits and deductions in return for lower corporate income tax rates — on Dec. 17 by voice vote.

The bill eliminates the 10% investment tax credit, retains five-year depreciation for computer equipment and allows a 20% R&D tax credit for three years while it reduces the top corporate tax rate from 46% to 36%.

The R&D credit expired Dec. 31 under existing law. Sen. John C. Danforth (R-Mo.) and others, backed by high-tech industries, tried to win a last-minute extension of the R&D credit through August 1986, but that effort was unsuccessful.

One provision of the tax reform bill, elimination of the 10% investment tax credit, will raise the cost of buying or leasing computer hardware, according to industry analysts [CW, June 3; Dec. 16].

Robert A. Bardagy, senior vice-president of Comdisco, Inc., a computer leasing firm based in Rosemont, Ill., said lease rates will go up 5% to 10% on Jan. 1 because leasing companies expect to lose the investment tax credit. "The increase will be significant but not devastating to the DP manager," he said.

VM software niche grows

From page 1

dition to VM versions of existing IBM software products.

This activity centers around a 16-year-old product that one user, Richard Rosenheim, software programmer for the New York brokerage of Scudder, Stevens & Clark, calls "the only operating system that can bend and accommodate the constant changes that we make in our processing environment."

The VM system appeals to on-line, interactive programs and can serve as a bridge while converting from one operating system, such as DOS, to another operating system, such as MVS, using the same machine.

The Scudder, Stevens & Clark experience with VM is typical of both what major users have confronted over the past few years and the reasons for the recent upsurge in activity among the independent software firms that accommodate these users — namely, the lack of a full range of utilities offerings from IBM. Scudder's IBM 4381 system runs IBM's VM/SP operating system and supports DOS/VSE to run its data base applications. According to programmer Rosenheim, Scudder recently added two specialized VM utilities obtained from an independent firm, VM Systems Software, Inc. of McLean, Va.

Scudder switched to VM four years ago, according to Rosenheim, a move made because the DP managers believed that the constant changes being made to data by brokers necessitated a flexible software system that would permit on-line updates and changes efficiently.

Damian Rinaldi, a software analyst at International Data Corp., a Framingham, Mass., market research firm, said independent VM companies supplying system utilities have been "growing very fast over the last few years, as opposed to other independents serving the DOS and MVS markets, who have been slow to jump on the bandwagon."

Rinaldi estimated that there are approximately 100 independent firms specializing in VM software products, of which two or three make up the largest share of the market, including VM Software, Inc. of Vienna, Va., and Computer Associates International, Inc. of Southbend, Ind. Rinaldi said that companies supplying VM system utilities generated approximately $935 million in 1985.

The independent VM software companies are in a precarious situation. They have helped spur demand for VM products but face the ever-present fear that increased demand will lead IBM to develop products that compete with their own as the market grows.

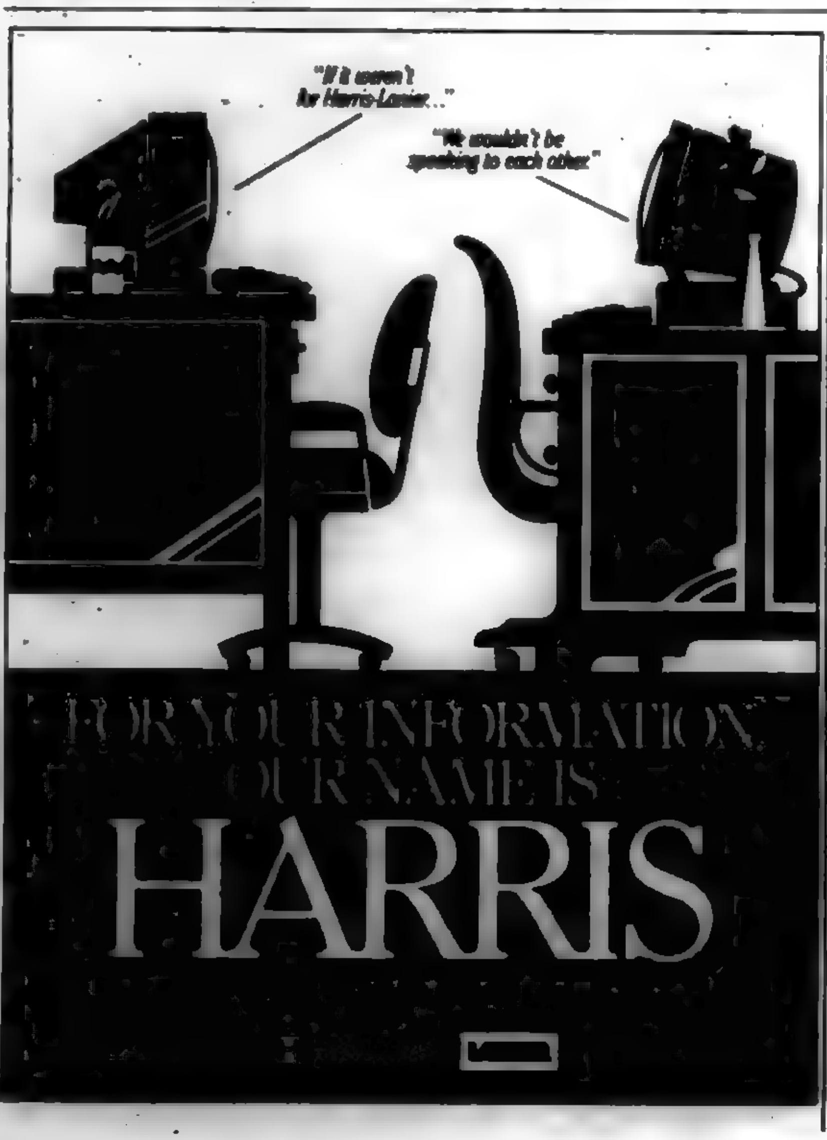
That fear is tempered by the conviction that any IBM involvement spurs demand even more. "We are content to let IBM take care of the center of the VM market while we concentrate on the edges," said Tom Foth, senior software specialist at Adesse Corp., a Ridgefield, Conn., specialist in VM education and software products. "We are going after the niches IBM doesn't appear interested in exploiting."

Foth claimed IBM is concentrating on expanding VM across all of its hardware systems, work that is absorbing much of its attention and leaves room for the independents to supply the utilities that users are demanding. In 1985, IBM expanded its VM lineup with an Extended Architecture version and CICS/CMS software products.

Third-party-supplied VM products provide needed functions, according to Michael Dewispleare, a system programmer at Shearson Lehman Brothers, Inc. in New York, another VM site.

"We are primarily an IBM MVS batch processing environment. But we run IBM's VM/CMS to support our information center. We use VM Center [sold by VM Software] to manage our information center, relying on it especially for our system security."

The increased interest and support now being given VM by IBM is ironic, said Gabe Goldberg, a programmer at VM Systems Software. "For years they ignored the thing as if they were hoping it would die," he said.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AT&T seeks approval to lower rates for international calls

Average 10% price cut expected in January

By Bryan Wilkins

WASHINGTON, D.C. — AT&T is seeking to lower international voice calling rates an average of 10.1% beginning Jan. 2. The reductions, which first must be approved by the Federal Communications Commission, would affect calling charges to 32 foreign countries and lower rates for callers by $150 million a year, AT&T said.

If approved, the planned reductions would represent the fourth time in four years that AT&T has lowered international rates in response to FCC directives that the international service be priced to recover its costs plus a 13.75% rate of return. Additionally, competition in the international voice market has picked up in recent years, with the entrance of MCI Communications Corp. into the marketplace through its purchase of Western Union International in 1983 and with the expansion of GTE Sprint Communications Corp. overseas. AT&T is still the dominant voice carrier in international calling services.

AT&T said the actual reductions for country-by-country calls will vary.

For example, calls to mainland Europe, including Austria, Belgium, Denmark, France, Italy, Spain, Sweden, Norway and Switzerland, would decrease by 10.7%, while calls to the UK and Ireland would decrease by 12.8%.

Calls to Australia, Japan, Singapore and Hong Kong would drop 6.8% and calls to the Middle East would drop 6.2%

Calling rates to Venezuela would decrease 13.9% and by 12.2% to India. Calls to Mexico would drop 5.2%.

AT&T said the planned reductions apply to initial-minute charges on direct-dial calls made from the U.S. as well as to additional-minute prices for direct-dial and operator-handled calls.

AT&T cut its international rates by 35% in in 1981, by another 6.1% in May 1984 and by 6.6% last June.

Frank Governali, an analyst with Kidder, Peabody & Co., said the planned price cuts would stimulate further demand for AT&T's international service and would not cause a drop in revenues.

No effect on earnings

Currently, "AT&T is probably earning in excess of a 16% rate of return on international calling, and this will have no effect on its earnings. In fact, they may increase as a result of this cut," Governali said.

Governali said that AT&T is currently grossing $1.5 billion annually on its international voice services and is able to be flexible in its pricing.

MCI said it was reviewing its own rates in light of the planned AT&T rate cuts.

TOP OF THE NEWS

NEWS from page 1
ers. This month Adobe is scheduled to release a set of 45 new printer fonts in 17 families used in professional typography.

■

Trilogy Ltd. recently reached a $7.1 million out-of-court settlement with investors who charged that the company's initial public offering was misleading. The offering was based on expectations that Trilogy, Gene Amdahl's second start-up venture, would develop a wafer-scale integrated circuit and would then use it to build a powerful IBM-compatible mainframe — both projects that were subsequently scrapped.

■

In a move that analysts say will strengthen the company's role in the on-line financial information market, Lotus Development Corp. announced Dec. 30 its plan to acquire Isys Corp., an Acton, Mass., software publisher. The acquisition would give Lotus rights to Isys products and technology, including the Analyser and Microscan software packages. The IBM Personal Computer-compatible packages provide, respectively, financial analysis and data communications in connection with online financial data bases.

■

Former high-flying micro manufacturer Vector Graphic, Inc. late last month announced that it filed for protection from its creditors under Chapter 11 of the U.S. Bankruptcy Code. The company said it will pursue the previously announced merger with Dual Systems Control Corp., a deal which has not been finalized.

■

The New York investment house of Oppenheimer & Co. sees the potential for "a dramatic and sustained turnaround" in the computer industry, based on a survey of 97 mainframe and minicomputer salesmen. From April to November, the salesmen who said they believe the worst is now behind the industry tripled from 22.5% to 67%.

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Users debate life span of IBM's aging Personal Computer

Future of one-time standard uncertain

By Clinton Wilder

It came out of Boca Raton, Fla., in August 1981 to revolutionize an industry and mark a fundamental change in the corporation whose label it bears. But as the IBM Personal Computer approaches its fifth birthday this summer, there are strong indications that the product is nearing the end of its illustrious life as the first standard business microcomputer.

While compatible competitors like Leading Edge Products, Inc. and Tandy Corp. offer significantly cut-rate machines for the price conscious, and IBM provides quantum leaps in storage and speed with its own Personal Computer XT and AT, the glory days of the plain vanilla Personal Computer seem to be over. The IBM Personal Computer continues to sell, but the question remains just how much longer the market, and more important IBM, will continue to perceive the machine as a viable product for business applications.

Although large corporate micro users vary in their opinions on the Personal Computer's future, some said they feel strongly that it no longer makes sense for most office purposes. "The Personal Computer is a consumer item; we have standardized on XTs," said Warren Kress, manager of Volkswagen of America, Inc.'s information center in Warren, Mich.

Kress called Personal Computer memory boards and other add-on products "stopgap measures," saying the micro's basic limitation is the speed of the Intel Corp. 8088 microprocessor. "The chip doesn't have the processing power," he said. "The add-ons are like fighting old age."

Personal Computer all but abandoned

In the International Division of Electronic Data Systems Corp. (EDS) in Detroit, the basic Personal Computer has been all but abandoned in favor of several thousand Personal Computer XTs.

"The only person I can imagine buying the Personal Computer would be a very cost-conscious home buyer," said Bob Corr, office automation manager for EDS Pacific operations. "The XT is well worth the extra money for business. If you've already got a PC, okay, but I wouldn't buy a new one."

Corr said he feels the Personal Computer's biggest limitation is its five expansion slots compared with the eight slots in the XT. "When you've got a modem card, a micro-mainframe link and networking, they get filled up fast," he said. "I've run into that five-board slot problem too many times."

Not all users agree, however. At New York-based Touche Ross & Co., a handful of Personal Computer ATs handle the most demanding applications, but most of the desktop work is still done on some 2,000 stand-alone Personal Computers. "If we could get the AT for the PC price, fine, but obviously we can't," said Ronald Jenks, director of information services. "As long as they produce the PC, we'll continue to buy it."

Some users simply find that many applications are still right at home on the Personal Computer. Senior consultant Bob Wasserman of the Peat, Marwick, Mitchell & Co. accounting firm's Minneapolis office goes so far as to call it a special-purpose machine, with its specialty being smaller tasks.

"Not everything we do is huge," Wasserman said. "For most short reports and spreadsheet models, it's fine. I don't see IBM making any more of them, but there will always be a use for it."

Extending micros' lives

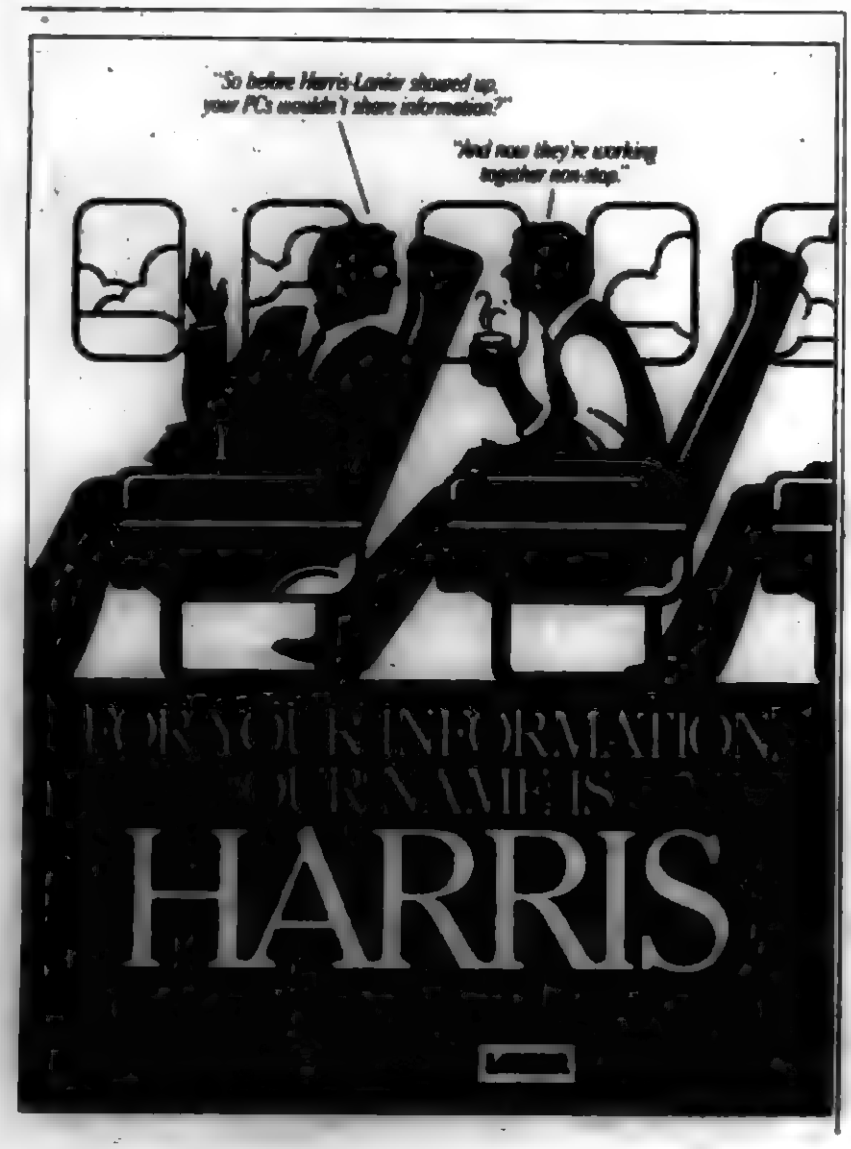
In some organizations, Personal Computers are getting their lives extended with additional memory and speed on expansion cards from start-up firms like AST Research, Inc., Plus Development Corp. and Mountain Computer, Inc.

Hartford, Conn.-based CM Alliance, parent company of the Connecticut Mutual Life Insurance Co., has purchased about 300 Plus Development Hardcards, which feature an XT-size 10M-byte memory on the plug-in board.

"That gives us a new lease on our PCs," said DP officer Chris Ludwig. "It buys us time until we make the next step, whether it's to a local-area network or something else."

That next step, from the MIS director's vantage point, represents perhaps the greatest threat to the Personal Computer's useful life. DP/MIS directors are still clamoring for the ability to network existing Personal Computers to solve their office automation needs. The efforts of network

See IBM page 10


"So before Harris-Lanier showed up, your PCs wouldn't share information?"
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Scanner puts text on-line

From page 1

will convert images to data and then reformat it into electronic data base form, said Lee Cannon, vice-president of marketing. Several new programs are in the works for 1986, he added.

The product is based on Dest's $10,000 to $12,000 Workless Station, a desktop optical character reader for dedicated word processing systems, but it is more flexible and costs less, Cannon said. The PC Scan optical reader is priced at $1,995, and the Text Pac software costs $595. The system also needs a controller card that will enable the scanner to communicate through the standard small computer system interface, which Dest sells for $195.

Dest's approach of bit-mapped conversion gives users one platform that allows the system to recognize anything they feed into it, said Michael Goulde, market analyst with the Yankee Group in Boston. "Once they've read the text, they can load it into any application," with applications limited only by the creativity of software developers, he said.

"The technology is not revolutionary by itself, but they've brought it in at maybe one-third the cost of any competing product," Goulde said. He predicted healthy sales for PC Scan and suggested that the product's low price will help accelerate development of applications for desktop scanners.

"Personal computers represent a big untapped opportunity," Cannon said. Dest's research showed that the word processing market is the largest potential user of optical scanning systems, so its first software for the personal computer version is designed to convert typewritten information to electronic data.

The scanner itself can read a printed page in five seconds, but Text Pac takes 25 seconds to convert the page into characters reproduced on the monitor in the proper format for the word processing program in use, Cannon said.

Text Pac also inserts appropriate formatting commands, including tabs, paragraphs, line lengths and page breaks. According to Cannon, its operation is essentially invisible to the user, who must only specify when asked which word processing package is in use for appropriate formatting.

The software recognizes formats of Multimate from Multimate International Corp., which is now a subsidiary of Ashton-Tate; Wordstar and Wordstar 2000 from Micropro International Corp.; IBM's Displaywrite II and III; Samna Word III from Samna Corp.; Wordperfect from Satellite Software International; and Microsoft Corp.'s Word.

The scanner hardware measures 11¼ inches wide by 16 inches long by 4 inches deep and weighs 17 pounds. It accepts 16- to 30-pound weight paper up to legal size and adjusts exposure automatically for colored paper.

"There are still 21 million pages of paper created in U.S. businesses every day," Cannon said, citing an Arthur Andersen & Co. study. While storing documents on disks saves space, and electronic data bases are often ideal storage-and-retrieval systems, the trick is getting the accumulated information from the standard file cabinet into the electronic one, he pointed out.

Dest estimates a $30 million market for personal computer optical scanners in 1986, which could grow to some $200 million in 1990. Offices would use personal computers for more filing resources were it not for the massive job of rekeying years of archived paper documents, Cannon said.

Besides offering quick translation of archived paper records, PC Scan enables users to transfer data between incompatible machines, Cannon said. He envisions heavy potential use in offices, such as legal offices, that create many repetitive documents.

PC Scan will be available this month to Dest's 130 dealers across the nation, as well as to some value-added reseller channels for such vertical markets as government, law and education. OEM agreements are still in negotiation, he said. Dest has already produced an OEM image processing model, Cobra, for Wang Laboratories, Inc.

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OTA pushes for government research on VDTs and health

By Mitch Betts

WASHINGTON, D.C. — The U.S. government needs to conduct more research about the health problems of VDT users, but most of the transition problems associated with office automation do not require immediate government action, according to the U.S. Congress' Office of Technology Assessment (OTA).

In addition to health concerns, the government should pay particular attention to changes that office automation makes in U.S. employment patterns, a new report by the nonpartisan office said. But the OTA report concluded that the scrutiny should not obscure the benefits of office automation.

"If judiciously implemented and wisely managed with a view to the legitimate interests of all parties, this basic technological advance can strengthen the American economy and advance the well-being of all Americans," the report said.

As commonplace as phones

The OTA said that in the office of 1990, one out of every three workers will use a computer terminal, and by the year 2000, terminals may be as commonplace on office desks as telephones are today.

The major health issues in office automation are the long-term stress of office jobs and the effect of VDT work on pregnant women, the OTA said, adding that the government lacks critically needed data on these subjects.

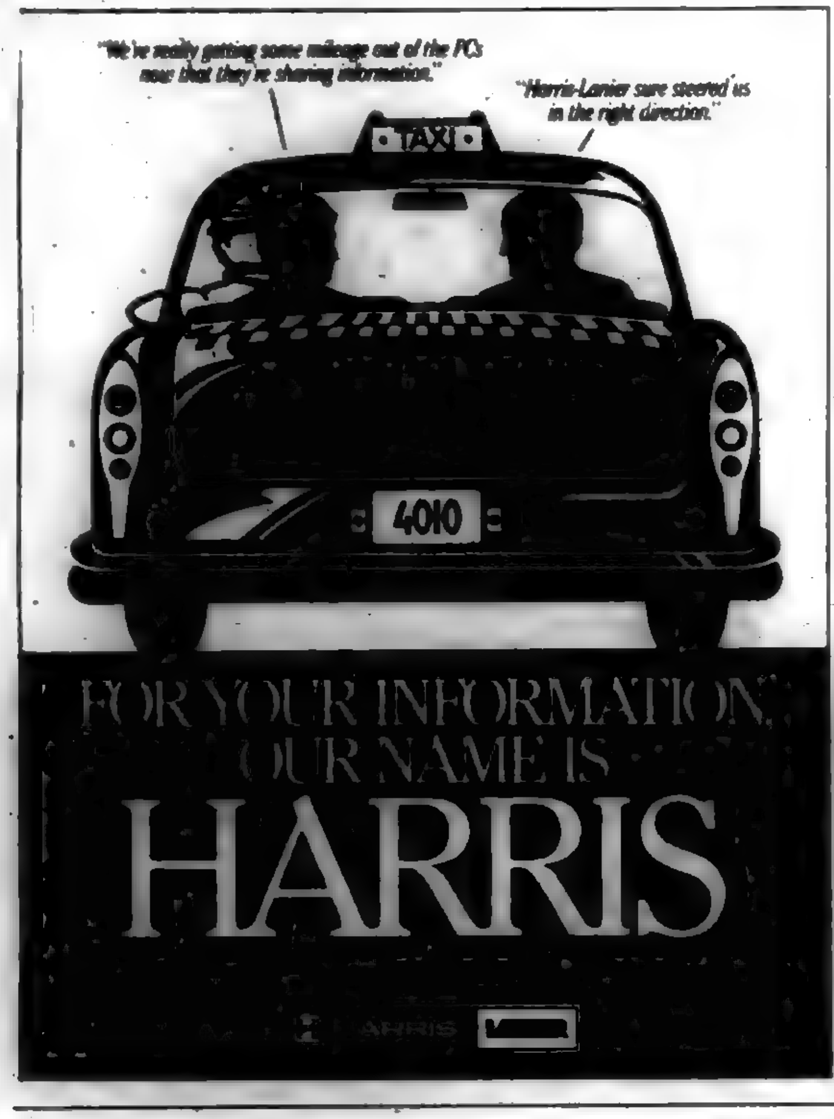
Consequently, the OTA suggested, Congress should direct the U.S. Occupational Safety and Health Administration and the National Institute of Occupational Safety and Health to conduct more research concerning the health of office workers. The agencies now mainly emphasize the health of blue-collar workers.

While available scientific research leads to the conclusion that VDTs do not hurt human reproduction, the OTA said, reports of unexplained miscarriages among VDT users and heightened public concern "make it essential that scientific research and careful monitoring continue until the possibility is entirely ruled out."

The increased efficiency offered by office automation is likely to slow the growth in office employment in the next few years, and during the 1990s, office employment may begin to decline, the OTA reported. Data entry jobs, especially, could be sharply reduced by the use of electronic document and funds transmissions, optical scanning equipment and voice recognition systems.

The OTA concluded that the possibility of reduced job opportunities in office work, which provides jobs for nearly half of U.S. workers and has been the strongest source of job creation throughout this century, is something Congress should watch closely.

The report, titled "Automation of America's Offices," is available from the U.S. Government Printing Office in Washington, D.C.


"We're really getting some mileage out of the PCs now that they're sharing information."
"Harris-Lanier sure steered us in the right direction."
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IBM micro's life span debated

From page 8

vendors to tie together micros into corporate office systems may be too little too late for the older model.

"It's a race now — departmental processors are getting better while PCs, through networking, are growing up," Volkswagen's Kress said. "The question is, Will PCs grow fast enough and to such an extent to replace departmental processors?"

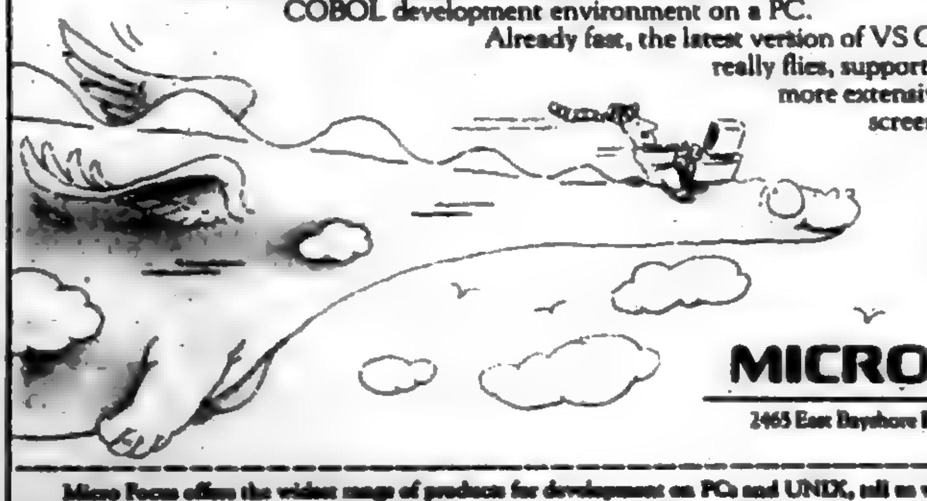
Many in the analyst community predict that the Personal Computer may soon go the way of the punch card. "I would be very surprised if the original IBM PC lasts through 1986," said Frank Gens, IBM analyst for International Data Corp. in Framingham, Mass. Gens said he believes IBM must offer a model running the Intel Corp. 80286 microprocessor in the $1,500 to $3,000 price range and envisions a stripped-down Personal Computer AT replacing the basic Personal Computer in 1986.

Only about 20% of IBM's retail microcomputer unit sales in 1985 have been Personal Computers, compared with 80% two years ago, according to San Jose, Calif.-based Dataquest, Inc. By contrast, the Personal Computer XT, in both floppy- and hard-disk-based versions, accounted for 50% of IBM retail unit sales this year, compared with 20% in 1983.

But some observers insisted that reports of the death of the Personal Computer are premature. "IBM has never dropped a product that still generates revenue for them," said Michael Gould of the Boston-based Yankee Group.

IBM, however, seems to be resisting any pressure to engage in a price war. Compatible vendors have already slashed prices below $2,000, creating expectations that similar machines will be available for the price of a IBM Selectric typewriter.

If IBM will not cut the price, it seems faced with an inevitable decline in demand for its entry-level machine. "Spending only $250 more for the floppy XT rather than the PC has to be a better business decision," said Norm DeWitt, director of Dataquest's micro service. "Personal Computer prices should come down in early 1986, but nothing lasts forever. Sooner or later it will be discontinued. Other vendors have had four years to copy and improve upon it, and many have done that."



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Dr. E. F. Codd, Computerworld, 10/21/85

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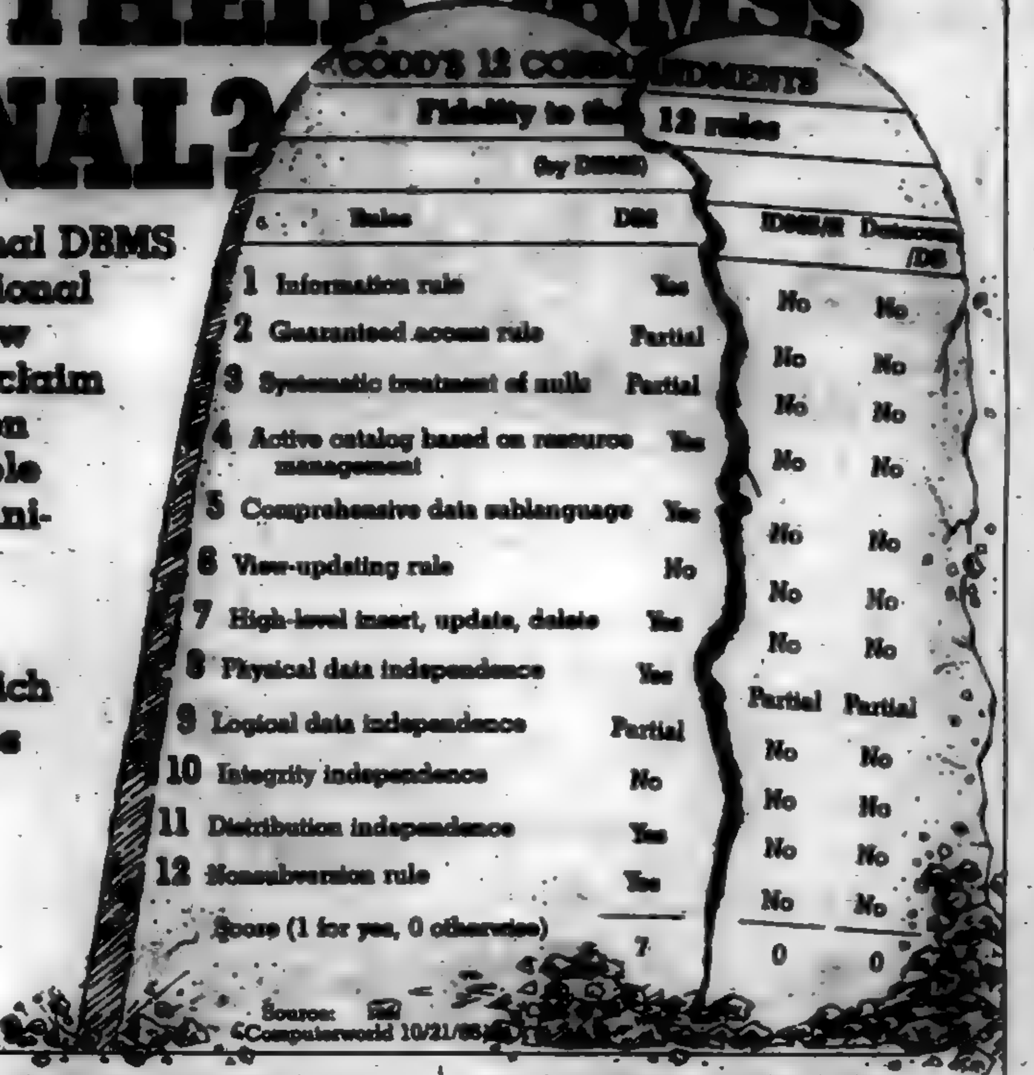
Dr. E. F. Codd on ORACLE in his paper,
"Is Your Relational Database Management System Really Relational?
An Evaluation Scheme," 9/10/85.



CODD'S 12 COMMANDMENTS

Fidelity to the 12 rules

(by DBMS)

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1 Information rule	Yes	No	No
2 Guaranteed access rule	Partial	No	No
3 Systematic treatment of nulls	Partial	No	No
4 Active catalog based on resource management	Yes	No	No
5 Comprehensive data sublanguage	Yes	No	No
6 View-updating rule	No	No	No
7 High-level insert, update, delete	Yes	No	No
8 Physical data independence	Yes	Partial	Partial
9 Logical data independence	Partial	No	No
10 Integrity independence	No	No	No
11 Distribution independence	Yes	No	No
12 Nonsubversion rule	Yes	No	No
Score (1 for yes, 0 otherwise)	7	0	0

Source: Computerworld 10/21/85

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RDS announces SQL-based fourth-generation language

Targets applications development on Unix

By Eric Bender

MENLO PARK, Calif. — Rounding out its family of IBM SQL-based development software for AT&T Unix systems, Relational Database Systems, Inc. (RDS) next month will take the wraps off a fourth-generation language product.

RDS' Informix-4GL, scheduled to ship Feb. 15, was designed as a complete application development system that also can supplement the company's Informix-SQL data base management system, said Vice-President Laura King.

Traditionally, programmers trying to finish off a custom application "tend to run out of power with the data base management system," King said. At that point, they either go back to the user with their regrets or go on with time-consuming development in languages such as C or Cobol, she added.

Using nonprocedural syntax

Informix-4GL speeds up this process, permitting programmers to specify the application primarily using nonprocedural syntax, King said. The company claimed that applications requiring hundreds of pages of C or Cobol code can be written in a few pages of Informix-4GL.

Noting that there are various definitions of fourth-generation language, King said that "ours is a language that an application builder will use."

She described Informix-4GL as a full-function system development language, which offers a fair amount of overlap with RDS' SQL product. "You get more help initially with Informix-SQL; you might use it for a prototype," King said. Informix-4GL users "have to be willing to write using a more sophisticated language," she added. Informix-4GL handles report writing and SQL queries, along with the ability to create custom Lotus Development Corp. 1-2-3-like ring menus, context-sensitive Help and customized data entry and query screens with scrolling and procedural controls, according to King.

Informix-4GL also can interface to existing C routines either as a linkable library or through the companion Informix-ESQL/C product, the company said. Data bases are fully compatible with Informix-ESQL/Cobol.

Pricing will range from $1,500 on the IBM Personal Computer AT under Microsoft Corp.'s Xenix to $36,000 on the Digital Equipment Corp. VAX 8600 under DEC's Ultrix. Other versions in the initial release include Altos Computer Systems, Inc. 2086, $2,400; AT&T 3B2, $2,400; AT&T 3B5, $4,500; AT&T 3B20, $18,000; AT&T Unix PC, $1,500; DEC Microvax II, $4,500; DEC VAX-11/750, $9,000; DEC VAX-11/785, $18,000.

'The market has really expanded'

RDS has sold 25,000 Unix licenses, and the 6-year-old firm's products "cover the whole spectrum of Unix machines — almost 90 systems," King said. She noted that although commercial Unix software initially targeted supermicrocomputers almost exclusively, "the market has really expanded, most importantly to larger machines."

The firm also will offer a $995 version for the IBM Personal Computer and compatible systems, available in March, King said. Additionally, a version for the IBM PC Network will follow, with pricing not yet set.

RDS began to offer IBM PC-DOS products three years ago and now has 5,000 sites installed — "a pretty respectable number for a company like this," King commented.

Paradyne cut from federal work

By Bryan Wilkins

WASHINGTON, D.C. — Paradyne Corp., the Key Largo, Fla., data communications firm, was suspended last week from doing work for the federal government. The action followed a recent 14-count indictment by a federal grand jury against the company and some of its officers in connection with a $115 million contract in 1981 to supply the Social Security Administration (SSA) with data terminals.

The suspension does not affect the one-year, $12.4 million renewal of Paradyne's contract to support the terminals that have already been installed at the SSA.

Paradyne denied any wrongdoing and asserted that the terminals have met SSA requirements. Meanwhile, the SSA is finalizing its analysis of bids to install new office automation and communications systems at its regional and central offices.

The 14-count indictment brought against Paradyne and seven current and former company officials alleged conspiracy to bribe and defraud the U.S. government in regard to the contract. Additionally, Paradyne Chairman Robert S. Wiggins was charged with obstruction of justice during an SSA investigation of the contract.

OUR PRODUCT IS IBM CONNECTIVITY
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VIEWPOINT

EDITORIAL

A year of living dangerously

If one theme sounds throughout this special forecast issue, it is this: Data processing executives have never faced greater personal and professional challenges than they will in the year 1986. Success will require seizing initiative and taking risks to an unprecedented degree.

During the first half of the decade, there was ample reason for caution. Vendors promised far more than they delivered, and the wary data processing manager could justify moving slowly and cautiously in terms of both purchase and implementation.

That strategy will be increasingly difficult to defend as corporate executives demand the data processing "magic" that provides more and better information as well as greater productivity and as users demand more sophisticated tools. Data processing managers will be forced to acknowledge the problems with highly touted but not fully evolved technologies and make the best choices they can.

True, all vendors have not yet delivered on every promise, but enough have delivered on some of those promises to put the proverbial ball in the DP manager's court. An array of new products and services promises to lower voice/data communications costs significantly while increasing a company's competitive advantage.

Major applications vendors have introduced long-awaited schemes to integrate diverse software packages. Major mainframe and superminicomputer manufacturers began delivering their next-generation machines in late 1985; the remainder will appear this year.

Microcomputer technology has matured substantially, moving many of these machines from the category of personal productivity tools to that of intelligent workstations and powerful nodes on local-area networks.

True, too, many of data processing's problems apparently have not been amenable to clear-cut technical solutions. Programmer productivity is one. Microcomputer-based workstations offer some hope, but they do not represent the technological miracle that will improve productivity by the 100-plus percent necessary to clear the applications backlog and to get software development rolling into the next century.

In fact, the data processing community has for too long awaited complete technological solutions when the very evolutionary nature of technology makes that impossible. There will always be new technical problems and vendor promises of solutions.

That is not to denigrate the significance of either the problems or the solutions. It is simply to recognize the reality of the more formidable challenge now facing data processing managers.

That challenge consists of laying aside the strategy of waiting for vendors to provide complete solutions. Instead, DP professionals must take the risks required to grapple with a panoply of partial solutions — technical and human — and wrest out of them a course of action and implementation that serves the unique needs of individual organizations.

That is the inevitable scenario and one that presents perhaps the greatest challenge the data processing community will face in the 1980s.

OH, THAT'S WHAT YOU SAID A YEAR AGO. AND NOW LOOK AT US!
1986
SHANGRI-LA

LETTERS TO THE EDITOR

Information officers may not want, need most advanced technology

The article "Planning amid change" [CW, Dec. 9] illustrates beyond a shadow of a doubt why most data processing executives should not be considered as candidates for the position of information executive or chief information officer.

My definition of an information executive vs. a data processing executive is based on the broader role the information executive plays in the corporation. The information executive's job is primarily created by the competitive demands for the total business enterprise and by a recognition of the need for information to be handled in a strategic manner and, certainly, on a corporate basis.

Conversely, today's data processing executive as described in the article is more concerned about allowing "MIS to reap the benefits of ever-changing information technology in an environment where fundamental assumptions become obsolete monthly." Translation: Vendor hype is more important than the realities of running the business?

The differences described above are those of scope and scale. They are significant because an information executive may not actually require advanced information technology to meet the competitive demands of the enterprise. All the executive requires is a willingness to ask who requires what information as well as when and where — independent of vendor hype.

George Danco
Pittsburgh

RJE can transmit data securely if caution and preparation are used

A recent letter to the editor, "Easy RJE data transfer overshadowed by method's vulnerability to hackers" [CW, Dec. 2], overstated the security risks of using remote job entry (RJE) for transmitting corporate data. With caution and preparation, RJE may safely be used for data transmission.

The following are specific examples:

- Mainframe RJE protocols allow passwords to be required before any data will be transmitted or received.
- Mainframe RJE protocols require a remote user to be authorized to issue operator commands affecting more than the operator's specific link.
- Many RJE links are connected over leased phone lines, making it impossible for a casual user to stumble onto the link's phone number, to sign on and explore.
- RJE does not bypass normal security facilities — it does not allow "a sophisticated user . . . to corrupt the corporate data base" if the user could not already do that by other means.

An installation oblivious to security might fail to exploit any of these techniques, but the resulting exposure would be because of negligence rather than because of faults in the RJE architecture.

Gabe Goldberg
Consulting systems programmer
VM Systems Group
Arlington, Va.

DPMA places VDT safety responsibility on users and vendors, not lawmakers

The Data Processing Management Association (DPMA) recently adopted a position statement concerning proposed regulations on VDT use. In the article "DPMA opposes VDT restrictions" [CW, Dec. 16], the DPMA's position was accurately summarized: "Legislation restricting the use of VDTs or limiting exposure to them is premature and counterproductive."

Unfortunately, "Notes & observations" in the Viewpoint section [CW, Dec. 16] left out an important part of the DPMA position statement.

The text of the position statement includes, "The DPMA encourages both users and vendors of VDTs to cooperate in the proper installation and utilization of VDTs at each site, employers to educate and train their employees in the proper use of VDTs, manufacturers to design properly and employers to provide workstations with flexibility in order to accommodate a wide variety of users."

Almost on a daily basis, our profession must face and cope with the challenges of technological change and its effect upon business, industry, computer systems and — most important — upon people. We will continue to keep an open and sensitive mind to this ergonomic concern. And we will continue to insist that our actions be evaluated and reported upon in a similar manner.

Eddie M. Ashmore
International president
DPMA
Park Ridge, Ill.

VIEWPOINT

One-person support centers limit MIS links to users

READER'S PLATFORM

By Naomi Karten

How can it be that so many information centers and microcomputer support centers are each staffed by only one person?

In most companies, information centers are up to their keyboards in work, developing user proficiency in personal computing while attempting to integrate this dynamic new technology into the overall computer and business environment.

Planning — remember planning? — falls by the wayside; there simply isn't time to worry about tomorrow, next month or next year when your users are playing tug-of-war for your attention.

One such personal computer specialist explained how he decided which users to help. "That's easy," he said, "whoever gets to me first. But I have to hide if I want to take a break," he added. "And I've learned never to go anywhere without my screwdriver because I can't get from my desk to the cafeteria without being sidetracked by five users with problems they need fixed right away. Half the time, I never even get to lunch."

And what happens in a one-person information center when this person is away, attending a conference, on vacation or even — perish the thought — sick? Easy. With no backup, user support comes to a standstill.

Users have nowhere to turn for help, and any productivity gains they have made take a rapid plunge. There are numerous strategies that create a more equal division of labor between users and the information centers and avoid nonstop cries for help.

But putting these strategies to work takes a critical mass — for example, a staff size of at least two — so that one can establish guidelines and standards, run interference with users and monitor progress, while the other provides the day-to-day, minute-to-minute support.

User support people tend to be a very service-oriented bunch. As inundated with work as these one-person jack-of-all-personal-computing-trades are, most enjoy their jobs immensely. They genuinely like working with people and derive a lot of satisfaction from helping nontechnical users become proficient with computers.

But how long can they keep it up? At what point will they burn out or just get tired of the user support treadmill? As one person said, "I put in 12 hours a day, and I love it. But my users are becoming angry. There's no way I can keep up with all of them. It's beginning to get to me."

Information center pundits sometimes spout ratios, such as one support person per 30 users or one per 100 users or one per 1,000 users. This one-ratio-for-all approach is a bit simplistic, given the myriad of factors unique to any particular organization. But no algorithm, even adjusted for all possible variables, would produce a ratio at the level faced by the one-person information center.

And where is MIS senior management during all this? That, really, is the important question. One information center worker voiced the concerns of many of her peers when she stated, "My management just doesn't understand what's involved. I don't know how to get through to them that I need more help."

My computer-based speculation processor has generated some theories to explain management's apparent lack of concern. For example, could it be that management views end-user computing strictly as a stopgap to divert user attention while MIS makes a bit more progress with its really big systems?

One implication of such a theory is that management views its information center staff as dispensable and that if the entire user support endeavor fails not much has been lost. A self-fulfilling prophecy, if there ever was one.

A second theory is that management really doesn't understand. In the eyes of many managers, since personal computers are small, managing their use must be easy and coordinating their integration into the business environment must be easy. Anything viewed as that simple certainly wouldn't justify an investment of more than one person. It follows logically that if the user support person can't keep up with the work load, the problem must be the person, not the responsibility.

A third theory is that MIS management simply isn't aware of what's happening on the end-user computing side of things. It's a different world, after all. It's as different as can be from the third-generation Cobol-oriented system development orientation in which most MIS managers spent their favorite years.

In some companies, users have begun to give up on their information centers, viewing them as more of the same from MIS: long on promise, short on delivery.

MIS management must come around to realizing that end-user computing is not a transient phenomenon. Like it or not, it represents today, tomorrow and probably the great forever after.

Sooner or later, MIS managers must realize that they cannot complain about losing control over corporate computing and, at the same time, refuse to allocate sufficient resources to retain that control.

MIS management must realize that information as a strategic tool means something more than fixing broken printers so users can complete their status reports on time.

Karten, president of Karten Associates in Randolph, Mass., consults and lectures nationally on strategies for success in the management of corporate end-user computing.

Welcoming 1986 as the year of the user

By Charles P. Lecht

According to the Chinese, 1986 is the year of the tiger and 1985 was the year of the ox. Whether or not the Oriental sages who conjured these images meant them to be comparative symbols of computer industry events in these two years, they offer a perfect correlation.

Could anyone dispute that the year 1985 was anything more than ox-like, plodding in the computer industry?

The foreign trade issue so consumed our attention that many failed to notice that domestic trade was less than vigorous for any new company attempting to gain turf in our emerging information systems field. As if behind plows pulled by oxen of gargantuan power, the companies that ruled the field at the beginning of the year, IBM and AT&T, spent the remainder of 1985 plowing the fertile marketplace to sow whatever new business seeds they carried in their sack loaded with things to grow.

LECHT ON SCIENCE

This year of the tiger may also come to be known as the year of the user. With increasing standardization, planning will once again be possible.

As any farmer will tell you, the process of plowing includes the turning of old plants and new saplings alike; that is, if they get by the mouth of the oxen.

This is not to say that our industry leaders had not earned the right to plow our field. They confirmed their right to rule our computer and communications fields after withstanding years of assault by the courts and competition alike.

Battered by the storm of change that engulfed them in the first half of the 1980s, our smaller manufacturers stubbornly plodded through 1985 trying like the devil to remain alive by following the troughs and furrows of our industry leaders while obtaining licenses to sharecrop.

Turned into domestic serfs

Some didn't make it. Many who did were forced into a harness of foreign origin or were turned into domestic serfs. Some with the resolve to make it in other ways sought relief from their woes by hauling alien industries into court.

Others were hauled into court themselves to pay their dues for rugged individualism. This was a time when a conservative and conformist posture would have suited them more.

It's my guess that 1986 will provide us with a dramatically different information systems industry picture.

When the going gets tough, the tough get going, and one can only agree. And what's tougher than a hungry tiger? A pack of them.

As 1986 opens, the field is surrounded by a mess of ornery and hungry tigers — the hundreds of companies that took to the hills to await a better day. The year 1986 is its dawn. Why?

Stimulate the pack to seek adventure

For one thing in 1986, the scent of the de facto information systems industry standard set by IBM and AT&T cannot help but stimulate the pack to seek adventure beyond the reaches of their current lairs.

Lack of an industry standard was the single most important obstacle to their doing so because its absence constituted a ravine into which most were to fall. Users, too, should benefit; now removed is a veil that until this day had served to obscure their future purchasing choices.

The new entrants to our information systems industry, those whose capabilities extend beyond the mere manufacturing of hardware and software, will find it far easier to compete in 1986. Service companies capable of offering experience in all sectors such as retailing, advertising, financial management, inventory control — the list is virtually endless — but have thus far been blocked from doing so by the technological and financial demands of trying will see that roadblock removed in 1986.

No longer is there a real need for them to be concerned with the means of getting there; now it's what to do after arrival.

This year of the tiger may also come to be known as the year of the user. With increasing standardization and many more supplier options, planning will once again be possible.

Theaters of the absurd

In comparison, the technological environments within which users had to perform their information processing chores for the first half of this decade will, by its end, appear as theaters of the absurd.

The hoots and hoopla of making a system work will be replaced by the challenge of what to do with its output. The madness of users group therapy sessions to coerce a reluctant supplier will be replaced by business group creative meetings to address what can be done with current systems.

The year of the ox is ended. Let us welcome the tiger.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies. He divides his time between Tokyo and New York.

VIEWPOINT

TURNAROUND TIME

Larry Long

Q ***Two weeks ago, management pulled two of us and another programmer/analyst away from our routine duties and assigned us 100% to an emergency, high-visibility development project. Our manager essentially told us not to bother him until the project is completed. Two of us view this project as a career opportunity to show what we can do. The third member of our committee views it as an opportunity to do some unsupervised loafing.***

We are all of equal rank, and no one was appointed as project leader. We were given the impression by our manager that we will be evaluated equally on the overall project effort. We are on schedule and making excellent progress toward meeting the deadline, which is three weeks from now, but only because two of us are spending nights and weekends on the project. The long hours will continue unless we can convince our third member to pull his load. Our question is, Should we report his inactivity to our boss?

It is not your function to evaluate your peers. I would suggest that the committee request a weekly progress meeting with your manager to tap his wisdom and to invite his feedback on how the project is going. On an emergency high-visibility project this should be done as a matter of course, anyway. For each meeting, prepare a brief written progress report and a summary of individual activities. If your manager doesn't already know what is happening — and I'll bet he does — then he surely will by the time the project is completed.

Q ***I was not affected by a recent work force reduction, but the writing is on the wall. I will surely be cut in the next one. In preparation for the inevitable, I have begun my search for another position. I have responded to all advertisements in the local newspapers and have sent my resume to virtually all reasonably sized companies within commuting distance of my home.***

To date, I have not received one invitation for an interview. My resume is enclosed. I would appreciate any comments on why my search for employment has reached a dead end.

You made a classic error in the preparation of your resume. Your resume reads more like the history of automation. The reader must journey through 2½ pages and several generations of computers and software before reading about what you can do for him today. At the first level of screening, resumes are often scanned. Someone scanning your resume might get the impression that you are one of the dinosaurs.

Many people screening resumes are too young to appreciate Autocoder programs or the IBM 1401, but they do understand the word "programmer." Certainly you should list all previous positions held and provide a brief discussion of duties, but any in-depth discussions should focus on state-of-the-art skills. You have some marketable skills. Prepare a resume that draws the reader's attention to these skills.

Q ***For the past seven years, I have been involved in all aspects of the printing business. My undergraduate degree was in the social sciences, so almost all my DP training has been on the job. For the past three years I have been a DP manager for a $30 million magazine printer, and I manage a staff of two.***

To be more effective in my current job and to be more attractive to future employers, I feel that I need some formal training in all aspects of MIS management. How can I improve my knowledge to be effective in my current job and to increase my future marketability?

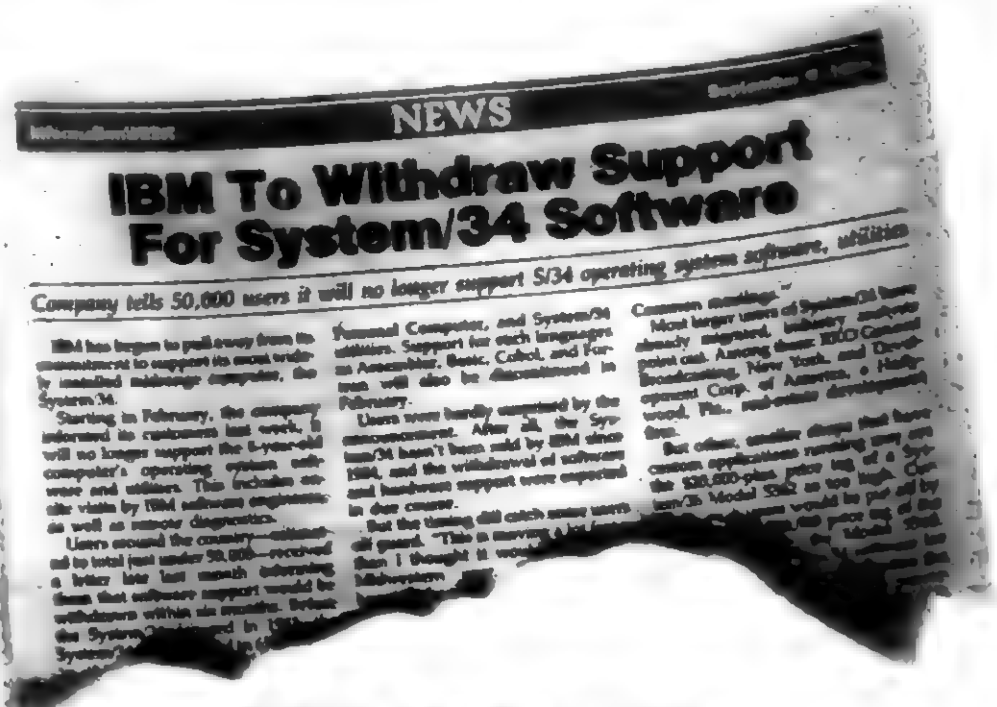
Most MIS degree programs, at both the undergraduate and graduate levels, focus attention primarily on the use and application of hardware and software technology. But the principles of MIS management are difficult to teach and learn outside the context of a particular set of circumstances.

As a result, academic institutions sometimes slight such topics as planning, procedures, in-house education, personnel management and the implementation of productivity measures.

Effective MIS managers are seldom products of formal education programs. Certainly MIS managers wishing to improve their ability to manage take advantage of available educational videos, seminars, books and periodicals. These resources provide them with a foundation of understanding for specific facets of MIS management. The real learning comes when they attempt to apply this knowledge to their environments.

When confronted with a particular management problem — information systems planning, for example — the really good managers tend to immerse themselves in all available information on the topic. Then they make a concerted effort to apply what they have learned. In short, the overwhelming majority of practicing MIS managers improve their skills through self-study and good old on-the-job training.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd would like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*



NEWS

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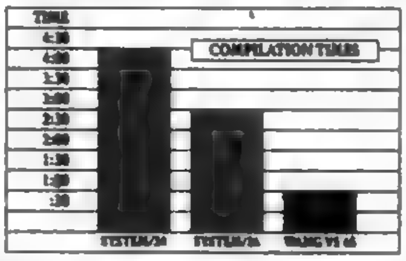

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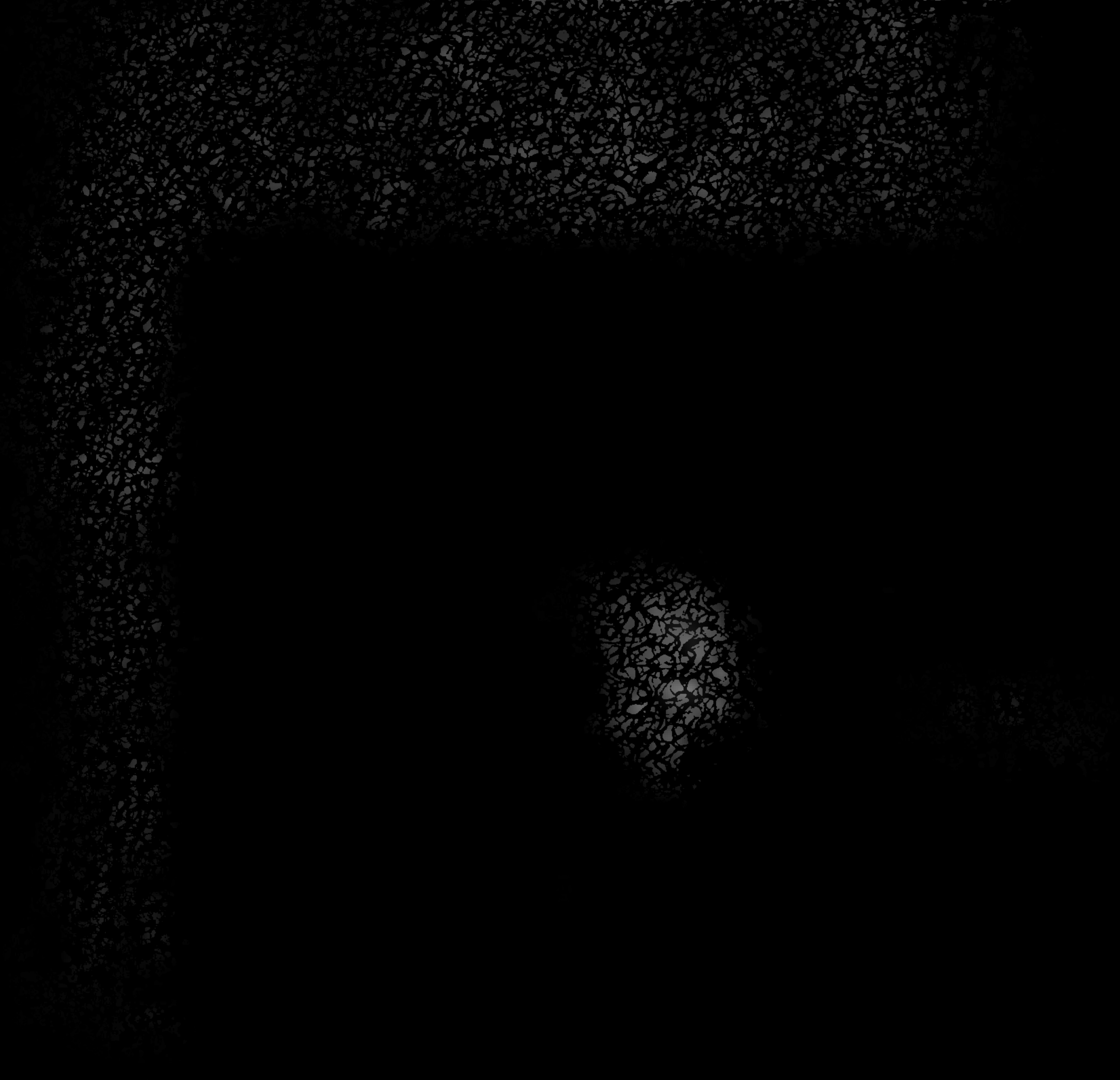

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Mainframe strategies

Building on the foundations of 1985

By James Connolly

Just six months into 1985, the product whose code name had been bandied about for many months — Sierra — broke into the open, and IBM's 3090 was presented to the public.

The Feb. 12 introduction was more than a high-end processor announcement. It was the impetus behind a wave of offerings on which a half dozen mainframe vendors will build their marketing and product development strategies for several more years. Last year was one of transition, if not booming profits, as mainframe vendors moved into a new product cycle.

In contrast, this year is likely to be a year of market solidification and, in some cases, holding on by the corporate fingertips. There will be some new processors announced, some previously announced products delivered and some existing products enhanced this year. But most mainframe vendors launched their flagship processors last year, leaving them with the jobs of tuning, producing and marketing those products this year and in 1987.

Within a month of IBM's announcement of the two versions of its 3090 — the dual-processor Model 200 and the quadratic processor Model 400 — plug-compatible competitor National Advanced Systems Corp. answered by rolling out its AS/XL systems. Another plug-compatible manufacturer (PCM), Amdahl Corp., waited until October to answer the 3090 but responded with three models of its new high-end mainframe, the 5890. While IBM began delivering its Model 200 two months early, around Labor Day, the Model 400 and the PCMs' offerings will not show up at customer sites for several more months.

Scattered throughout the IBM and PCM announcements, some of the non-IBM-compatible vendors commonly known as the BUNCH — an acronym for Burroughs Corp., Univac (Sperry Corp.), NCR Corp., Control Data Corp. and Honeywell, Inc. — unveiled their own high-end systems.

Burroughs announced its high-end A15 and mid-range A10 systems. Honeywell offered five models of its DPS 90 series, and Sperry enhanced its 1100/90 processors. NCR did not jump into the high-end race and stayed with its V-8695 system with a performance rating of 7.3 million instructions per second (MIPS), a rating well below the 27 to 75 MIPS range where other mainframe vendors are doing battle.

This year is likely to be a year of market solidification and, in some cases, holding on by the corporate fingertips.

Financially troubled CDC also stood pat in terms of its top-of-the-line hardware, with its Cyber/180 series, introduced in 1984, but did begin deliveries of the high-end member of that series, the Cyber/180 990 with performance claims as high as 65 MIPS.

But that was last year.

The two primary questions facing all the mainframe vendors this year are how to expand, or at least maintain, market share with their announced products and how to stay in a market where they are expected to develop a new high-end generation every three years.

"The question continues to be whether these companies will continue to put in the big

ILLUSTRATION BY DAVE RIDLEY

bucks for developing their own large systems, at least as far as the BUNCH is concerned," observed technology analyst Steven Milunovich of First Boston Co.

He noted that while companies such as IBM, the PCMs and Burroughs are moving from new product introduction cycles into production and growth cycles, they still must deal with a market slowed by "saturation of computing power" and "a weakness in capital spending plans" on the part of customers.

> ***'The BUNCH companies just don't have the money to make inroads into IBM's customer base. The bottom line is that this is an IBM world. IBM is the de facto standard.'***
>
> — **Dale Kutnick**
> **Independent consultant**

Independent consultant Dale Kutnick of Wayland, Mass., added that for most mainframe vendors, mere survival in the market will be the challenge. "The cost of producing a mainframe is skyrocketing. If you are one of these companies, you have to hold on. The rest of this decade is going to be a matter of holding on," he said. Kutnick said the BUNCH companies "just don't have the money to make inroads into IBM's customer base" by continuing to develop and market their own high-end machines.

He cited the example of Honeywell, which has turned to NEC Corp. of Japan to produce mainframes. Among the PCMs, Amdahl developed the 5890 basically on its own, but with some joint research with Fujitsu Ltd., which is a 40% owner in Amdahl. NAS does not produce its own mainframes but serves as U.S. marketing representative for Hitachi Ltd.

There has been little sign of the BUNCH companies or the PCMs chipping away at IBM's base. Although market researchers may not agree on the precise numbers, one illustration of IBM's dominance is market research firm International Data Corp.'s (IDC) estimate that for 1984, IBM shipped 67.4% of the large-scale computers installed worldwide. Burroughs held second place in that survey with 9% of the market.

"The bottom line is that this is an IBM world. IBM is the de facto standard," Kutnick observed, although he noted that the BUNCH companies, operating in various market niches, have their customers locked into their own technologies. He added that the benefits of jumping to the IBM world often are outweighed by the cost of scrapping BUNCH peripherals and software. The time and money involved in installing a $5 million mainframe and the accompanying peripherals and software are too great to allow frequent box swapping in many DP shops.

With the 3090 technology in place, IBM is likely to increase production of those 3090s and a key peripheral — the 3380 disk drive — this year.

Late last year, demand for the high-end 3380 Model E dual-density drive was slow enough to spur an IBM price cut, but the demand for the 3090 Model 200 was hot enough to keep a steady order backlog. Many of those Model 200 buyers are already talking about upgrades to the Model 400.

It also is conceded by those observers that a uniprocessor version of the 3090, commonly referred to as the Model 100, will debut early this year.

Other IBM announcements to watch for this year include new models in the mid-range 4361 and 4381 lines. However, observers noted that this year may be the last full year for 4300 sales, with a replacement line expected to be announced in 1987 for 1988 delivery. In addition, IBM is expected to introduce a high-end member of the System/36 minicomputer line and its long-awaited reduced instruction set computer (RISC) engineering workstation.

But IDC analyst Frank Gens said that IBM's strategy involves more

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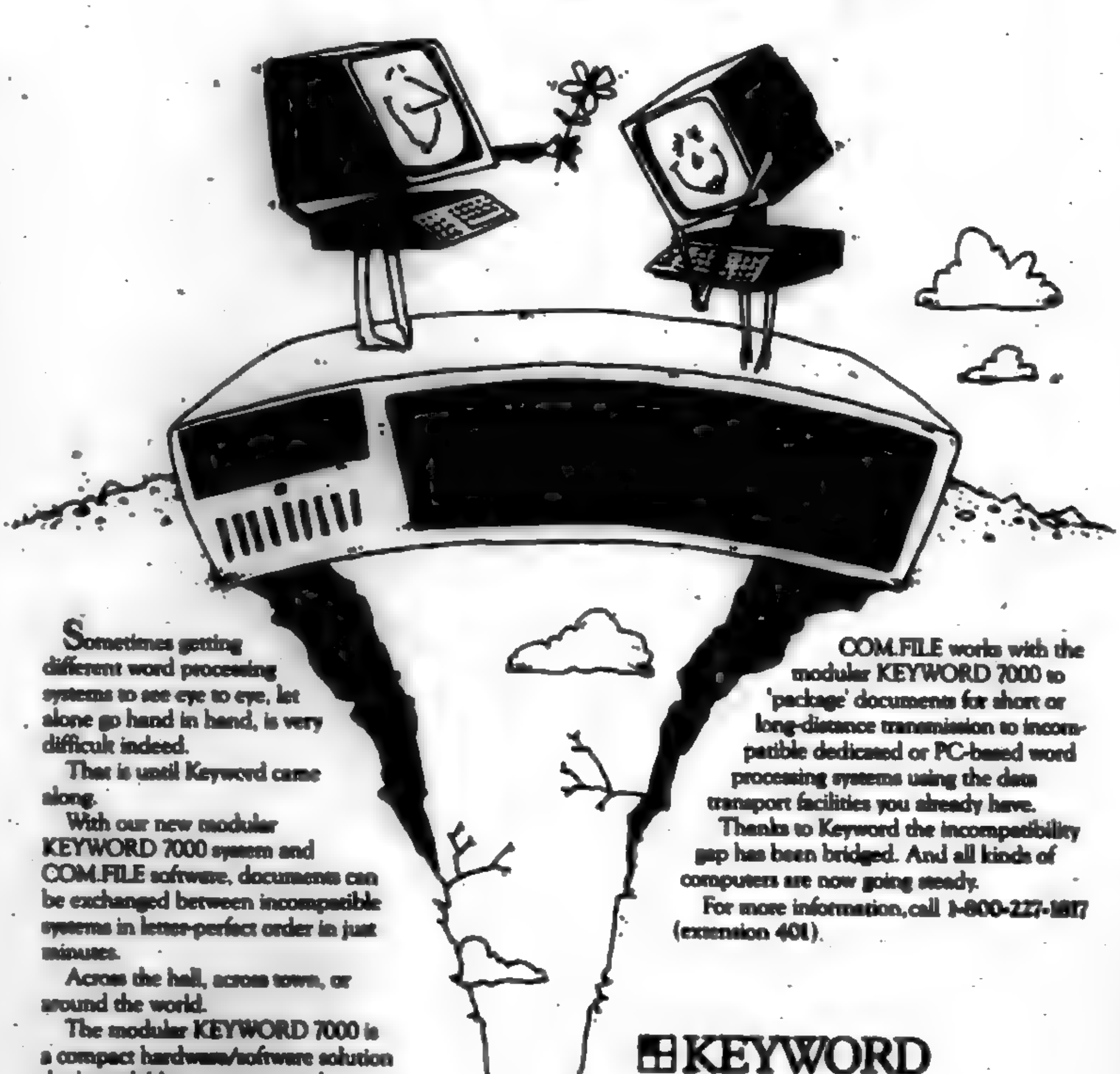

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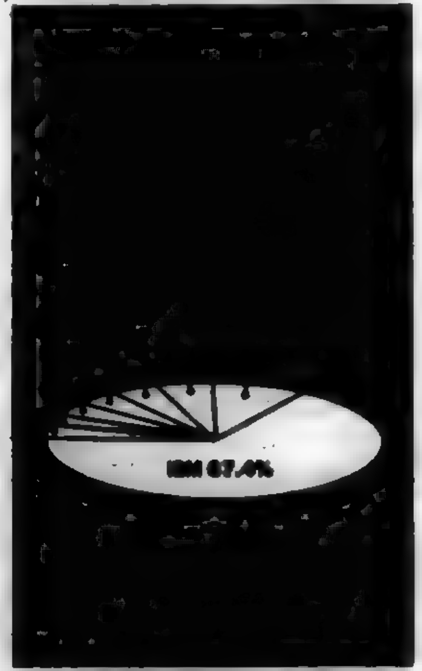
than adding high-end processors every three years and mid-range systems in the interim. That strategy is based on the need to tie distributed systems into the mainframe and to let the sale of distributed systems spur mainframe sales and mainframe sales to drive more distributed system sales.

"Stage one was to get the distributed hardware out there, to install something, whether it was personal computers or the IBM System/36. Now they are coming into stage two, which will be where they tie that hardware into the mainframe. That will be a build cycle, where the more distributed systems you sell, the more large systems you sell. You start hitching mainframe growth to distributed systems growth," Gens said.

Crucial combination

That combination, particularly the mainframe hardware and software aspect, is crucial to IBM, according to Gens. He noted that the profit margins are significantly higher on those mainframe sales than on personal computers and low-end systems. Among the tools needed to carry out that distributed approach, according to several observers, are a new version of the MVS/XA, which is due in 1987 or 1988, and a new version of DB2, IBM's relational data base management system.

MITCHELL J. HAYES



The rest of the industry continued to trail behind IBM in 1984.

Gens said new versions of MVS/XA and DB2 are necessary to support the additional user demand involved in a shift to more distributed systems.

Gens and Kutnick noted that the new MVS/XA will be different from the current version but will not represent as dramatic a step as did the transition from MVS/SP to MVS/XA. They said that a drastic shift would make it harder for the PCMs to compete, but it would also complicate the lives of IBM's own customers, many of whom are still putting off the conversion from MVS/SP to XA.

While developing those products, and a six- or eight-processor 3090 set for 1987 introduction, IBM researchers reportedly have set their sights on a new generation of mainframes. That project, code-named "Summit," is expected to lead to a product announcement in 1988 or 1989.

What will Summit look like, and will it be the end of IBM's 370 architecture?

Miltnovich predicts that Summit will incorporate the 370 architecture, but added, "They just moved to emitter-coupled logic, so they might squeeze another generation out of it. After that, in the 1990s, look for something a little more crazy."

Kutnick added that the core technology will not change from that of the 3090 and that Summit probably will incorporate more pipelining and significantly improved interprocessor communications.

Gens predicted Summit will include an integrated data base machine and that it will use some RISC technology for special-purpose processors within the system, but that the system software will have to mask that technology from the applications.

Summit will present yet another challenge to PCMs NAS and Amdahl. However, observers agreed that if IBM does gain new customers in the next few years, it will be at the expense of some BUNCH companies, rather than at the expense of the PCMs.

Analysts and customers reacted favorably to the high-end PCM product additions last year in terms of promised performance and pricing. To outbid IBM for new contracts, NAS and Amdahl may have to undercut IBM's pricing by 20%. But several analysts agreed that the PCMs will tend to steal customers from each other, not from IBM, this year.

One consultant noted a role reversal for NAS, which is scheduled to deliver its AS/XL during the second quarter of this year, and for Amdahl, which plans to ship its first 5890 systems in the second quarter with other models set for delivery late this year and in 1987. That shift for NAS and Amdahl reportedly has NAS, which often has been recognized for its price-cutting, focusing on improving its technology with the new generation in comparison to earlier systems. Meanwhile, Amdahl, with a reputation for emphasizing technology over pricing, has adopted the more aggressive role in pricing, similar to NAS' earlier approaches.

NAS and Amdahl also are expected to continue diversification efforts begun in recent years. Those efforts have focused on peripheral sales, which can be a more stable revenue source than processors, and on communications equipment, particularly

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in Amdahl's case.

Several observers expect Amdahl to strengthen its ties with its best customer, AT&T. Those ties could lead to an AT&T equity interest in Amdahl — if federal authorities allow it — and could give AT&T the mainframe market foothold that it needs to battle IBM toe-to-toe in all markets as the world's information processing king.

Among vendors of smaller machines, Nixdorf Computer Corp. is expected to bring to the U.S. the 4381-compatible system that parent company Nixdorf AG introduced in West Germany, Austria and Switzerland in the fall, the 8890 D series. In addition, Global Ultimacc Systems, Inc., which previously sold systems made by the defunct Magnuson Computer Systems, Inc., has a marketing agreement to handle NAS' 4300-class 6600 line. One industry expert notes that several other vendors in that mid-range PCM market are at the "hopeful" stage, trying to solve compatibility problems, supply problems and marketing problems.

■

Breaking up the BUNCH

No, there is no such company known as BUNCH. But in mainframe computing lingo, it often is easier to say that there is IBM and the BUNCH — five mainframe vendors who do not mimic IBM's architecture but who each hold on to market shares ranging from 9% to less than 1%.

In fact, the BUNCH companies are a diverse group that compete with each other as well as with IBM and that tend to target their own special niches in the market.

They focus on science and engineering, specific government branches, retail, banking and industrial control.

Dropping out of the mart

But in an age when it takes three or four years to develop a mainframe and only months for IBM or a start-up to make that system obsolete, industry observers are watching for signs that one or more of the five will drop out of the market or be absorbed by a deep-pocketed multinational sponsor.

Analysts also expect more OEM agreements allowing the BUNCH companies to repackage other vendors' products.

"I think in the next year, maybe two years, you will see some of these companies as acquirers, but more than three years out they may be acquired themselves," said Steven Milunovich, an analyst with First Boston Co.

Leading the BUNCH

The "B" in BUNCH is Burroughs Corp., which observers believe is intent on continuing its own product development. Estimated to have about 9% of the large-scale market, Burroughs introduced its high-end A 15 and mid-range A 10 systems in 1985.

Burroughs has fought to get into government markets in recent years and is expected to continue to expand its presence there as well as in the finance and education markets.

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> ***In an age when it takes three or four years to develop a mainframe and only months for IBM to make that system obsolete, observers are watching for signs that one or more of the five BUNCH firms will drop out of the market.***

"Burroughs seems to be committed to keeping its own mainframe technology alive. I haven't seen them winning too many major new contracts, but they are doing all right," observed Dale Kutnick, an independent consultant based in Wayland, Mass.

The "U" in BUNCH is for Univac, which is now part of Sperry Corp. The computers are still commonly referred to as Univacs.

Sperry talked unsuccessfully about merging with Burroughs in 1985, so speculation about Sperry being acquired by someone remains. Sperry, which some observers consider the only mainframe vendor emphasizing AT&T's Unix as an operating system for its full line of products, reportedly has been holding on to its base in education and the utilities while trying to expand its defense and banking market bases.

Sperry is seen as being in the middle of its high-end 1100/90 life cycle, but the firm is expected to replace some mid-range systems with a system code-named "Swift" in 1986 or 1987.

However, Sperry also recently announced it is considering links with Hitachi Ltd. for peripheral products and technology within Sperry's 1100 architecture.

NCR Corp., the "N," is said to be ready to offer a new high-end processor, but even that will perform fewer than 10 million instructions per sec-

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end (MIPS). Kutnick maintained that NCR makes "basically a big minicomputer."

NCR is expected to concentrate on serving merchandisers such as large department store chains with computing systems ranging up from point-of-sale networks, leveraging the market from where it drew its original name — National Cash Register.

The "C" in BUNCH is Control Data Corp., the Minneapolis company that had its share of financial problems in 1985 and is considered by many a candidate to be acquired as a whole or in pieces.

CDC announced its Cyber/180 systems in 1984 and has concentrated on the education, scientific and engineering markets. The high-end of the Cyber/180 line — the Model 990 — will be delivered to its second customer in January.

CDC is one of those companies fighting to hold its mainframe base. The company took its name off one of its most visible product lines when it formed ETA Systems to produce the Cyber 205 supercomputer and the scheduled ETA-10 supercomputer.

The rationale behind that move was to split off from mainstream operations the development and marketing responsibilities for supercomputers.

"For all intents and purposes, they [CDC] are concentrating on survival. I can't see them doing anything but losing ground in the mainframe market. The only niche they seem to have is the scientific market, and the problem there is that guys like IBM and Amdahl are significantly improving their own products in that area," Kutnick said.

Honeywell, Inc. is the "H" in BUNCH and a company estimated to own about 7% of the large-scale market.

Honeywell introduced its DPS 90 series of mainframes in April for delivery late in 1985. That series of five processors was the first product line of a Honeywell-NEC alliance. The DPS 90 is based on NEC's S-1000 mainframe.

Honeywell is expected to concentrate its efforts in established markets such as the manufacturing industry where Honeywell got its start in selling control systems.

"Instead of looking for new markets, Honeywell is going back to its roots, in controls," First Boston's Milunovich said.

— James Connolly

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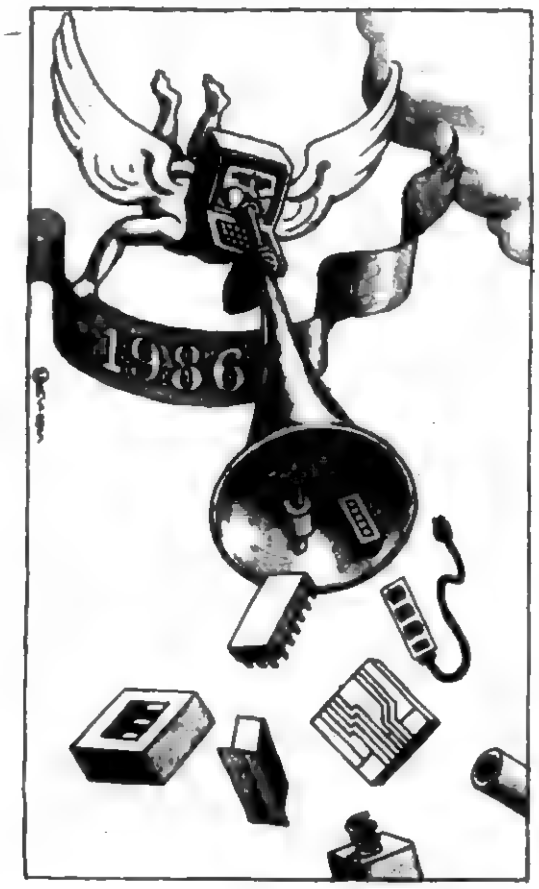

ILLUSTRATION BY ROB SAUNDERS

Desktop computing

No longer strictly personal

By Eric Bender

During the past few years the microcomputer has transformed itself from a shiny new high-tech toy to a standard business appliance that often appears as useful but as anonymous as the phone. But while the glamour of personal computing has faded, the technology keeps marching on, offering an ever wider choice of resources that just might help to solve problems.

In the next year or two, high-end desktop devices will continue their evolution toward multi-million instructions per second (MIPS) machines, with graphics displays reaching a level of resolution only engineers commonly see today, with links being forged into a vast world of data within and without the corporation and with a broad range of optional integrated voice- or image-processing services.

> ***Pinpointing which new products will find a home is a perilous business, with the only safe bet being that no real-world implementations will go as smoothly as predicted.***

Most likely these little powerhouse machines will still be called personal computers although that may be misleading. Often they will be seen less as computers than as fairly intelligent front ends to other systems such as videodisk players. And the "personal" part of personal computer may seem to disappear when the device becomes a diskless end node on a distributed network that downloads programs and accesses files under the watchful eyes of centralized DP/MIS.

Meanwhile, a new crop of application software should offer significantly greater ease of use and flexibility, taking advantage of graphics in noncosmetic ways. Software also will incorporate a growing flavor of artificial intelligence technology, with some of the first practical "software assistants" making an appearance.

As usual, and for very good reasons, the marketplace will lag behind the technology, with the bulk of the installed hardware base remaining garden-variety IBM Personal Computers and the like for several years.

Pinpointing which new products will find a home is a perilous business, with the only safe bets being that no real-world implementations will go as smoothly as predicted, that everything will take longer and cost more than expected and that technical improvement alone will not guarantee anything.

In many cases, acceptance of technological advances will be stalled until they receive blessings from standards setters, which in personal computers usually means IBM. One historical example is microfloppy drives, a mature technology that offers significant benefits over minifloppies but remains on the periphery because Big Blue has not spoken.

Next-generation desktops will be built around 32-bit chips that put most of a high-end supermini CPU on a tortured piece of silicon smaller than a postage stamp. Various contenders are worthy entries from a technical point of view, including Motorola, Inc.'s 68020; AT&T's 32100; and National Semiconductor Corp.'s 32032 on the open market and Digital Equipment Corp.'s Microvax II and other chips in proprietary machines.

But the most likely to succeed is the newest chip off the block, Intel Corp.'s 80386.

The 80386 will provide sustained performance of 3 to 4 MIPS and virtual memory capacity of more than 64 trillion bytes — 32 times the size of the U.S. gross national debt in dollars, noted David House, vice-president and general manager of Intel's Microcomputer Group.

State-of-the-art chip

The 80386 is a key ingredient because it provides "total state-of-the-art architecture" along with compatibility with the CPUs in current IBM micros, said Microsoft Corp. Chairman Bill Gates.

As such powerful general-purpose CPUs arrive, "the notion that there is such a thing as a special-purpose machine goes away," Gates predicted.

With the chip expected to ship in volume in second-quarter 1986, systems based on it should begin appearing in 1987. The first such machines are likely to be multiuser systems or network servers, and 80386-based systems will migrate over time toward high-end single-user machines.

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> *'Everyone's waiting for Microsoft and MS-DOS 4.'*
>
> — Maureen Fleming
> Digital Information Group

However, it is worth noting that despite the dominance of Intel chips in personal computers, none of the company's processors introduced after the 8088 has found a place in the sun as quickly as expected.

Another heavyweight

Among other heavyweight silicon contenders, a compact version of DEC's Microvax II clearly is on the way. DEC has shipped well over 5,000 of the current Microvax, which W. D. Strecker, vice-president of engineering product strategy at DEC, described as a "deskside" system. "Within the near future you will see a desktop implementation of VAX," he said.

Some experts predict a significant role for reduced instruction set computer designs in silicon, although a majority questions whether the potential performance advances will outweigh compatibility problems.

Similarly, symbolic processor architectures are making the shift into very large-scale integration, with desktop systems beginning to appear in the next two years. This move will go hand in hand with "a change in general-purpose computers to make them more efficient at symbolic processing," predicted Symbolics, Inc. President Russell Noftaker. "The differences between symbolic architectures right now and general-purpose architectures are going to disappear in the near future."

Graphics processors

Elsewhere on the hardware side, dedicated graphics processors will handle the processing required for the high-resolution screens, and designs increasingly will add a general-purpose CPU to handle I/O.

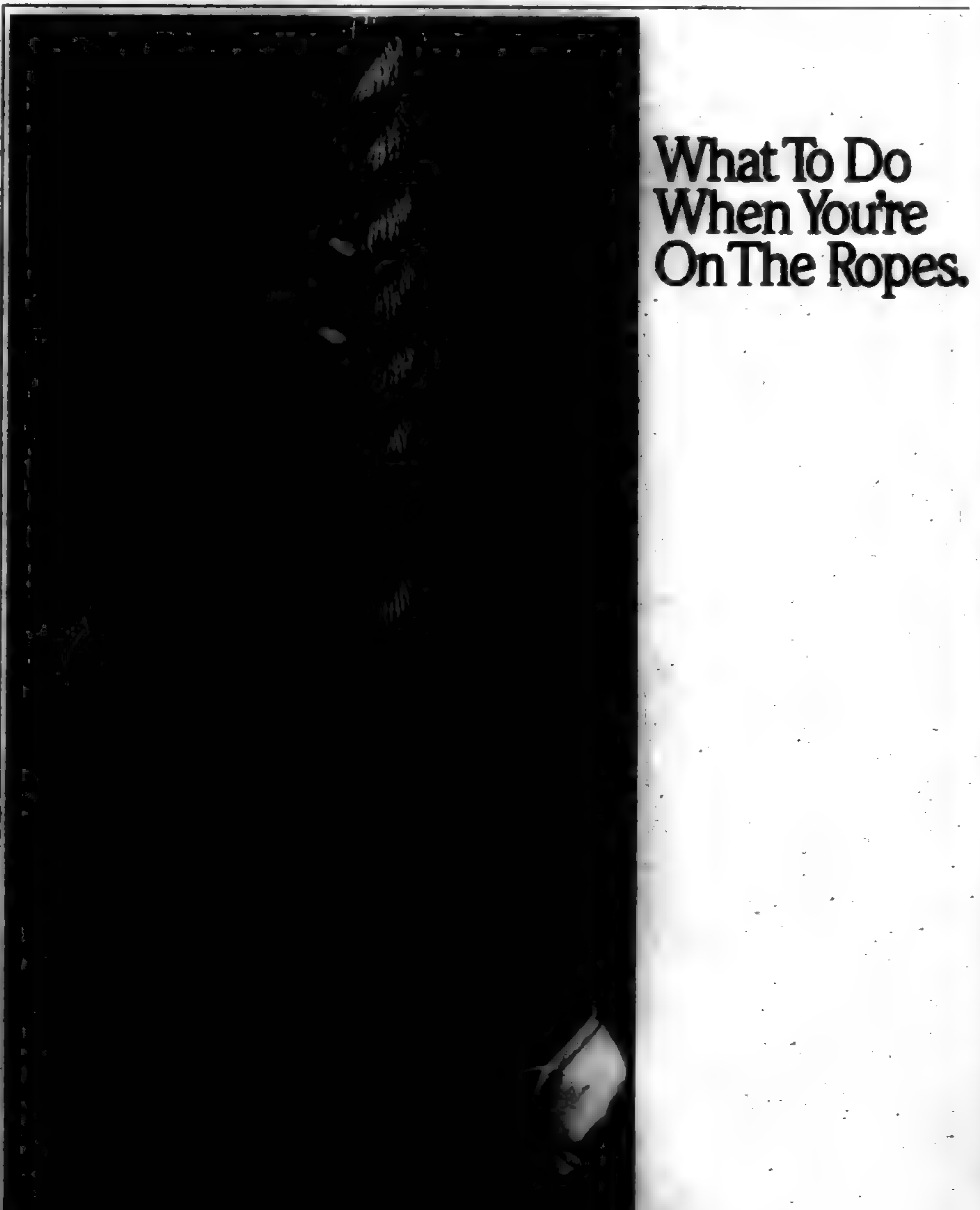
And 1M-bit random-access memory (RAM) chips will quietly proliferate. Barring unforeseen supply shortages, RAM costs will continue to drop to a level that would have seemed ridiculous a few years ago.

Tapping all this low-budget power will require major upgrades in operating system software. MS-DOS is being rewritten one more time to boost support for multitasking, networking, extended memory and graphics, but IBM and MS-DOS author Microsoft are preserving discreet silences about what exactly lies ahead.

Even the occasional delphic revelations, such as IBM Entry Systems Division head William Lowe talking about a multiuser MS-DOS, may give conflicting signals. In Microsoft's view, "multiuser" here means not "shared CPU" but "multitasking with network hooks."

Asked what those hooks might contain, Gates replied that the upgraded software will not be dramatically different. "It will rely more and more on the server and view it as integral part of the system."

Naturally, the new soft-



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ware must also make peace in some way with emerging IBM communications standards such as LU6.2.

On the memory side

On the memory side, software developers are still waiting for the official word on how to bypass the 640K-byte direct-address limitation, and without it, they really cannot take advantage of the Personal Computer AT's Intel 80286 chip. "Everyone's waiting for Microsoft and MS-DOS 4," said Maureen Fleming, president of the market research firm Digital Information Group in Stamford, Conn. "It's a mess."

While many suggest that there is some fundamental incompatibility in the marriage between MS-DOS and the 80286, most likely in the silicon, Microsoft denies it.

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> ***'Within the near future you will see a desktop implementation of VAX.'***
>
> — W. D. Strecker
> DEC

IBM and Microsoft both feel that the answer continues to lie in providing extended memory addressing in the 80286's protected mode, Gates said. The 80286 operates in both real and protected modes, in the first case mimicking earlier processors and in the second case handling many system functions in hardware. The two modes are incompatible, and Microsoft has been grappling with the problem of running existing packages in extended mode.

A joker in the pack

But there is a joker in the pack for software developers — the Lotus/Intel/Microsoft Expanded Memory Specification (EMS), released last spring, which offers a way to address extra memory without a tremendous rewriting effort.

Many said they believe the EMS will establish a standard for memory management on both 8088- and 80286-based machines. "It's a little kludgey," but it will do the job, maintained Compaq Computer Corp. President Rod Canion.

Others disagree. "Much too much has been made of the EMS," said Ashton-Tate President Edward Esber. "I still can't afford to design a memory configuration above 640K. IBM could change the rules overnight."

While there is also controversy about graphics environments — whether IBM will migrate its Topview environment to a graphics version, whether Microsoft will establish Windows as a standard or whether some dark horse will appear — there is little doubt that the potential user benefits are huge.

A graphics-environment standard offers three main pluses, Gates said. First is the chance to offer a common user interface across various applications; "character-based interfaces will never be consistent," he noted. "Second, you can do rich, rich documents and third is the screen bandwidth" — the heightened ability to deliver information quickly and intuitively."

Next-generation software

"Next-generation software has to be made for the 80386, built for a graphics environment, incorporate artificial intelligence front and back ends, be mainframe and mini cognizant and cognizant of other data as well," Esber forecast.

While AI content has been overhyped in many early products, the technology offers the promise of major advances for micro software. Among these, Esber said, are the ability for computers to "do what I mean, not what I say," to embody and transfer knowledge and to redefine computer literacy.

Many within the artificial intelligence community feel that beginning to fulfill AI's promise will require hardware that will not make it down to the desktop for years.

"There's sort of a game being played" by some hardware vendors promoting their machines that way, Symbolics' Noftsker insisted.

However, "people are addressing needs at very different levels," remarked John Spencer, vice-president for marketing and sales at Teknowledge, Inc.

As one example, he said,

small and relatively unsophisticated knowledge systems can answer some user demands. "Just because we've proved the technology's reliable doesn't mean we should abandon it."

Another slant on AI is offered by Microsoft's upcoming "softer software" and similar programs expected from other leading vendors such as Lotus Development Corp. These packages will bundle in a software assistant outfitted with a constantly updated knowledge base covering user preferences. "The software starts to interact with you; it seems to act like it sort of understands your intent," Gates said. "It's not static."

In addition to new kinds of applications, today's major packages will get face-lifts and additional features, with the trends being toward natural language front ends, macros and a variety of communications links.

As the hardware is strengthened, software packages will be extended dramatically. One example lies in word processing: "With the 80386, I could do some decent grammar checking," said Camilo Wilson, founder of Lifetree Software, Inc. That, in turn, could support features such as a thesaurus that pops up not only with synonyms but with related concepts.

Here are some safe bets: Modem hardware will keep shrinking and getting cheaper, and users will continue to migrate towards higher speeds, with 2,400 bit/sec. becoming a standard for asynchronous links. Costs for local-area network interfaces also are dropping. Somewhere down the road, many expect, IBM Token-Ring network hardware will be as standard as RS-232 ports are now.

But the outlook for the grab bag of voice/data products is not clear at all. Each year, small vendors offering technically interesting products crash and burn. The most promising integrated personal computer/phone combinations, such as Compaq's Telecompaq, emphasize not the latest technology but attention to prosaic details like simple English labels on function keys.

In voice response, the situation is exactly opposite: The market is still waiting for a technological breakthrough to produce affordable and robust systems. The current drawbacks of voice response equipment running off micros are displayed during trade show demonstrations, when sales personnel don microphones and slowly repeat words as if they were giving commands to rather unintelligent dogs.

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> ***While many suggest there is incompatibility in the marriage of MS-DOS and the 80286, Microsoft denies it.***

Recognition rate of 97%

Once trained to a given speaker, systems typically achieve a 97% to 98% recognition rate, said Ed Marcato, marketing manager at Kurzweil Artificial Intelligence, Inc.

The equipment differs in size of vocabulary, in ability to filter out extraneous noise and in other niceties, he said.

The Kurzweil Voice System, which handles 1,000 words, has been sold to about 100 customers since shipments began in June. Sample applications include both traditional voice response situations — in environments where the user's hands are already busy, such as quality control — and office applications. In one case, the system could act as a front end to Artificial Intelligence Corp.'s Intellect mainframe data retrieval system, Marcato remarked.

Among other voice technologies, voice-synthesis and voice-mail techniques are more mature, but they make the most sense when implemented on centralized systems, according to office systems consultant Tom Billadeau of TRB & Associates.

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backup systems.

Optical storage devices will receive dramatically more attention in 1986, with compact disk read-only memory (CD-ROM) players hooked to personal computers grabbing the spotlight. In addition to storing standard on-line textual information, CD-ROMs are capable of handling any other digitized information, such as pictures or audio, so many upcoming jobs for the drives are not immediately apparent.

> ***Somewhere down the road, many expect, IBM Token-Ring network hardware will be as standard as RS-232 ports are now.***

Within large corporations, early users will come from three groups, according to Peter Rudnicky, DEC's marketing manager for CD-ROM Publishing Services. These groups include libraries, "information intermediaries" such as market researchers and anyone with a lot of data to distribute internally.

A pilot project for internal distribution of machine-readable files at a corporation with 200 or 300 CD-ROM drives might take two to three years and cost $400,000 to $500,000. The cost may be less if software is developed in-house, Rudnicky estimated.

One potential holdup for CD-ROMs — the lack of domestic supplies of disks — seems to be vanishing. A 3M Corp. factory now is ramping up and Sony Corp. promises to begin production in this country in early 1986.

Application software may represent a longer term limitation.

The players offer "relatively slow access times, an

Outlooks '86

"In 1985 AT&T drove Unix. Utilizing their Unix-based computers, they created several vertical market niches, specifically in hospital administration, legal services and in auto dealerships. AT&T's marketing efforts have led to acknowledgment of Unix as an operating system for commercial businesses. Major insurance companies and manufacturing operations have considered or are actively purchasing Unix-based equipment."

— Jean Yates,
vice-president,
International Data Corp.

"One major event that occurred in 1985 was that the local-area network market started to arrive. It was, of course, expected in 1984. It should begin to take off in 1986. As we get more [local-area nets] there will be more software for them. As people start interconnecting their PCs you'll see office automation develop from the bottom up. In 1986 the small multiuser systems will use a lot of [Microsoft Corp.] Xenix and [AT&T] Unix. By the end of the decade, Unix will have 5% to 8% of the computer marketplace.

Another area of development is that the mainframe software vendors are creating versions of their software for the PC. It's kind of strange when for $500 you can buy a product that costs $100,000 on a mainframe.

The biggest challenge coming up in the next two years is to get a multitasking version of [Microsoft] MS-DOS working. That will allow people to migrate into a better behaved, more controlled environment."

[illegible]

average of about a second," Rudnicky said.

If the retrieval software lingers over its tasks, the overall system may seem very slow to computer users although on-line subscribers may see it as relatively quick. On one CD-ROM system at Comdex/Fall '85, response time dragged on into seconds, even for some tasks that did not require accessing the player.

> ***Many said they believe the Lotus/Intel/Microsoft Expanded Memory Specification will establish a standard for memory management on both Intel 8088- and 80286-based machines.***

Larger write-once optical systems also are emerging quickly, but their high price tags will keep them away from the desktop in archival applications, at least in the near future. Meanwhile, practical erasable optical systems still seem three to five years away.

Elsewhere among peripherals, the movement toward nonimpact printers keeps accelerating. As one illustration, Dataquest, Inc. estimated that North American sales of $10,000 and less expensive laser printers will climb from 49,000 in 1984 to 107,000 in 1986 and to 199,000 in 1988. Hardware prices are plummeting while features are added, and sophisticated graphics-oriented software is appearing.

Research and development efforts are showing different degrees of success in other, specialized applications.

The greatest technical problem for laptop micros — finding an easy-to-read screen with low weight and minimal power draw — remains unsolved. Some progress may be made — for example, the upcoming AT&T laptop's screen uses shading to simulate four-color dis-

Outlook '86

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play. But LCD, backlit LCD, electroluminescent and plasma designs all suffer from serious drawbacks.

Image processing with personal computers, which consultant Fleming described as "a market on the brink," is just beginning to draw the required crop of software. Current applications range from swapping documents back and forth between remote locations — easily revising them at each site — to teleconferencing to signature verification.

A sobering perspective on image processing, however, is raised by the Wang Laboratories, Inc. PIC, a desktop system first annouhced two years ago that is yet to play a major role in office automation. Wang currently is emphasizing PIC-like capabilities as part of a centralized, shared processor system. "We're getting away from a microprocessor-based solution and moving to the VS world," said Estal Fain, director of product marketing.

In another job, the micro acts as a front end to a videodisk player, creating an interactive video system. This technology is mature and beginning to see broad-scale adoption.

Training applications

Many early applications will be in training factory workers, because defining needs is relatively straightforward, said Nate Kalowski, marketing vice-president at Visage, Inc. One very large manufacturer has committed to buy thousands of interactive video systems, he said.

The flow of inventions seems unending. Among the most intriguing, at Comdex/Fall '85 Panasonic Industrial Co. linked a television camera to an optical storage system and hooked up an Apple Computer, Inc. Macintosh that ran editing software, giving users a spectacular array of video capabilities.

Other products seem to appear out of the blue, such as Cauzin Systems, Inc.'s Softstrip, which stores data and programs on paper printouts.

But among this cornucopia of computer blessings, what do users want? Cautionary notes are common.

"The gap between what a person uses and what we provide has gotten larger instead of smaller," Ashton-Tate's Esber remarked. "We never get to discuss when enough is enough."

"We're in technological overspeed," commented Software Publishing Corp. President Fred Gibbons. "With products like the Personal Computer AT and Windows, we may have gone way beyond the user. We have to make sure we still address professional needs." ■

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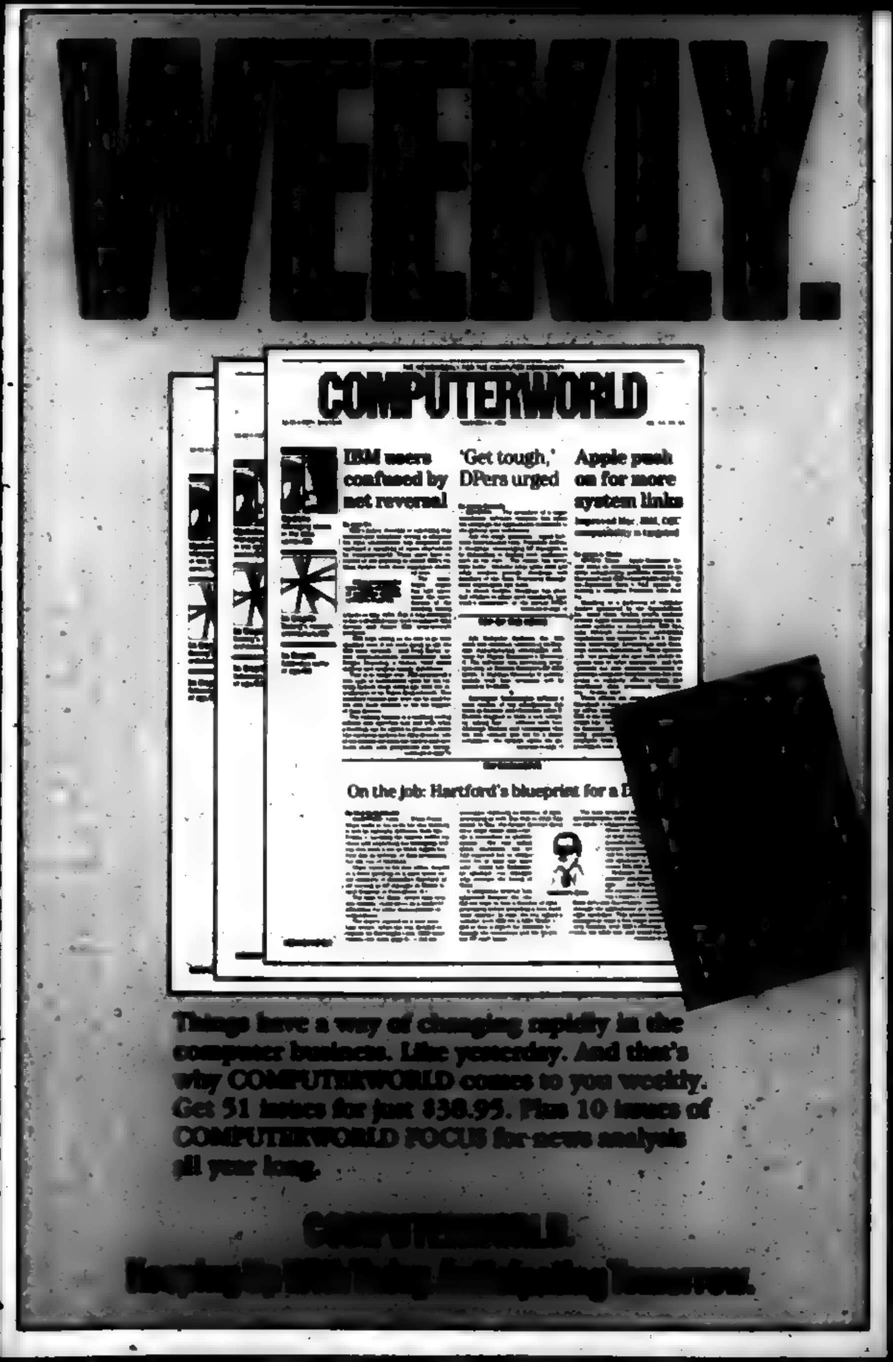
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Communications options

The world beyond AT&T

By John Dix

During the past year, telecommunications users were able to retire some of the many balls they have been juggling since AT&T divestiture in January 1984, but keeping the remaining spheres revolving smoothly has not been a picnic.

Although better equipped now, communications users in the postdivestiture era find that life is still complicated and made ever more so by flourishing options.

Nowhere is this more apparent than in wide-area networking. More alternatives have probably surfaced in the market for long-distance services than in any other transmission area. While rich with potential, the alternatives are still out of reach for the majority of users who, for the most part, are still doing battle with the lingering effects of divestiture.

Juggling is an apt metaphor.

At the same time they have to contend with rate revisions that affect their existing services, users must also examine newly tariffed services, monitor and gauge the importance of new technologies, measure the viability of carriers and orchestrate services from multiple suppliers to form a harmonious system.

As if that were not enough, communications managers are also expected to make optimal, cost-effective use of existing networks and explore potential means of using communications to get a leg up on corporate competition.

Time has not even helped assuage some nightmares created by the AT&T breakup. The considerable day-to-day task of network maintenance did not get any easier in 1985 compared with the frenzied year of 1984. Pinpointing problems and coordinating maintenance for networks composed of separate local and long-haul carrier components is still a bear. Carriers have a nasty habit of finger pointing and blaming failures on each other.

"Our frustration with facility repair and maintenance did not improve in 1985," said Daniel Mandreger, senior engineer with Consumers Power Co. in Jackson, Mich. "If anything, it's gotten worse."

That lament is echoed over and over again. "Many things we used to call Ma Bell for when it took end-to-end circuit responsibility you have to do on your own now," said William G. DuVall, vice-president of network operations for CompuServe, Inc., the Ohio-based company that provides time-sharing and home computer services. "We've had to beef up network control and support staff considerably to handle the load. We've also rewritten a lot of tools so it's not as bad as it was before, but I don't think it's getting any better."

Although better equipped now, communications users in the post-divestiture era find that life is still complicated and made ever more so by flourishing options.

Few companies have escaped unscathed, regardless of size. "Divestiture has put more of a burden on customers. We're coping with it and doing well, but it has been a challenge," conceded Gerard R. Weis, vice-president of data communications and software services at Sears Corporate Communications, Inc., the wholly owned subsidiary that provides Sears,

ILLUSTRATION BY KEN CONDON

Roebuck & Co. with communications services.

Some smaller companies have been hard pressed. "Our company is in an austerity crunch so we have to deal with more problems and difficulties on a daily basis with the same number of people," Mandreger said.

There was, however, a positive aspect to the situation. Competition among vendors is rampant. A buyer's market is in the making, and the forces at work there will ultimately determine fair market service rates. Flux is creeping into service pricing. The goal of AT&T divestiture, it seems, has begun to bear fruit.

"There is more competition going on between AT&T and the divested Bell operating companies than there ever was before, and you're getting deals both ways," DuVall said.

Carriers are hungry. "Some long-distance companies are coming in and offering all kinds of things, like a free microwave shot to their [point-of-presence] and discounted rates," DuVall said. "There are some strange offers out there."

And they will probably get stranger as competition heats up. It is coming from all sides. Established carriers are offering bulk bandwidth, which users can chop up and employ as they wish. Carriers are also trying to retain customers with new types of services and pricing options.

New carriers are cropping up and leasing or selling capacity on long-haul, fiber-optic networks. Still other competition is coming from companies which sell equipment that enables users to install their own communications systems either to link to existing carriers or bypass all carriers.

Large companies have the greatest ability to take advantage of the new alternatives — they have the capital resources and in-house communications expertise needed — and the largest incentive: They stand to save the most.

For these users, the hot topic of the year was T1, a digital service consisting of 1.54M bit/sec. of bulk bandwidth that users can chop up and use as they wish. Although T1 can be used as a single very high-speed link, it is typically segmented by the user into 24 voice channels or an equal number of 56K bit/sec. data channels. The appeal of T1 is that it costs roughly the same as only 10 or 11 individual 56K bit/sec. digital channels.

Virtual networks

To address the voice and low-speed data needs of companies with widely dispersed facilities, many carriers have introduced virtual networks, viewed by some to be last year's most important communications development.

Virtual networks go by different names. AT&T's service, for example, is called the Software Defined Network and MCI Communications Corp.'s network is dubbed Virtual Private Network. Both will be deployed beginning early this year.

The basic idea of all virtual networks is the same. Users can tie small company facilities into the corporate leased-line network using dial-up connections, the configuration for which is stored in the memory of carrier switches. As tariffed, the service is an economical way to support locations that do not generate enough traffic to justify a leased-line connection to the corporate net and have traditionally used direct distance dialing or WATS lines.

MCI's and AT&T's virtual networks are both analog and aimed predominantly at voice usage but can be used for data transport at speeds up to 9.6K bit/sec. The services are made possible by specially programming carrier network switches.

AT&T claimed its Software Defined Network service, which is targeted at customers with at least 20 geographically dispersed sites, can shave up to 20% off users' communications bills.

Another service that bowed in 1985 that is expected to be of great importance beginning this year is AT&T's Megacom service, a bulk calling option said to be a tier above AT&T's present WATS service. Customers in the Fortune 500 that use WATS 1,000 hours or more per month can reportedly save roughly 10% on interstate calls.

The primary difference between WATS and Megacom is the mileage component used to calculate rates. WATS rates are calculated using mileage bands, five of which segment the country. As way of example, the monthly bill for a WATS customer who has Band 5 capabilities, which includes all of the U.S. and 3,800 hours of usage on 39 access lines, will be roughly $66,000 per month. The same service could be achieved with Megacom for $61,420 per month, for annual savings of nearly $55,000.

Awaiting Megacom

"Megacom is something a number of us have looked for for a long while," said Hallenbeck of Emery. "It will definitely save money, but 10% is probably a bit optimistic."

All of the tariffs AT&T approved by the Federal Com-

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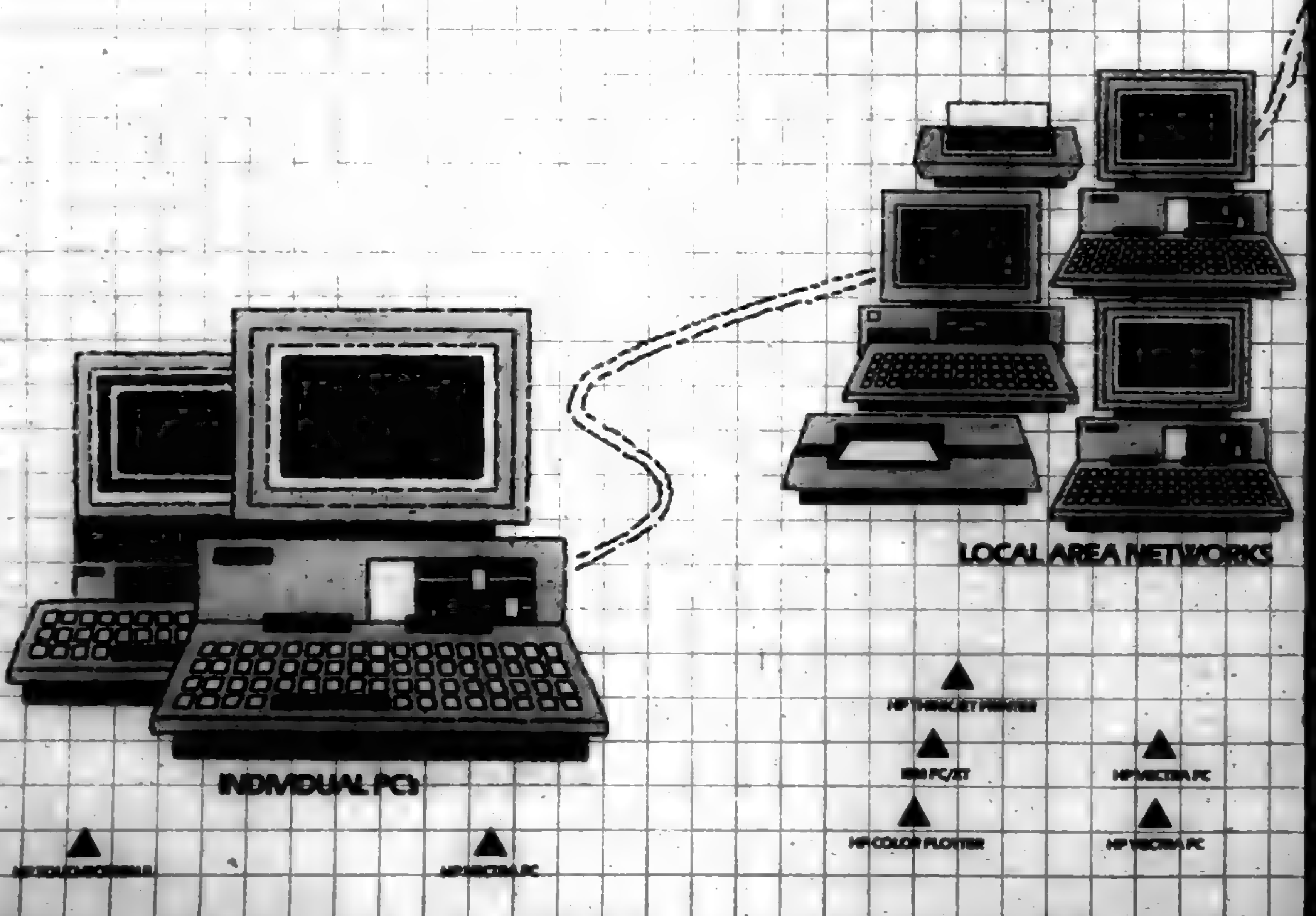

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munications Commission this past year — including new Software Defined Network, Megacom and private-line tariffs — share one thing in common: They unbundled the cost of local access and termination.

Disallowed by divestiture to provide end-to-end services, AT&T's new tariffs give the user the option to access its services in one of four ways.

These access options are through AT&T, which would act as the customer's agent and procure the necessary connections through the appropriate local telephone company; through the local telephone company itself; through an independent access vendor; or by building its own access link.

Two of the four access methods bypass the local telephone company. Bypass is a hot and controversial subject that built up steam in 1985 and has potential to boil over in 1986, more than a little aided by AT&T's new tariff structures.

"Unbundling the pricing shows the large user the underlying costs of the service. It says to a Fortune 500 customer, 'I'm paying 80% of the charge for access and termination, not the intercity portion of the service,' " according to Ken Leon, a security analyst with L. F. Roshschild, Unterberg Towbin in New York. This will encourage customers to seek access alternatives.

AT&T not sidestepping

AT&T once said it would not sidestep the divested Bell operating companies to reach large customers unless the local carriers were "unwilling or unable to provide access at market price/performance levels," according to Jerry Thames, general manager of AT&T Communications network services.

Only one customer to date, Merrill Lynch & Co. in New York, uses bypass facilities to reach AT&T, a deal cut for fear of losing the account to another carrier willing to provide direct carrier access.

Innocent? No. Although it may not be trumpeting bypass on the streets, AT&T is working behind the scenes. In September, AT&T even introduced a family of microwave bypass products. Leonard Klienrock, a professor of computer science at University of California at Los Angeles and president of Technology Transfer Institute, a conference group in Santa Monica, Calif., goes as far as to say, "AT&T is one of the biggest promulgators of bypass right now."

More locals bypassed

We will see more and more local phone companies being bypassed as users link directly to long-distance carrier network access points, according to Mark Winther, director of new communications services at Link Resources Corp., a market research firm in New York. "The local companies can't move quickly enough to change their tariff structures to keep them economical for large businesses."

> **'AT&T is one of the biggest promulgators of bypass right now.'**
>
> — Leonard Klienrock
> University of California
> at Los Angeles

From the local telephone company's perspective, the result is the same regardless if the impetus to bypass comes from the long-distance carrier or from the customer.

"The 10/90 rule applies here," Klienrock noted. "Ten percent of the business customers generate 90% of the business revenue. It's exactly that 10% who have the wherewithal and motivation to bypass."

Interconnecting buildings

In addition to using bypass to access long-haul carriers directly, users are employing the technology to interconnect local buildings.

Long-distance carriers are not immune to bypass. Many companies have installed their own private corporate networks, bypassing both local and long-haul carriers.

E. F. Hutton & Co. in New York is installing an end-to-end satellite bypass system that is expected to save the company $9.3 million over a seven-year period. The system will pay for itself in one year, according to Bernard A. Weinstein, first vice-president of communications and

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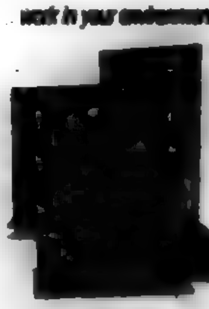

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branch information systems.

However, the cases cited are the exception, not the rule. Like T1, bypass is talked about more than actually used. It does have inherent risks.

"If you're going to put in fixed bypass facilities because its cheaper than a leased facility, you have to be confident the price of the leased facility won't drop to the point where your fixed facility is no longer economical," warned Alan Schaevitz, director of the San Francisco office of Network Strategies, Inc., a consultancy in Burke, Va. Short payback periods are a necessity.

Sometimes bypass is just plain uneconomical. "The public utility commission here in [Jackson, Mich.] has held the cost of channel facilities down for their customers so we have a hard time justifying bypass," Mandreger of Consumers Power said. DuVall of Compuserve noted, "Companies with limited capital budgets don't do that kind of thing."

As 1986 unfolds, users will attempt to evaluate, plan for and try to implement cost-effective communications alternatives such as those mentioned. They will also be taking furtive glances over the horizon to Integrated Services Digital Network (ISDN), that mysterious universal network solution.

ISDN gathered momentum in 1985 and will be beta tested this year. The idea is to provide an end-to-end, all-digital service that can be used to support any mix of voice, data or video.

"Everyone's goal is to reach the day when any telephone can make any kind of call. That is the world of ISDN," explained Bob Harcharick, president of MCI Digital Information Services Co. "We're all working on these things. We are also still working on just what ISDN means."

Supports two channels

With ISDN, a single residential telephone line — known in ISDN parlance as a 2B+D basic interface — would be capable of supporting two 64K bit/sec. channels: one presumable for voice and a 16K bit/sec. channel for signaling and/or packetized data transport, explained Daniel Minoli, a member of the technical staff of Bell Communications Research, a facility owned jointly by the seven regional Bell holding companies.

The primary rate interface used by business, known as 23B+D, would support 23 64K bit/sec. digital channels and one 64K bit/sec. D channel for signaling and packet support, Minoli said.

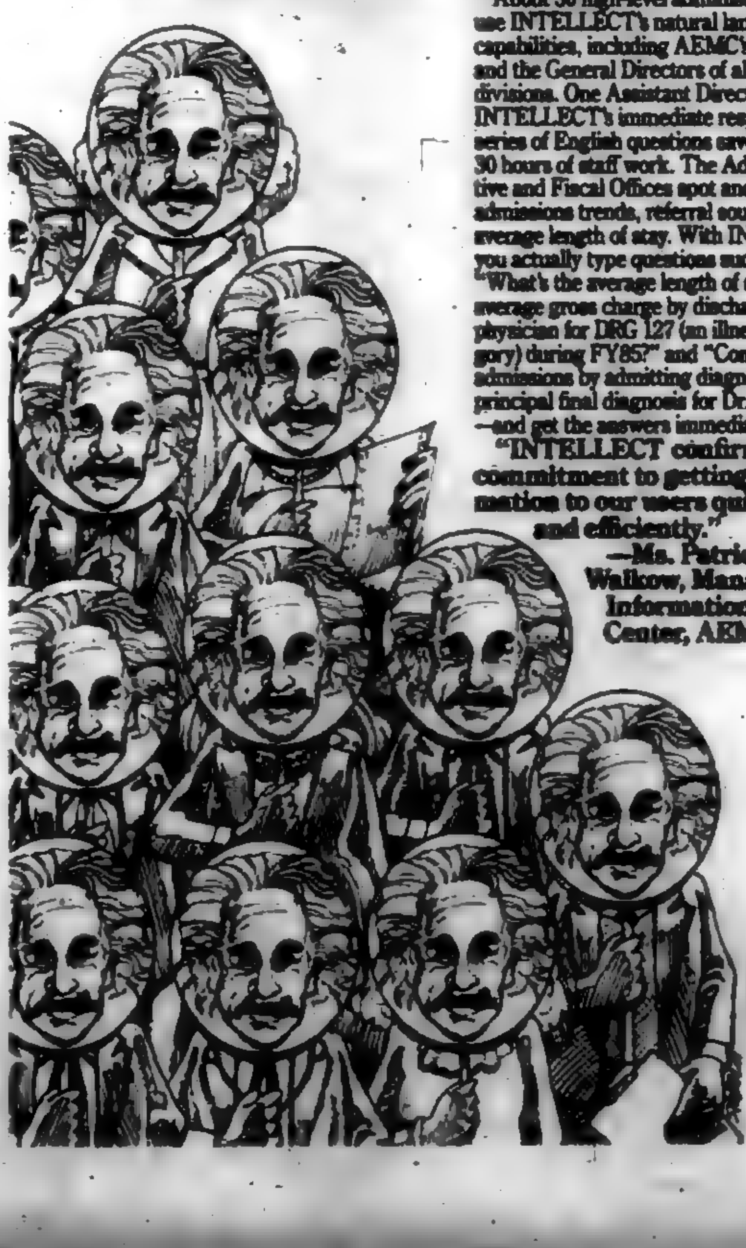
"Today, if I have three different needs for communications link I may have to get three different links," Schaevitz said. "ISDN promises multiple use of a fixed resource — the local loop — and gives better utilization of the available bandwidth."

Besides offering a universal outlet that removes the need to have specialized interfaces for voice and data, ISDN promises to cost less than services offering the same bandwidth.

Most sources say that although nebulous, ISDN will be commercially deployed in 1987. The allure of technology can obscure reality. Witness Daniel Mandreger of Consumers Power Co. He is not as excited about bulk bandwidth services, 45M bit/sec. fiber-optic trunks, virtual networks, satellite shots, bypass schemes and ISDN as he is about being able to use push-button phones with his Centrex service.

"We've been working with rotary phones attached to a electromechanical [Centrex] switch that has been in service since 1963," Mandreger said. Michigan Bell is scheduled to install a new switch soon, which will offer such "advanced features" as call forwarding and conference calling. ■

> 'We are still working on just what ISDN means.'
>
> — Bob Harcharick
> MCI Digital Information Services Co.



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—Mr. Hal Augustine, Director, Computer Services, Albert Einstein Medical Center.

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—Mr. Paul LoRusso, Vice President, Information Systems, AEMC.

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"INTELLECT confirms our commitment to getting information to our users quickly and efficiently."
—Ms. Patricia Walkow, Manager, Information Center, AEMC.

INTELLECT performs so well in giving end-users fast, easy English access to information, AEMC's Information Center plans to develop new applications, including one on hospital personnel. And new INTELLECT/SX (the "personal computing" mainframe version of INTELLECT) will allow even more departments to develop their own applications with minimal Information Center involvement—which may end the need for some users to maintain micro-based databases.

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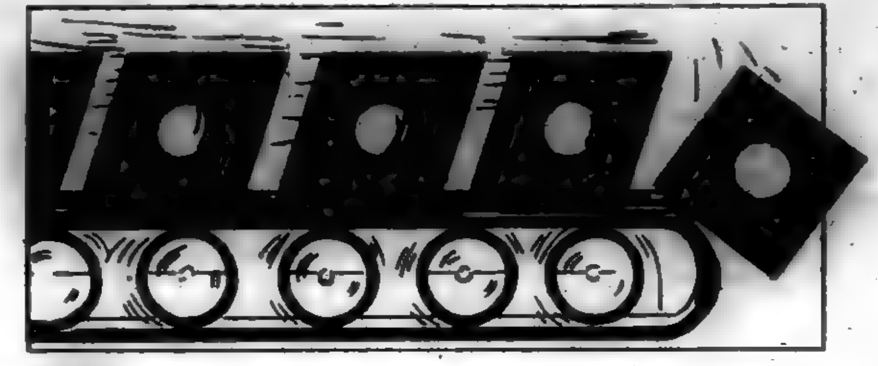

Programmer productivity

Never have so many done so little for so much

By Jeffry Beeler

For as long as anyone in the industry can remember, vendors and systems pundits have boldly predicted startling breakthroughs in the battle for improved programmer productivity. Each year, fresh reports of some newfangled methodology, language or productivity tool have stirred hopes that a technological millennium is at hand and that all software development woes will soon magically vanish.

But almost without exception, past promises of dramatic gains in programmer productivity have proved wildly inflated and have left many user organizations feeling bitterly disappointed with the results.

The continuing inability of both vendors and users to come to grips with their software development ills has inevitably taken a severe toll. Today, many corporate MIS departments find themselves beset with a host of long-standing difficulties that seemingly defy solution.

Past promises of dramatic gains in programmer productivity have proved wildly inflated and have left many users feeling bitterly disappointed.

Large companies typically devote 50% — in some cases, as much as 70% — of their total programming effort to maintenance rather than new systems development. Even when computing organizations do find time to work on future applications, their output per programmer often averages only five to 10 lines of debugged Cobol code per day. The combination of high maintenance requirements and low levels of individual productivity, meanwhile, has created huge application backlogs — hidden and otherwise — that have undermined DP management's credibility and alienated nontechnical end users.

Against the resulting backdrop of rising stress and falling programmer morale, turnover among computing professionals has climbed in many cases to as high as 25% per year.

Experts who specialize in such matters would like nothing better than to report that the future of programmer productivity holds infinitely greater promise than it ever has in the past. But sadly, practically no one with any knowledge of the subject sees much reason for great optimism. At least as far as applications development is concerned, this year will be cast in virtually the same mold as all the other dreary years that preceded it.

Once again, users will read with intense interest as dispatches from the technological front line glowingly describe the latest triumphs in the struggle against unproductive programming. Some of the purported advances, particularly microcomputer-based workstations and automated design generators, will undoubtedly gain widespread acceptance and may even contribute incrementally to improved systems productivity.

But barring divine intervention, no product now or in the future will come even close to yielding the 100% to 1,000% programmer productivity increases that many vendors breathlessly claim.

"Anyone who speaks of productivity improvements on the order of 50 to 100% or more is a fraud," according to Tom DeMarco, a

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Despite vendor assurances to the contrary, the search for a revolutionary technology that will end development bottlenecks once and for all seems no closer to reaching its goal than it did previously. So like it or not, the vast application backlogs and other software-related headaches that have vexed large corporations for 20 years are likely to persist for a long time, DeMarco said.

DeMarco's skepticism is echoed by many others, including independent DP consultant Gopal Kapur, who expects the already sad state of programmer productivity to deteriorate even further during the months and years ahead. Although a handful of unusually well-run computing shops can realistically look forward to productivity gains as high as 20 to 40%, the overwhelming majority will find the going increasingly tough.

"The organizations that will see improvements in programmer productivity will definitely be the exceptions," according to Kapur, who heads the Danville, Calif.-based systems consulting firm of Kapur & Associates, Inc.

Why do the prospects for a dramatic turnaround on the programmer productivity front look so bleak? The reasons are manifold. Part of the problem stems from a pervasive conservatism that makes most MIS directors highly resistant to change. "The reluctance to take risks with new technology is rampant and prevents DP managers from selecting the tools that would best address their needs," according to Dan Walkovitz, president of Mainstay, Inc., which supplies aids for developing analytical applications.

Another reason that the programmer productivity problem seems unlikely to ease anytime soon is that a large percentage of systems executives are woefully deficient in technical know-how, according to Kapur, one of MIS management's sharpest critics.

"Ten years ago, the industry used to have a saying that DP managers were knowledgeable about technology and ignorant about people," he recalled. "Today, they are illiterate about both. Most of them, in fact, have so little technical expertise that they can't even ask the right questions to find out where they have problems."

This technological "illiteracy" has driven many information systems directors to drop even the pretense that they are still personally involved in the fight against inefficient development and has left them entirely reliant on vendors for solutions.

Productivity dilemmas

In the past, the quest for quick technological fixes to their programmer productivity dilemmas led DP managers to place their faith in tools like Cobol and fourth-generation languages. This year, they will increasingly seek salvation in vendor-supplied goodies like integrated graphics and word processing packages, which centralize documentation and electronically create data flow diagrams, and software that automatically restructures existing code, Kapur said.

But although the latest technological darlings will have their undeniable virtues, few will do anything to address the software design and requirements definition issues that lie at the heart of the programmer productivity crisis, he added.

And even if all new products that come down the pike were the computing equivalent of a Stradivarius violin, user organizations would still face an acute shortage of virtuosos to play them. In other words, only the most accomplished programmers will be able to exploit the potential of the latest tools.

However, the outlook for programmer productivity is by no means entirely devoid of bright spots. Consider, for example, intelligent programmer workstations, which are widely believed to have potentially far-reaching implications for application development.

As they are currently conceived, programmer workstations consist of selected Cobol programming aids and hard disk-based personal computers that serve basically the same coding function as a traditional IBM 3270 TSO terminal. The workstations also typically boast a sophisticated uploading capability that allows large-scale systems to be written off-line as a collection of modules and then shipped to a host mainframe for assembly and testing.

As a complement to conventional mainframe-based development, programmer workstations offer some conspicuous advantages. For example, they constitute a dedicated resource and thus provide faster response times than contention-ridden hosts, according to Chris Berrin, supervisor of development center and information center operations at Blue Cross of California.

To date, the use of programmer workstations has made only modest inroads at most major organizations like Crocker National Bank, which earlier this year began testing the first of 10 such machines as part of an ongoing pilot project. But in the very near future, installations of the workstations will almost certainly multiply. "A lot of companies seem to have at least their foot in the door and are looking in pret-

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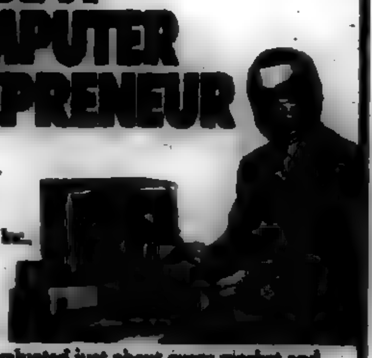
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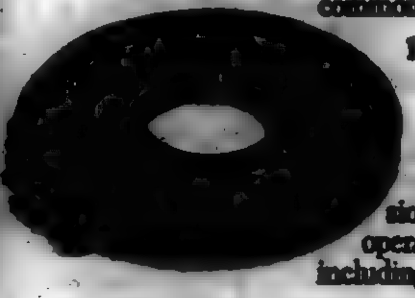

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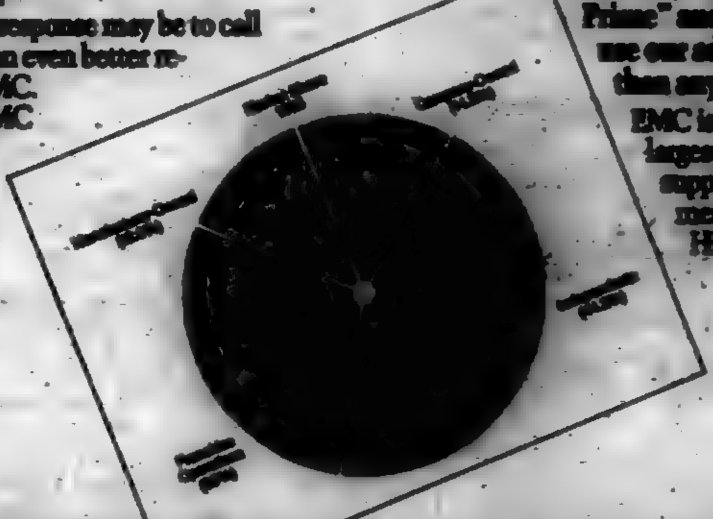

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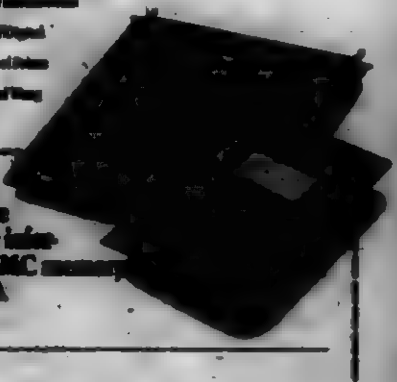

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ly much the same direction, although some are apparently further along than others," according to Peter Katz, a project manager at San Francisco-based Crocker.

Katz sees the programmer workstation phenomenon as merely the latest chapter in the much grander saga of microcomputing's growing infiltration of big business. The invasion began when large numbers of micros started making their way into the hands of engineers and other skilled technicians. Now, the influx is entering a second phase in which the devices are slowly but relentlessly spreading to professional programmers and their MIS coworkers.

A somewhat different portrait of workstation evolution is painted by Paul O'Grady, vice-president of worldwide sales and marketing at Palo Alto, Calif.-based Micro Focus, Inc. At present, O'Grady said, personal computers play only a comparatively minor role in the application development process, where they serve primarily as an extension of installed mainframes.

But now that IBM has finally announced its long-awaited Token-Ring network, micros suddenly find themselves poised on the brink of a fundamentally new mode of operation. Soon, the machines will gain the necessary technology not only to continue supporting the familiar 3270 TSO development environment but also to be interconnected to form local networks in which mainframe applications will be created collectively.

Networks of programmer workstations promise to augment software productivity by promoting resource and data sharing and by enabling many development tasks to be off-loaded from the host mainframe. The use of networked workstations will also stimulate the development of multiuser applications that will take advantage of important leading-edge technologies like graphics and system prototyping, O'Grady said.

■

Crocker explores workstation path

Many profound differences separate Crocker National Bank and Blue Cross of California. One ranks among the largest U.S. providers of banking and financial services. The other is known far and wide as a mass processor of medical insurance claims.

But in at least one notable respect, the two organizations are in complete accord: Both have already begun to explore the use and potential productivity gains of programmer workstations, and both expect their efforts to continue this year.

Crocker National Bank has already installed a limited number of the machines in its internal systems organization, and Blue Cross is seriously exploring the possibility of doing likewise although the idea has yet to receive formal approval.

Moreover, by no stretch of the imagination are Crocker and Blue Cross' activities atypical. All across the U.S., countless other companies are contemplating similar workstation evaluation and development projects.

Crocker's experiment with programmer workstations was launched about 18 months ago when it began evaluating prospective hardware and software modules. Then, last June, the process entered a new phase when a single prototype of the bank's programmer workstation found its way for the first time into a production environment, according to Crocker project manager and systems officer Peter Katz.

Since then, Crocker has installed a total of 10 workstations, each incorporating a 640K-byte IBM Personal Computer XT and supporting an assortment of commercial software packages that the bank has integrated under its own proprietary shell.

During this year, Crocker expects its workstation installations to continue. "We already have quite a few [additional workstations] budgeted for next year and plan to roll them out gradually in the areas where they will be most justified," Katz said. "The first place where we'll put them will probably be development."

With the right modifications, workstations might also prove helpful to Crocker's nontechnical end users. So the bank is preparing a second such system that would replace Cobol Workbench with development aids like spreadsheet packages but would otherwise be configured with basically the same software as the programmer workstations.

More homework needed

Blue Cross, in contrast, wants to give the programmer workstation concept some additional thought before deciding whether to proceed with a pilot project. "We have to do a bit more homework first to see how the notion is likely to be received," according to Chris Herrin, the organization's information center and development center supervisor.

On paper, though, programmer workstations look promising. "What we're thinking of doing is to decentralize some of our coding activities," Herrin said.

Whether programmer workstations will ultimately prove effective remains unclear. "On the development side, the workstations seem to be improving our programming productivity rather significantly," in a few cases by as much as 33%, Crocker's Katz said.

"On the maintenance side, the preliminary results are somewhat less favorable."

In the end, Crocker hopes to extend the workstation concept to support the application development process as a whole, not just the coding stage, Katz said. ■

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One company's story

How Computervision weathered the storm of '85

By Rosemary Hamilton

The events of last year, conveniently clumped under the heading "computer industry slump," did more than halt a winning streak or temporarily dull the industry's shine. To many computer companies, 1985 marked a turning point, a time when they either began to overcome the long-simmering troubles that the slump exacerbated or a time when they let the slump drag them deeper into the backwaters of the industry.

One company at this juncture is Computervision Corp. of Bedford, Mass. The road it has traveled since first pioneering the computer-aided design and manufacturing market 16 years ago mirrors that of many a high-tech company. Founded in the late 1960s by entrepreneur Philippe Villers and Martin Allen, who is still chairman of the board, the company struggled to convince the market of its CAD/CAM concept.

As the concept took off, so did Computervision's fortunes. Throughout the late 1970s and early 1980s, it had a steady rise in revenue. In 1984, it landed on the Fortune 500 list as a half-billion-dollar company with its highest revenue ever, big profits and plans for major expansion. It seemed to embody the fervor of the industry in general.

But like many other computer companies, there were problems lurking in the shadows. For Computervision in particular, it was a growing flaw in its product line and increasingly fierce competition, most notably from IBM. Although in the process of a project to convert its systems to conform to industry standards, Computervision was selling proprietary stand-alone systems that were rapidly losing market appeal. And last year, when the slump brought problems like these to the foreground, Computervision and those companies in similar predicaments really got socked.

Computervision now wants to turn things around. But just exactly where it goes from this pivotal point remains to be seen. It has set into motion two major plans. First, the company is undergoing a major face-lift — streamlining management and administration, marketing and research and development — so it can survive in a more crowded, less growth oriented market. Second, it has focused nearly all resources on the completion of its product transition project, a major undertaking that, put simply, involves porting its software from those proprietary systems to a networked, industry-standard-based environment.

In 1985, when the slump brought problems to the foreground, Computervision and those companies in similar predicaments really got socked.

At the close of 1985, Computervision had put many of its reorganization plans into place. The second plan — speeding up the product transition project, which commenced back in 1983 — is on schedule and is expected to be finished sometime in 1986, according to James Baar, vice-president of communications.

But Baar is the first one to caution against too much optimism. "We're not out of the woods yet," he said in a recent interview. Computervision still considers itself in a pre-

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ILLUSTRATION BY KEN CONDON

carious position. In fact, James Berrett, chief executive officer, and Robert Gable, chief operating officer, refuse interview requests in such uncertain times, according to Baar. Gable took over day-to-day operations from Berrett last year, a move that is perhaps the most symbolic of all changes made at Computervision.

Gable, who was a director of the company for 11 years and a vice-president of Kidde, Inc., is a "professional manager from the accounting fraternity," according to Barr. He is responsible for tightening up the organization, whereas Berrett, who retained the title of chief executive and president, focuses on strategic planning. In replacing Berrett, whom Baar described as a "brilliant CAD/CAM whiz kid," Gable took away the company's emphasis on technology and substituted a bottom-line focus.

> **"**
>
> ***'If users see Computervision go down, they won't know who to trust anymore. Almost everybody is rooting for them.'***
>
> **— Charles Foundyller**
> **President of the research firm Daratech, Inc.**

Such a shift was commonplace in the industry last year as high-profile companies like Apple Computer, Inc. and lesser known start-ups like Higher Order Software, Inc. in Cambridge, Mass., replaced their technology-oriented leaders with seasoned businessmen more suited for a maturing industry.

In 1984, few Computervision employees — from the top brass down to the security guards — would have suspected this bottom-line approach was around the corner or that the operative words would soon be "control," "sharper focus" and "cut costs." After all, this was a high-flying, high-technology company, whose earnings had increased by 35% to $47.7 million in 1984. "When you're growing, there's an atmosphere that nothing can go wrong," Baar said. "It's very heady."

That year, Computervision ranked No. 1 of all CAD/CAM and computer-aided engineering vendors, according to Daratech, Inc., a CAD/CAM research firm in Cambridge, Mass. It had a lock on 20% of the market and had its highest year-end revenue ever — $556.3 million — to show for it. In addition to reigning supreme in the traditional CAD/CAM market, the company was also branching out, finding new markets for CAD/CAM applications, such as race car design.

Then 1985 began. IBM, which, ironically, had forged a partnership of sorts with Computervision in 1984, steadily chopped away at Computervision's market share.

Actually, Computervision was named an IBM value-added reseller, the fruit of which is the CDS-5000, a Computervision system used for CAD/CAM data base management. It is based on IBM Series 4300 hardware and runs Computervision's product data management (PDM) software. Charles Foundyller, president of the research concern Daratech, recalled a big promotion when this took place. "Computervision characterized it as a special partnership. They even showed this slide with a blue background and one hand gripping the other," he said.

As IBM marched onto Computervision's turf, outside economic forces — a drop-off in capital spending and the strong U.S. dollar abroad — put an even tighter squeeze on Computervision's ability to drum up orders.

Compounding this situation was the fact that Computervision had completed an extensive ramp up at the tail end of 1984. Baar said the company moved in to 1985 "with high expectations. We were prepared for a bigger 1985 than 1984." Consequently, the company increased inventories by 71%, added 1,000 new people and rented new facilities. Operating costs escalated as revenue decreased.

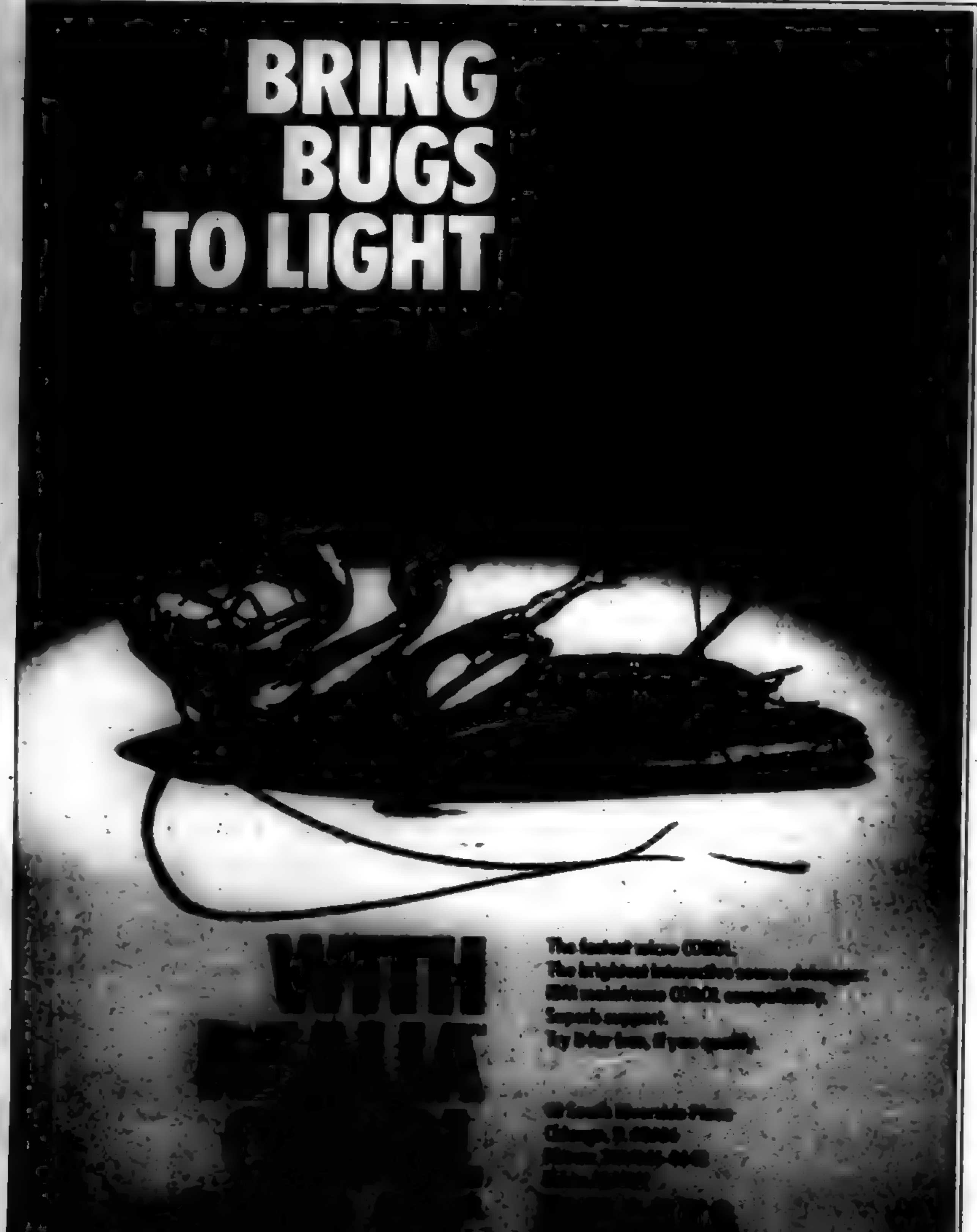
By the end of 1985, Computervision had fallen to third place behind IBM, which had captured a 21% share and had become the No. 1 CAD/CAM vendor, and Intergraph Corp. of Huntsville, Ala., which followed with a 15% share, according to Daratech. Computervision's portion had slipped to 12%.

The slip was reflected in last year's earnings and revenue. At press time, year-end results had not been released. But the damage, per quarter, was as follows: In the first quarter, the company reported a loss of $18.7 million on revenue of $105.8 million, down from net income of $10.7 million on revenue of $121.7 million in the same quarter of 1984. The second-quarter loss was $19.5 million on revenue of $112.2 million, compared with net income of $11 million on revenue of $133.5 million in the second quarter of 1984. A third-quarter loss came in at $20 million on revenue of $105.8 million, a 23% decrease from revenue in the third quarter of the previous year.

It was a hard lesson for Computervision to learn, but, "We have a company today of much more realistic people," Baar said.

Baar remembers when the seriousness of Computervision's problems became clear — shortly before the end of the first quarter in 1985.

In April, the company sent a letter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to its shareholders saying it now looked at the year as "more challenging than we anticipated only a few weeks ago. . . . Regarding the near-term outlook, we remain cautious primarily because of continuing uncertainties in the worldwide economy, the market lag that typically accompanies product line transitions and increasing competition."

Immediate response

The company responded to the sudden downturn immediately after the first quarter by making a number of changes, from reducing its staff by 1,600 people through layoffs and attrition to postponing research and development projects.

That was followed by Chief Operating Officer Gable's overall reorganization of the company into five operating groups — marketing and North American sales, international sales, worldwide services, research and development and manufacturing — a major departure from the various divisions under Berrett that each had their own marketing and R&D efforts.

As Baer put it, the company now has a "a marketing department that's all marketing." In early December, the company reassigned four corporate vice-presidents to head the streamlined divisions.

> **'We have a company today of much more realistic people.'**
>
> — James Baer
> Computervision

With the divisions more tightly controlled, the overall corporate focus was put on the product transition project. The whole issue of product transition is really a story of Computervision being caught between the proverbial rock and a hard place.

CAD/CAM powerhouse

The company is a powerhouse when it comes to CAD/CAM software, having approximately 300 different applications packages in what it calls the Computer-Aided Design and Drafting System (CADDS) family. However, the software was written for Computervision's proprietary system, the CDS-4000, which at least one observer claimed is obsolete.

Computervision disputed that claim but did acknowledge that its future competitive edge is linked to industry-standard-based systems.

The core of Computervision's product line, the CDS-4000, is a multiuser design system made up of hardware based on the old Data General Corp. Nova computer. It has been enhanced through the years, and Berrett was quoted earlier this year as saying it is a state-of-the-art machine.

To compete with the likes of IBM, however, Computervision cannot hang on to this system forever. But it cannot abandon it, either. There is a huge installed base of CDS-4000 users; it runs the CADDS software, and, at a cost ranging between $350,000 and $500,000, the system is Computervision's real breadwinner.

So the company developed a strategy calling for a two-pronged product transition.

First, port all the CADDS software that runs on the CDS-4000 to industry-standard, 32-bit workstations, such as the Sun Microsystems, Inc. workstation that Computervision recently added to its product line. Second, convert all of Computervision's systems to an AT&T Unix environment. That way, the 32-bit workstation can be networked to the CDS-4000, which would act as the host system. The CDS-4000 and workstations can then be linked to the CDS-5000, where all the CAD/CAM-related data can be stored. In addition, this network can accommodate systems from other vendors, such as VAX computers from Digital Equipment Corp.

Neither phase is complete. In mid-1985, for instance, Computervision introduced a Unix-based network that would have linked its workstations to the CDS-4000. However, users had to purchase software that averaged $5,000 per workstation to access the CADDS software.

In a sense, it is a Band-Aid solution until CADDS is made fully compatible with the workstations.

The end result of the entire project is what Computervision calls Product Process Automation, a concept it has been promoting heavily since the inception of this project. The company sees a day when it can provide the entire CAD/CAM environment, from individual workstations to large data base management systems that take the product production process from the concept and design stage to manufacturing, documentation and service stage.

The emphasis of Product Process Automation will be software, since Computervision now says that hardware is secondary.

Take the IBM 4300-based CDS-5000. Baer said the company does not care if customers buy their mainframe from it or from IBM, which is a strange remark for an IBM value-added reseller to make. The only advantage to buying the entire system from Computervision is "one-stop shopping," he said. What is important is to buy Computervision's PDM software, of which an upgraded version, PDM II, was released in November.

Of course, critics would say this is the company's way of conceding that customers were never very interested in buying IBM hardware from Computervision in the first place.

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"The problem now is the speed and timing in making these [product] changes," said John Rohal, an analyst with Alex Brown and Sons in Baltimore. "The major issue is, how long can they keep customers feeling positive about these developments?"

Keenly aware of the need to get Product Process Automation on the market as quickly as possible, the company refocused its research and development division to pursue this goal. Before the slump, Computervision — which spent 11% of revenue on research and development in 1984 — could afford to tie up resources on pioneering-type projects, like software to help design artificial human body parts.

Such cutting-edge efforts were considered too costly. Throughout 1985, the company "reduced, eliminated or combined a whole variety" of development programs, Baar said.

Similarly, the marketing focus was narrowed. Instead of concentrating on growth in new customers, Computervision now sees it as more profitable to bring its total solution concept to its existing customer base.

Baar put it this way: "Today, we are looking at an array of CAD/CAM markets. You can no longer be the dominant company in CAD/CAM. We plan to focus on our core market." The company has "turned back to the heartland of CAD/CAM" instead of venturing into new areas, he said. That means focusing on the electromechanical market in which Computervision got its start and concentrating on the large user base it established in that area.

At the same time, if a customer were to approach Computervision with a project in a new area, the company would accept such a challenge. But, as Baar said, "No one in R&D is spending a lot of time developing new software for the medical world."

One indication of this marketing shift is the firm's attempt to beef up its service to customers with a separate division for that purpose. In the past, it had only been an offshoot of sales.

Getting lean and mean

The framework of the organization was also changed to suit the simpler focus. This entailed the "get lean and mean routine" that so many computer companies talked about in 1985. In addition to the layoffs, it closed facilities that were not full to capacity.

By the end of 1985, the company had shut down "about a half dozen facilities," including a manufacturing plant in Sanford, Maine, and two office facilities in California that it had been renting but had never occupied.

Another step is what Baar called the "elimination of unneeded assets." He would not provide specific details but said the company continues to sell off office equipment from "personal computers to sizable computers."

Other cost-cutting measures, such as an increased emphasis on accounts receivables and "making sure orders are orders," are also under way, Baar said.

Plans for early '86

In early 1986, the company will continue reorganizing and cutting back under Gable's command, Baar said. He would not discuss additional changes, however, until they actually take place.

Just how successful the "new" Computervision will be is unclear. If the the company stays on schedule, the product-transition project should be complete this year. But whatever ground IBM, Integraph and other vendors gain in the meantime could spell more trouble for the Bedford company.

"If Computervision isn't able to get back, it will damage the credibility of all the other vendors," according to Daratech's Foundyller. "If you buy a CAD system, you're tying your future to that vendor. If users see Computervision go down, they won't know who to trust anymore. Almost everybody is rooting for them." ■

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Software pricing strategies

Tough times bring independents to the table

By John Gallant

At this time of the rolling year, the usual party of pundits gathers to ponder how the software industry landscape will be reshaped by the shifting winds of the coming months. In foretelling the future of software technology, a great many predictions are likely to miss the mark. Such is the nature of conjecture.

One thing seems certain, however. Software prices will increase — significantly. On that matter, users, vendors and analysts fatalistically concur.

That software prices will rise does not necessarily mean users will pay more for all the software they purchase next year. Sluggish sales and stalled revenue growth in 1985 made independent software vendors even more willing than usual to "play ball," as one user put it, on pricing. Some users and observers characterized the final months of 1985 as a period of pricing frenzy during which vendors slashed list prices to seal much-needed sales.

If the fortunes of the independent players improve in 1986, the "give" in the customary give-and-take of price negotiations will probably not be so great. But if the software industry slowdown continues unabated or worsens, analysts contend, instances of price cutting may become more common, and the degree to which price tags are slashed may be more severe. The price cutting is likely to feed on itself as users become better informed and more aggressive in demanding price concessions.

ILLUSTRATION BY DAVE RIDLEY

All of this, however, ignores IBM, which has the most significant impact on the majority of users. As the dominant player in every segment of the large systems software market, IBM's pricing strategies are the music to which users must dance. Software continues to account for a larger portion of IBM's total revenue — and a significantly larger portion of its profits — and routine, significant price hikes are one of the tools IBM uses to ensure that software revenue continues to grow. IBM does not deal on pricing, users say. IBM does not have to, analysts remind.

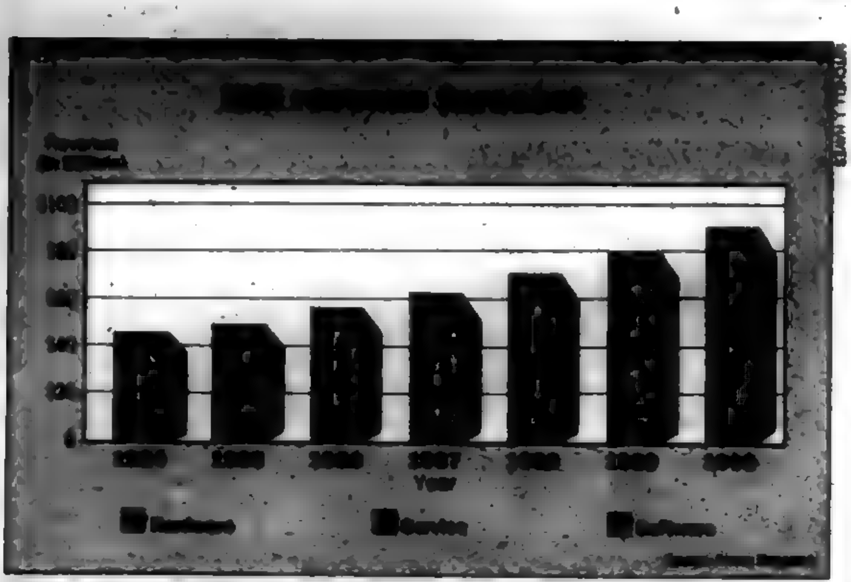
Beyond the immediate importance of IBM's pricing strategies to users of its software, observers agree that IBM sets the tone for pricing in the industry. There is an adage that says IBM is conditioning users to pay higher prices for software. Neither users nor vendors gainsay it.

"For years, IBM has got people used to paying more and more for software," said Richard Biggs, senior vice-president/director of MIS at Provident Bank of Maryland. "Ever since IBM unbundled hardware and software, we have watched a steady increase in IBM software costs."

Sluggish sales and stalled revenue growth in 1985 made independent software vendors even more willing than usual to "play ball" on pricing.

"IBM sets the trends we all follow," said Frank Dodge, president of McCormack & Dodge Corp., the Natick, Mass.-based applications vendor. "IBM is IBM. The rest of us are followers."

Dodge's comments were echoed by Dennis Yablonsky, president of Cincom Systems, Inc.,



IBM's revenue is projected to reach more than $90 billion by 1990.

an applications and data base management system vendor located in Cincinnati. "IBM is the base from which every company views itself. The higher IBM's prices are, the more we can charge, assuming that we maintain a quality differential. What IBM is doing, both in terms of how and how much it prices its software, is good for the industry."

According to Annex Research, a Phoenix-based computer industry research and consulting firm, IBM's 1984 software revenue was $3.2 billion, or roughly 7% of its total revenue. Software, however, accounted for nearly 8.5% of IBM's profits for the year, a figure that underscores the increasing strategic importance of software sales to the hardware giant.

"Therein, you see the importance of IBM's software prices," said Bob Djurdjevic, president of Annex Research. "Software is a product that provides a larger contribution to IBM's profit than it does to IBM's revenue. Therefore, it is an area of strategic future importance to IBM."

IBM software revenue in 1985

In 1985, according to Scott Smith, vice-president of Gartner Group, Inc., a Stamford, Conn.-based market research firm, IBM's software revenue was expected to increase by approximately 30% to more than $4.1 billion, slightly more than 8% of total revenue.

Although IBM's software revenue growth was 10% lower than in 1984, Smith said, IBM fared significantly better than the industry as a whole, which grew at roughly 23% in 1985. IBM benefited from its massive rental base, which provides a steady revenue stream that can be easily swelled by price increases.

Beyond its bottom-line importance, though, software is also the engine that drives hardware sales — a relationship that is not lost on the Armonk, N.Y., giant.

"The mistake comes in looking at IBM as a hardware company," Smith said. "Software represents only 8% of revenue today. But software is driving hardware sales, and IBM is increasingly realizing that."

Annex Research's Djurdjevic said users can expect IBM to apply a three-pronged strategy to price increases in the future. The tines of IBM's pricing strategy will include the following:

- Periodic upward adjustments based on what IBM calls "normal business review." Users weathered three such periodic adjustments in 1985. In February, IBM increased prices on most systems software by roughly 7%, and in October it upped prices on more than 1,100 applications and utility packages by an average of 10%. In November, prices on nearly 140 of IBM's almost 500 microcomputer packages were hiked between 8% and 30%. Djurdjevic said users should expect similar price adjustments in 1986.
- Major price increases accompanying releases of enhanced software products. Although such price hikes do not have the regularity of the periodic adjustments, their impact can be significant. According to Djurdjevic, the initial release of MVS/XA, announced in 1981, was nearly three times as expensive as the then-current release of MVS/SP. Other important products recently subject to such increases were the latest release of the IMS DBMS, with Extended Recovery Facility, and VM, with the introduction of VM/XA. Prices on both upgraded products were significantly higher than previous releases.

Were the price increases justified, considering the enhancements to the products?

"That is a very good question," Djurdjevic said. "A threefold increase in MVS pricing, for example, is something you would think users would not take lying down. I approached many users who had installed MVS/XA and asked them to assess the additional cost relative to the additional functions and benefits. Not one user had a concrete answer.

"All of them talked about the benefit of 31-bit addressing," he continued. "That was the IBM marketing

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pitch. It focused on the increase in addressable memory rather than the dollars-and-cents issue. But that is a systems programmer answer to an economic question. Users had undergone no concrete justification process as they would have with a hardware purchase. They justified the increased costs with a qualitative opinion rather than concrete facts."

■ Less easily discernible price hikes resulting from what Djurdjevic labeled new "creative pricing methods." One such method that analysts said will become more common across IBM software offerings is so-called "value pricing" or usage-based pricing. Rather than paying a fixed monthly or one-time fee, users will pay for software based on the number of terminal users or the number of transactions processed. Several IBM products have recently been subject to value pricing, including IX/370, IBM's version of AT&T Unix System V running as a guest under VM.

New accounting method

"This is a whole new method of accounting for software that will allow IBM to charge larger companies more because they use a package more than a smaller company," Djurdjevic said.

> ***'When IBM controls a market, it really charges high prices.'***
>
> — Martin Goetz
> Applied Data Research, Inc.

Many independent software vendors said they are also in favor of value pricing, which, as a result, may become a more widespread practice in 1986. "Functional pricing is something we feel is appropriate, and we would like to see more of it," Cincom's Yablonsky said.

But value pricing is clearly a vendor-driven phenomenon — the majority of users are against it. "I have not yet run across value pricing, but I strongly object to it," Biggs said. "I really have a mental problem with it. It is just another way to hide price increases."

'Playing on user ignorance'

"Vendors are playing on user ignorance," said Glenn Lukowicz, director of MIS at Speidel Division of Textron, Inc. "They couldn't price their products up front to make the same amount of money. In the long run, users will be paying a hell of a lot more money than if they just bought the package outright."

Djurdjevic also predicted that next year IBM will offer a larger number of software products for one-time charges rather than monthly licenses. In October, IBM made 262 former monthly tariffed programs available for a one-time charge. Although the policy will give users who purchase products protection from future price hikes, IBM is the clear winner, he said.

"None of the packages that I have seen shifted to a one-time fee are the latest releases of IBM software," Djurdjevic said. "IBM has typically applied this policy to older versions, the products it is getting ready to discontinue in the foreseeable future. It is trying to maximize the cash it gets out of the package. IBM enjoys the benefit of a rental stream for a long period of time and then one, large balloon payment at the end."

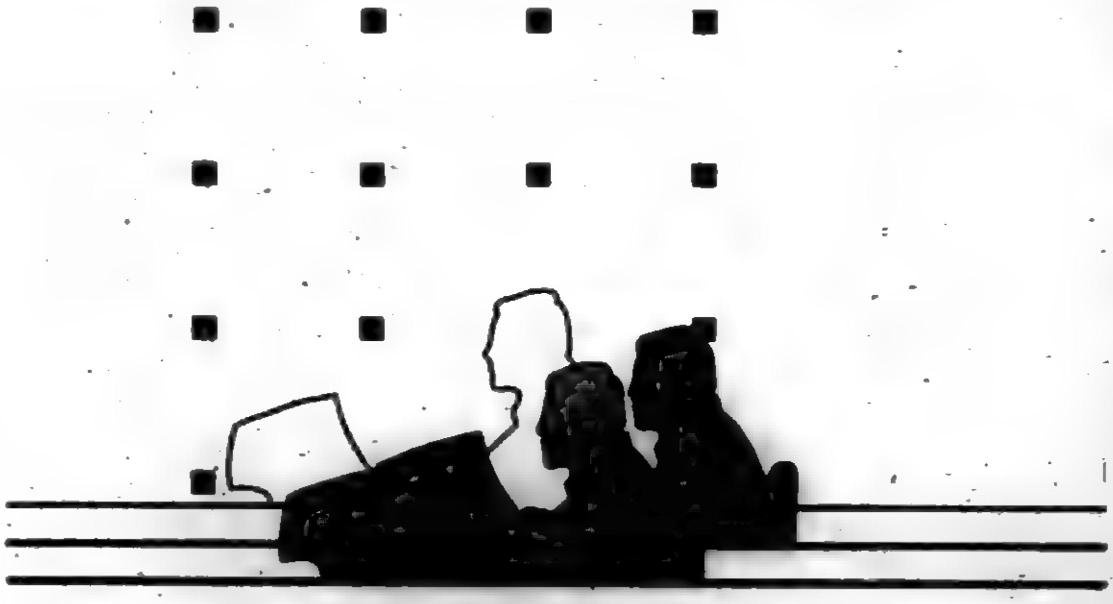
On the subject of which IBM products will be most significantly impacted by price hikes, there is little debate. Because IBM virtually owns the operating systems market and the related software market, users can expect to pay even higher prices there.

"When IBM controls a market, it really charges high prices," according to Martin Goetz, president of Applied Data Research, Inc. "Look at operating systems where IBM has a virtual monopoly. There you will see prices go really high, and users will really be hurt," Goetz said.

Even though IBM faces competition in the applications and DBMS markets, analysts said, it still has a powerful leg up on its Lilliputian contenders.

"You have to be careful to compare apples and apples," Djurdjevic said. "IBM can announce something new and unique, such as the [Extended Architecture] version of IMS, that other vendors have to respond to once it is shipped. Nobody else has the added capability, and that gives IBM the chance to price at a higher level. By the time the competition catches up, IBM may have come up with another feature at a higher price. It's a lot like the [plug-compatible manufacturer] market. IBM has a virtual monopoly because others have to follow it."

Damian Rinaldi, director of International Data Corp.'s Software and Services Information program, added, "IBM maintains a dominant position across the board in software. It may not be as dominant in all areas as it is in systems software, but it is, nonetheless, the most influential player." But where many see only revenue growth as the primary force behind IBM software price increases, Rinaldi attributed them to another important factor — increasing software development, support and maintenance costs. "On the one hand,



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IBM has to increase price; on the other, it has to come up with more products," he said. "The cost of developing products is staggering. IBM may drill 100 wells and only hit one gusher."

That more sympathetic overview of IBM's pricing moves is certainly the one IBM itself espouses. In a recent interview with *Computerworld*, Robert Berland, director of strategic planning for IBM Information Services, countered users' complaints that price increases did not necessarily go hand in hand with product enhancements.

"Our packages are continually under enhancement, continually being upgraded," Berland said. "Key products, the major strategic systems, have ongoing development teams, support, marketing and education efforts behind them. That is an incredibly expensive, people-intensive business."

■

Evidence of price slashing apparent

The relationship between IBM's software prices and the list price of independent vendor software is fairly steady. Users can expect the stated price of most large systems software packages to increase significantly next year for many of the same reasons IBM's prices will go up: the need for vendors to improve their bottom lines, the desire to test what the IBM-influenced market will bear and the rising cost of personnel and development, support, training and marketing efforts.

But as many users tell it, the list price of independent vendor software often bears little resemblance to the actual price at which it is sold. Some vendors vehemently deny that price cutting generally occurs, and it is difficult to get a handle on just how extensive the practice is.

However, the weight of anecdotal evidence highlights the fact that price cutting is at work in the software market and that the level of slashing fluctuates with the state of the economy.

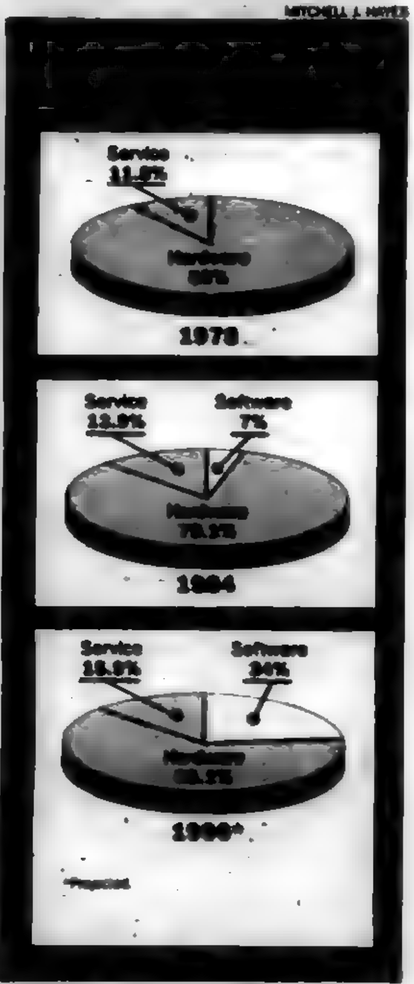
"A lot of hidden price flexibility becomes apparent when the crunch comes," said Damian Rinaldi, director of International Data Corp.'s (IDC) Software and Services Information program. "That is a fact of life. If vendors cannot be flexible on price, they'll throw in other packages to sweeten the deal."

Wheeling and dealing

"We were dealing with an applications vendor for a general ledger package for $125,000," said Glenn Lukowicz, director of MIS at the Speidel Division of Textron, Inc. "Then the vendor found out we were talking with a competitor. The vendor offered us a bundle of packages, including the general ledger, worth $200,000 for $110,000. We took the competitor's offer of three applications and micro-mainframe link software for $80,000. The competitor had originally offered us the general ledger alone for $80,000. Even at that point, we wondered if we could have done better."

Contrast Lukowicz's comments

MITCHELL J. HAYES



Software should generate almost a quarter of IBM's revenue by 1990.

Outlooks '86

"In 1985, Ada came out of the research and development labs. It is finally being used in real and significant projects.

"The year 1986 will show refinements. The tools will be [illegible] to meet the needs of the developing market.

"This is an indication of a [illegible] market that will lead to [illegible] volume of sales, which [illegible] the market to develop [illegible] faster pace."

— [illegible]

The personal computer that raised high performance to new heights.

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Which is why IBM created the Personal Computer AT® system. It's changed a lot of ideas about business computing.

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with those of William Graves, president and chief operating officer of Management Science America, Inc. (MSA). "There is a real lack of understanding about price cutting. Most of the information people think they have is inaccurate.

"They don't understand what someone bought for the price, how much service, training and so on," he said. "We have taken a lot of heat on price cutting, and it is inaccurate and inappropriate.

"If we are guilty of price cutting," Graves continued, "we are one of the least guilty."

'Not all that frequent'

"Price cutting is not all that frequent," according to Martin Goetz, president of Applied Data Research, Inc. "It is an overblown issue. We have never taken the lead on price cutting, and I'd stand up in court and say that."

Cincom Systems, Inc.'s President Dennis Yablonsky concurred. "We try to set our prices aggressively. We sell the value of our products, and we just do not permit price cutting," he said.

According to McCormack & Dodge Corp.'s President Frank Dodge, however, "The discounting in 1985 was incredible. There has always been some discounting, but it used to be pretty much a year-end thing. Since our competitors went public and began to be rated on their quarterly performance, it became a quarterly thing. Now it is brutal."

Similar package for less

Dodge said that in a recent third site sale of a multiple-package suite, which M&D was offering for 50% of its list price, one of the company's better known competitors offered a similar suite of products for $80,000 less — about 35% of that vendor's list price.

"We go in at list price, and we try not to talk about discounting at all until we are the selected vendor. Then we negotiate," Dodge said.

"When we win, several of our competitors will try to lowball the client, offer $400,000 worth of products, say, for $175,000. The user will say, 'I think your products are better, M&D, but I cannot justify spending twice as much for them.' We might have to go to $325,000, and we will do it. It is just part of the game."

Price cuts have impact

Sometimes substantial price cuts have an impact quite different from that which was intended, users said. "Big price cuts definitely make me apprehensive," Lukowicz said.

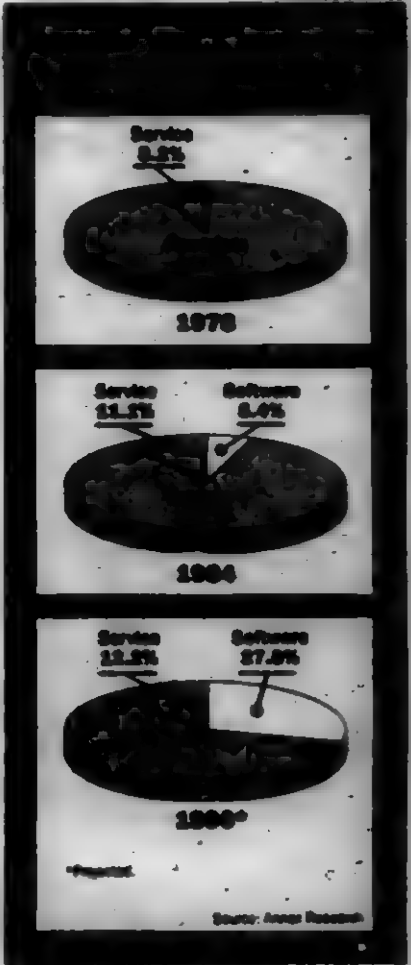
"You wonder why they are willing to take a supposed loss. The vendor also gets you wondering whether you couldn't push further, and it gets you psyched up for further decreases in the future," he said.

"When the price goes too low," IDC's Rinaldi said, "users assume that there is either something wrong with the product or that other buyers were being shafted all along. It isn't good business to cut aggressively over a long period of time."

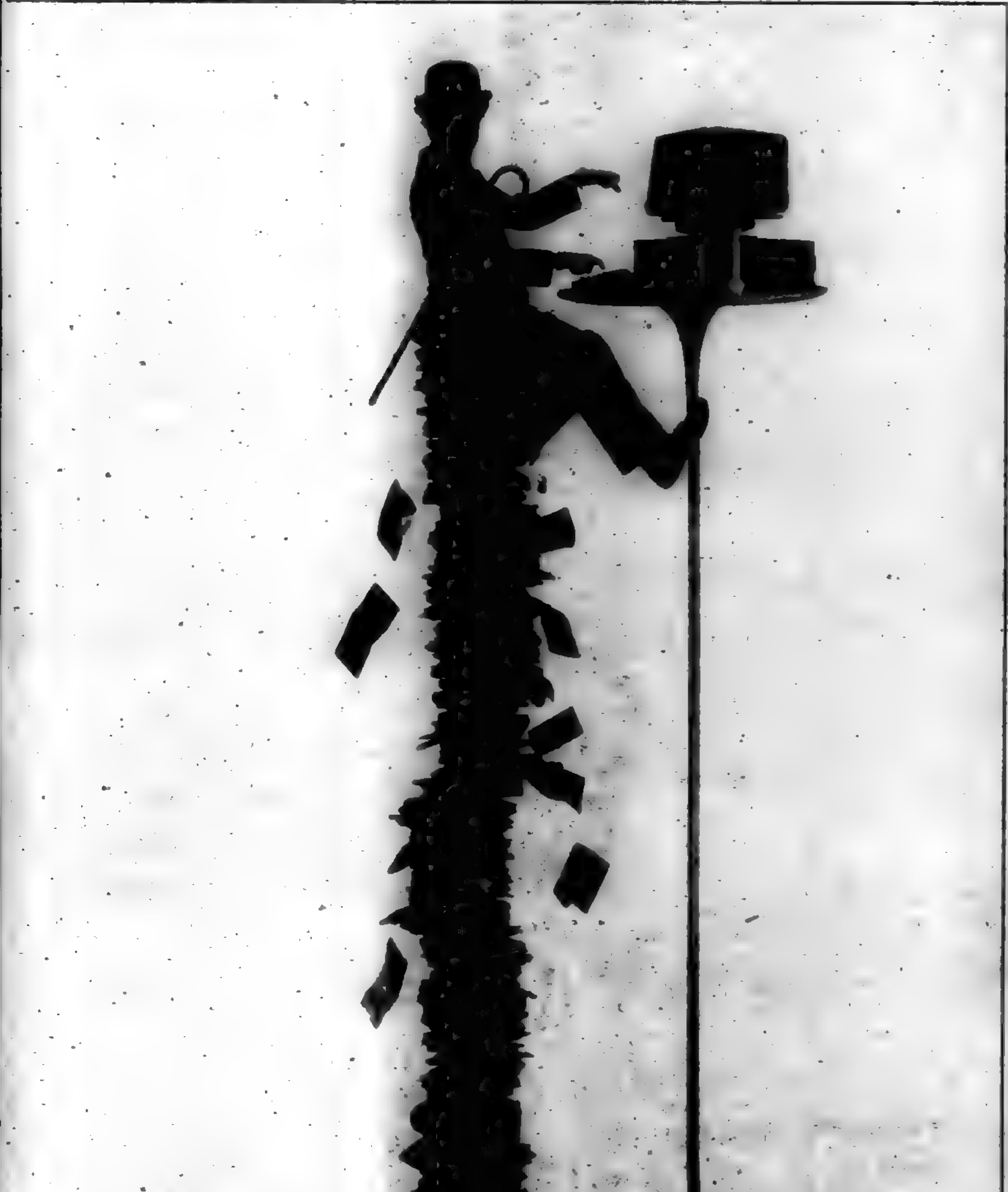
Ignorant about prices

Vendors concur that users are relatively ignorant about which software companies cut and about what other users are paying for their products. That is a view users clearly do not share.

MITCHELL J. HAYES



Software is becoming more important to IBM's bottom line.



"Users are not really very knowledgeable," Yablonsky said. "There is really no place users can find out what others are paying or what a vendor is doing. I think users, though, are just assuming that everyone is cutting, and they are pressing all the vendors."

But Lukowicz claimed that users rely on vendor-supplied customer contacts who freely share price data and valuable bartering information about vendors. "It is in our own best interest to share that information," he said. "When one user gives you some help, he is hoping there will be someone there to help him in the future."

Users care little about price

And to hear it from vendors, users really care little about price. Quality is the key word, vendors said. Beyond that all else pales.

"People want to make sure you are selling them what they want. They are not worrying about pricing," according to MSA's Graves. "A good user will try to negotiate, but price is not the top-of-the-list item."

But Olin Mills, Inc.'s systems programming and data base/data communications administrator, Pete Clark, contends that price is a critical factor in purchase decisions.

"Yes, pricing is important. We have always been price aggressive, and I see other users become just as aggressive," Clark said. "It is common knowledge that list price doesn't necessarily hold."

Unfortunately for vendors, price cutting also seems to feed on itself. "We have been feeding on price cutting for years," Lukowicz said. "The anticipation is there, we count on it. If we cannot negotiate with a firm, it is not even considered."

"Price cutting starts out vendor driven," Yablonsky said. "But in the last six months, we have started to see customers asking for deals who a year ago wouldn't have even considered pushing for special treatment. This is a problem. Once it starts, it feeds on itself. All the customers start to feel that they should get special terms."

Added training or support

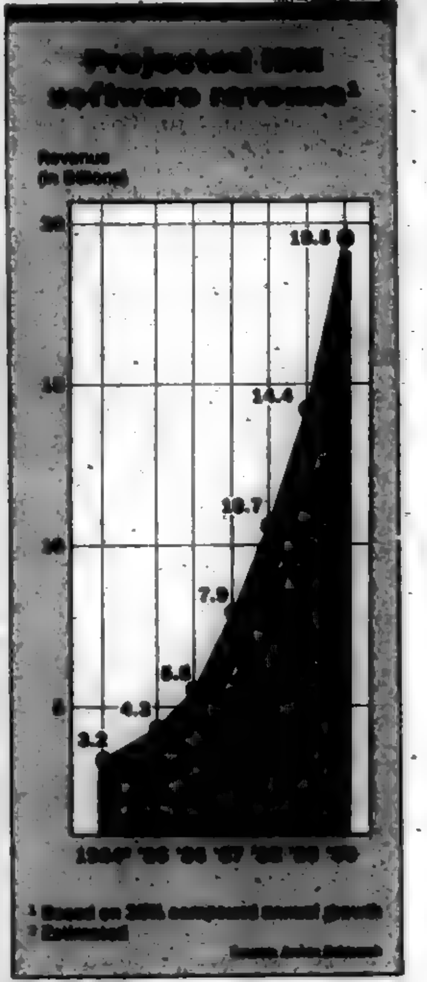
One thing even vendors admit is that they routinely assuage price-aggressive users with offers of added training or support. Yablonsky said the only thing Cincom will deal on is additional support or education days. Goetz said ADR also uses such bargaining chips.

How much of an impact price cutting will have next year ultimately depends on the state of the economy in general and the software industry in particular. If price cutting becomes more rampant, some vendors could be hurt, Rinaldi said.

"I think you will find that the companies that are part of larger organizations will be able to survive the cutthroat behavior for a longer period than your two corner gas stations nickle and diming each other to death," he said.

— John Gallant

MITCHELL J. HAYES



¹ [illegible]
² Estimated

Source: [illegible]

IBM's revenue from sales of software is forecast to reach $19.5 billion by 1990.

S/38
Telex
Communications
Made Simple.
TELEX-PRO
[illegible]

AT&T goes to market

First you walk, then you run

By Charles Babcock

The scene was AT&T's value-added reseller council meeting last fall in Morristown, N.J., and the speaker was a newly recruited AT&T value-added reseller, James Jacobson of Jacore Systems.

His customers were clamoring for a minicomputer line with which they could grow, according to the chairman of the Marietta, Ga., firm. They needed something that would allow them to take their software with them as they moved up to more powerful processors.

AT&T's 3B line, with its Unix System V operating system. and wide range of performance, offered precisely that option, he said.

Some observers question how valuable the mid-range market is, squeezed as it is by supermicros on the bottom and by lower cost mainframes on the top. But for now it appears to be the only market that is open to a new vendor and still growing, and AT&T is pursuing it for all it is worth.

Furthermore, the competition from IBM is a mixed bag — the System/36, System/38, the Series/1 and the 8100 distributed processor — all of which are incompatible with each other and the low end of the IBM 4300 mainframe series line.

Jacore is sensitive to the compatibility problem because it makes the bulk of its $60 million in revenue selling IBM System/36 packages. Before it became one of AT&T's value-added resellers, it was — and still is — IBM's largest reseller, one of the 10 that IBM recruited in 1982 when it first started using the third-party distribution channel.

"We are delighted to add the 3B line to our business," Jacobson said. He said he thinks it offers a better price/performance ratio than the System/36 and that it answers his customers' need for a migration path.

Jacobson said Jacore is not alone in seeing the advantages of the AT&T line.

Value-added resellers are independent businesses that supplement a vendor's direct sales force by reaching smaller, scattered customers that a highly trained account executive is likely to miss. Their typical sale is a $90,000 system with custom features built into it. Analysts said these resellers are the dominant sales force in the mid-range, small business and departmental computer market, and the vendor that makes the best use of them will show the greatest gain in that market. "Having highly reputable [value-added resellers] is of prime importance to us," said Alan L. Mendelson, AT&T Information Systems' computer division vice-president in charge of resellers.

For now, the mid-range market appears to be the only one open to a new vendor, and AT&T is pursuing it for all it is worth.

"I think going after the value-added resellers is the right thing. It's their best opportunity. But they better hurry," said James W. Meyer, who follows AT&T as codirector of research at Janney Montgomery Scott, Inc., a Philadelphia brokerage house.

The mid-range market includes businesses with 1,000 or fewer employees, departments of large corporations, the government and other institutions. Despite the slowdown in sales elsewhere, the mid-range market contin-

ILLUSTRATION BY MARC TAFFET

FORECAST

ues to grow and represents potential sales of $9.8 billion in 1986, according to Infocorp, the Cupertino, Calif., market research firm. The larger share of that market, $5.3 billion, is expected to be derived from departmental buyers, while small businesses with $5 million to $50 million in revenue will account for $4.5 billion, Infocorp spokesmen said.

"I don't think these people are committed to any particular vendor," Meyer said.

"IBM has essentially left that market wide open," said Molly Upton, editor of International Data Corp.'s (IDC) newsletter on office automation.

"This is where AT&T and IBM will fight it out head to head," predicted C. Noel Wadsworth, president of Jacore.

But winning that fight remains a challenge.

Until late last year, AT&T was unable to play to its strengths in the communications field, a major concern of the departmental computer buyer who is often bracketed by IBM mainframes and micros. Since 1983, AT&T has been restrained by the Second Computer Inquiry, in which the Federal Communications Commission ruled that the operations of AT&T Information Systems, the equipment subsidiary, had to be kept separate from AT&T Communications, the long-distance service unit.

Significant provisions of Computer Decision II were waived in September, and since then, AT&T has had the option of having one salesman or one team offer both communications and computer products to the same customer.

AT&T's 4,000-person direct sales force has been busy knocking on the doors of the Fortune 1,000 companies; but regardless of whether they are talking to large customers or small, the salesmen of AT&T equipment still face the problem of a limited selection of software.

Unix applications increasing

AT&T is striving to bring more Unix applications to market, frequently through alliances with small C-writing software houses, and the number of applications is rapidly increasing, spokesmen for both AT&T and independent observers said. By mid-1986, the 500 programs listed in AT&T's software guide should triple to 1,500, said Curtis A. Weeks, director of applications software for the Computer Systems Division.

If AT&T is to compete with the formidable library of software for IBM machines, it is going to have to convince potential 3B users that independent software houses are developing applications. And to do that, it needs an installed base of machines, according to Kenneth M. Leon, securities analyst with L. F. Rothschild, Unterberg Towbin in New York.

Which brings many observers back to the value-added resellers. "Given the constraints of Computer Decision II on them in 1985, concentrating on the value-added resellers was a real smart move," IDC's Upton said. The resellers, with their ability to write software and customize systems, could address both computing and communications problems.

George F. Colony, president of Forrester Research, Inc. in Cambridge, Mass., said he expects AT&T to move more hardware through resellers in 1986 than it did in 1985. Sales of 3B totaled $800 million in 1985, compared with $100 million in 1984, he estimated. About 30% of them came from value-added resellers, he said. In 1986, he figured, 40% to 50% of the total will come from resellers. "AT&T will give up direct sales to value-added resellers to get more application software out there," he said.

> "
>
> *'It's perfectly viable now to have Big Blue at the top, some other color at the departmental level and IBM PCs at the bottom.'*
>
> — Molly Upton
> International Data Corp.

In pursuing resellers, AT&T has an unwitting ally in IBM, Jacore spokesmen claimed.

A reseller for IBM must seek approval from a review board for each new system it wishes to sell. The approval procedure can take "months and months. It's very formal," said Wadsworth, who also claimed that Jacore lost sales while waiting for approvals.

"They approve one thing one time and not another. They approve a system for sale by one company and not another. It's strange," he said.

Jacore Chairman Jacobson said that IBM has only used the value-added reseller channel for three years and blames some of the problems on inexperience. But Wadsworth attributed the difficulty to "IBM's plantation mentality," where it insists it is the master of its business and where outsiders are relegated to a servile status.

"They have been dominant for so long, they don't know how to do anything different. AT&T can watch what IBM does and do the opposite," he said.

Regardless of whether it is complaints about IBM or the attractiveness of the 3B, value-added resellers have been flocking to AT&T. At the start of 1985, Mendelson took charge of the reseller sign-up by weeding out 13 of AT&T's 40 existing value-added resellers. Mendelson said he did the trimming because he wanted to establish a group that could provide after-sales support as well as push hardware/software packages.

Since then, the numbers have mushroomed in the opposite direction. AT&T now counts 125 primary resellers, each doing over $1 million annually in sales, and 550 indirect resellers, which provide components of AT&T systems and act as distributors of hardware to smaller companies doing less than $1 million a year in business.

One of its biggest catches was VMark Computer of Natick, Mass. VMark officials recently shared the podium with Computer Systems Division President James D. Edwards to say they will offer a data base management system to Pick Systems' Pick operating system resellers. With it, applications designed to run under Pick can be used on Unix systems, adding a potential 3,000 applications to the available Unix library.

Brokerage analyst Leon said AT&T is still in "the honeymoon stage" with its value-added resellers and that it is too early to say whether its ardent courtship will pay off. But he said pushing the 3B line for "departmental networking and communications is a strategy that plays to AT&T's strengths."

In 1985, AT&T appeared to change its strategy quietly in that direction. Instead of hyping Unix as an operating system to compete with IBM systems, it began talking about its potential as a multiuser, departmental interface.

The change of emphasis recognized that the commercial marketplace is dominated by IBM mainframes and operating systems at the top and either IBM PC-DOS or Microsoft Corp. MS-DOS compatibles at the bottom. If Unix has a future in the commercial market, it will have to squeeze somewhere in between the two. AT&T also sought to illustrate that it could fit into the IBM world and offer something extra, with such products as the 6500 Multifunction Communications System, an IBM 3270-compatible that could talk to various mainframes.

"It's perfectly viable now to have Big Blue at the top, some other color at the departmental level and IBM PCs at the bottom," Upton said. If shared in the marketplace, that perception does nothing to hurt AT&T's computer products.

Colony termed 1985 a watershed year for AT&T because it succeeded in getting Unix System V established as a standard. At times, the effort took on the air of AT&T furiously trying to recapture something that it invented, as small OEMs continued to push their own versions of Unix.

AT&T finally seemed to get the runaway back into the corral when it announced it would work with Sun Microsystems, Inc. to enhance Sun's University of California at Berkeley Unix Version 4.2. The joint effort will result in 4.2 being made compatible with System V, thus neutralizing the competition between the two.

In another milestone decision, six European manufacturers said they would adopt System V as their standard. And Intel Corp. said it would port System V to its new 80386 microprocessor, ensuring that Unix will appear on a host of new products.

AT&T still finds itself without a mainframe offering, and it is unclear whether it will seek a joint marketing agreement with a mainframe vendor such as National Advanced Systems Corp. or Amdahl Corp. If anything, IBM's hold on the mainframe market appears more seamless among commercial users than it did when AT&T announced its 3B line in March 1984.

"It's just very difficult for them there," said Archie McGill, former president of the Advanced Information Systems division of American Bell, the forerunner to AT&T Information Systems prior to the breakup. "I think you better make your way in the minicomputer market before you try to go into mainframes," he said.

However, AT&T in 1985 did announce it will sell a Unix mainframe operating system developed by Amdahl.

AT&T's microcomputers, the IBM-compatible PC 6300 and dual Unix/MS-DOS PC 6300 Plus, were some of the success stories of 1985, Colony said. AT&T sold an estimated 170,000 units, mostly through retail outlets, compared with 15,000 to 20,000 the year before. The performance placed it fourth among microcomputer sellers, behind IBM, Apple Computer Inc. and Compaq Computer Corp. But its Unix PC continued to be a slow seller, according to Colony. AT&T said sales of the machine give it 6% of the desktop market.

But the microcomputers are moving at low prices and many analysts question how much profit AT&T is realizing from them. Its future lies in establishing its mid-range line, and IBM's recent pricing moves foretell keen competition ahead. The entry model of an IBM System/36 that can support three users and a printer is $10,000 with the high-end System/36-5362 available for $21,000. ■

Outlooks '86

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FORECAST

Micro management

Learning to handle end-user computing demands

By Peggy Watt

The microcomputer is no longer a stranger at the corporate office. But even as corporations are accepting and encouraging the use of micros, they are becoming more structured about how that will be done.

Corporations are adopting firm policies for micro purchase and use, spelling out procedure for procurement, applications, user responsibilities and software distribution.

"Before we had a policy, it was kind of computermania; do your own thing," said Larry Dorf, senior vice-president of Security Pacific Automation Co., a subsidiary of Security Pacific National Bank in Los Angeles.

Now, he said, the bank has a 1½-year-old policy stating that the institution "encourages and supports the use of personal computers throughout the organization when it is justified through increased productivity or when there is reasonable assurance that it will be more effective than other means."

Senior management was at the top of the list to get personal computers at Security Pacific, Dorf said, and President and Chief Executive Officer George F. Moody got the organization's first personal computer a little more than a year ago. Since then, 90% of the company's executive vice-presidents have been introduced to personal computing, and a number of senior vice-presidents sit on the information center's steering committee.

"What we were really doing was getting the right mind-set out there," Dorf said. "If a vice-president's subordinate came up with a good business suggestion that required buying a personal computer, the vice-president would know what the subordinate was talking about."

The bank also reviews its policy periodically. "It's just a sign of the immaturity of the PC market as opposed to the mainframe world that this policy is still being worked out," Dorf said.

Like most companies, the bank's strongest controls involve acquisition, for consistency of equipment in use, and the harnessing of impulse purchases that may turn out to be less than useful, Dorf said.

"But with too much control, you can stifle people with standards and put a hold on innovation," he added.

Most managers said the micro enthusiasts in their companies are rarely short on innovative uses for the new equipment and, in fact, must sometimes be reined in.

Most managers said the micro enthusiasts in their companies are rarely short on innovative uses for the new equipment and must sometimes be reined in.

Policy setting is "a very laborious task in most corporations," according to James T. Fortney, manager of systems planning for Litton Data Systems, a division of Litton Systems, Inc. in Los Angeles. Management also has the chore of choosing standards that are still being set in the industry and deciding who should really be the personal computer users in the firm "whose job is to get work done, not to learn to use computers," he said.

McDonnell Douglas Aerospace Information Services Co.'s policy is "an attempt to make anarchists unite," according to Richard Nel-

ILLUSTRATION BY ROB SAUNDERS

son, senior section manager, in a gentle prod at technozealots who are so excited about new technologies that they forget the purpose of the machines is to improve productivity and not just to find new ways of doing things.

McDonnell Douglas, of Long Beach, Calif., drew up its policy two years ago, recognizing that "personal computers belonged in the total picture of office automation," Nelson said.

"Office automation and personal computing are linked and ought to be supported by the same organization," he added. For example, a deluge of microcomputers to a given division is likely to be followed six months later with a request for extensive cabling, he said. Now, most of McDonnell Douglas' personal computers are connected to mainframes.

> **'You can stifle people with standards.'**
>
> — Larry Dorf
> Security Pacific Automation

The company boasts some 5,800 IBM-compatible microcomputers companywide for its 90,000 employees. Its aircraft division plans to ease into a one-to-one ratio of employees to workstations, be they personal computers or intelligent terminals.

Nelson said standardization has helped the company get bulk discounts, and he encourages employees to share their skills.

"But we don't try to solve every individual need," he added. "Some things are specialized, and individual departments can do them."

At Arco Petroleum Co., a Los Angeles subsidiary of Atlantic Richfield Co., software already on the approved list is easiest to get, but other acquisitions are not impossible, said Bert Jablinski, division manager.

Certain vendors are favored for their volume discounts, he added. And under the firm's first microcomputer policy, published in mid-1982, any personal computer purchase needs approval from a vice-president.

Arco organized its end-user computing division after a 1981 presidential memo expressing concern over the "rapid, unchecked growth of computers in all areas of the company," Jablinski added. He said Arco was concerned that the "right" equipment was purchased and that growth would not overrun budget.

Pacific Gas & Electric Co. (PG&E), San Francisco, which considers itself a pioneer in integrating micros into the company ranks, is nevertheless still waiting to hear industry verdicts on some automation standards.

"As far as a general local-area network, we're waiting," said Thomas J. Buckholtz, office technology project coordinator. Rather, micro-mainframe communications are more critical because budgets are being designed on micros with data downloaded from mainframes and then uploaded again. Micro-mainframe connections are "even more practical than local-area networks," he said. Micro-micro communications are not urgent because "you can always carry a diskette down the hall."

Some 2,000 microcomputers have sprung up in PG&E offices across its 94,000-sq-mile territory in the past three years, Buckholtz said. They handle chores as ordinary as office functions and as unique as enabling meter readers to dump data entered in hand-held calculator-like systems into the main office data banks.

Its 6-year-old policy "captured early something that other people are trying to catch up with now," he said. Its principles include the pledges to meet the needs of the company — be they memo production or engineering computations, to encourage user-friendliness by "placing tools in the workplace that keep people at their work and do not distract them," to keep its users as self-sufficient as possible through peer coordinators and standardization and to introduce technology where it fits well and when appropriate.

PG&E also claims to be the pioneer of microcomputer site licensing after signing its first license in 1983; it now has eight such contracts, Buckholtz said.

"If we had not done it, we would have far fewer computers and would be rationing software," he said. Both customer and manufacturer benefit from site licensing, and "it's much easier to equip systems because the software is standard." Still, he added, PG&E will "occasionally buy an off-the-shelf package" when there is a request for very specific applications.

Santa Rosa, Calif., city DP manager Bob Amiral said he has seen similar situations in the public sector.

"Cities seem to fall in one of two categories," Amiral said. "Either they're like us, with controlled data processing selection, or decentralized, with people doing their own thing with their own systems and their own programmers in their own divisions or departments. On one hand, the people uncontrolled are in the heat of things, taking advantage of the latest technology, but I don't think it's cost-effective a lot of the time."

He, too, has allowed individual departments with unique needs to acquire very specific systems, such as an Apple Computer, Inc. Apple IIe for measuring sewage flow, a Kaypro Corp. Kaypro for helping program the sewage treatment plant and a Digital Equipment Corp. Rainbow for handling financial data processing.

But for continuity, the bulk of the systems the city expects to buy in the next year will be compatible with each other. A variety of Compaq Computer Corp. desktops and portables are the chosen hardware; Lotus Development Corp.'s Symphony will be one of the software programs of choice, Amiral said.

The city's philosophy has been to prioritize requests, determine the appropriate hardware and software, decide whether to buy programs or develop them and "try to stay as standard as possible," Amiral said.

"I think it was astute on the part of city government to take its time. You hear about a lot of people with micros on their desks they're not using or employees writing their own package, getting the department dependent on it then leaving."

Other managers observe that microcomputing productivity is contagious.

"People are very creative, and it feeds on itself," said Timothy Turnpaugh, senior vice-president of Seafirst Bank's technology division. Turnpaugh has overseen the Seattle company's placement of nearly 1,000 Apple Macintoshes throughout its statewide sites.

Users initially received the same software: the Macwrite and Macpaint programs bundled with the computer. As department users became acquainted with the system's capabilities, they developed applications suited to their needs. Turnpaugh called one department's Multiplan price analysis system "strictly homegrown" but a good example of the creativity he hoped the microcomputer infusion would provoke.

> **'Personal computers belong in the total picture of office automation.'**
>
> — Richard Nelson
> McDonnell Douglas
> Aerospace

"The people who had a problem got their hands on the technology and applied the technology to the problem," he said.

Seafirst's Macintoshes are connected through its IBM System 3084 for electronic mail, but they are also all being boosted to 512K bytes of memory to enhance stand-alone use. Turnpaugh said he expects local-area networks will be the next boost, instead of hard disks.

"The problem with individual hard disks is that backup is unfamiliar to novice users; security and data management must be maintained," he said. "We have a handful of hard disks for special-needs cases and specific applications.

"I think the way the world is going is it's going to be a blend."

However, networks will bring "a lot of issues to resolve," including those of copy protection, McDonnell Douglas' Nelson said. "There are benefits to localized processing at different levels and for data storage at different levels," he said.

Local-area networks are also the focus of the five-year plan at Logicon, Inc. said Gus Tepper of the firm's Strategic and Information Systems division. Now the ratio is about one personal computer for every six employees, with the micros mostly used for word processing and other secretarial activities. The personal computers sometimes are used to emulate the IBM 3270 Personal Computer, but linking the micros themselves is the goal, he said.

Security Pacific considers communications between micros and mainframes and even established minicomputer systems necessary, said Jim Smith, president of the bank's information processing subsidiary, Security Pacific Computer Solutions, Inc. He said 90% of the institution's 3,000 personal computers have the capability of emulating an IBM 3270 terminal for interaction.

But the bank has not yet embraced local-area networks, Smith said. "We always ask, 'What are you going to move around on them?' "

Pacific Bell Telephone Co. is looking further into the future than ever, according to Jack P. Garrett, information systems district manager. He said a new San Ramon, Calif., office complex will include 6,000 or more workstations for some 7,200 employees who will be housed there. Each workstation will include a telephone-grade twisted-pair wire, five data-grade wires, two 75-ohms coaxial cables and fiber-optic ducting.

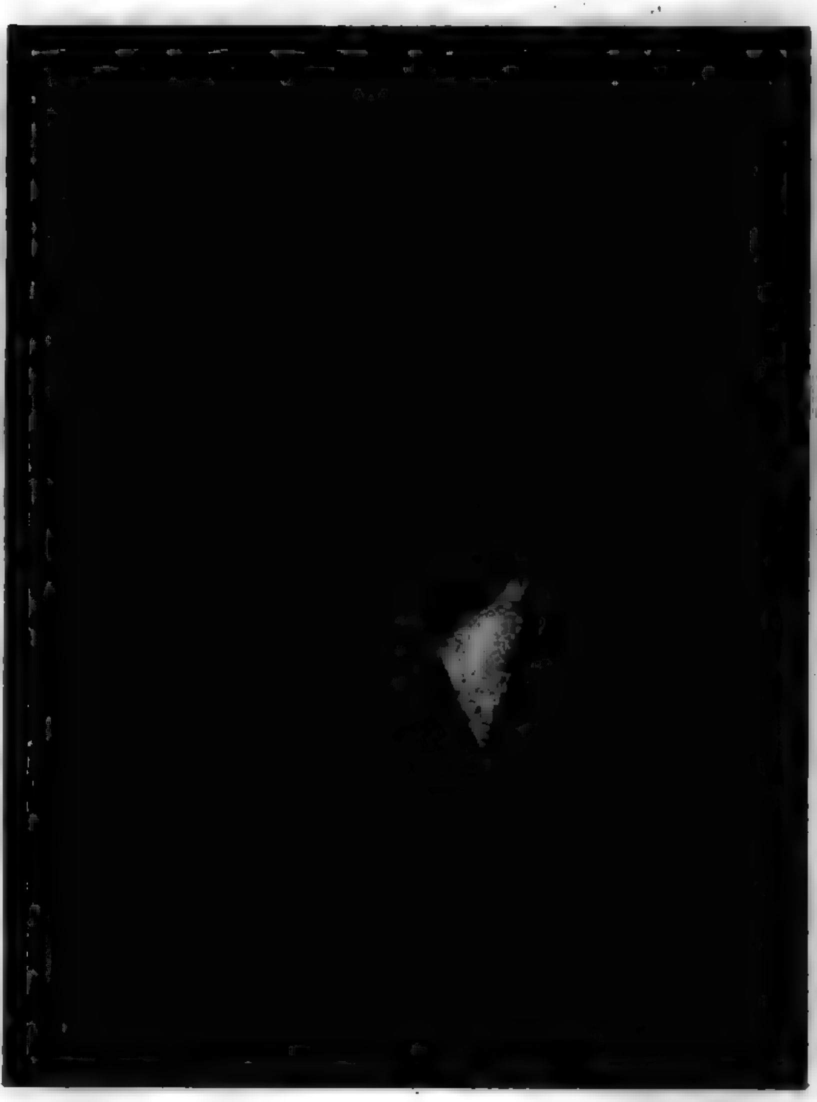
"You can't tell today what technology will bring tomorrow," he said. "The intention is to provide as much potential for each workstation as possible." ■

Outlooks '86

[illegible]

Straight talk about software companies.

“When you buy a computer software product, you’re buying the company behind it.”



When Cullinet Software was founded in 1968, it was one of the first companies created to specialize exclusively in computer software products. We felt it was time to stop re-inventing the computer software wheel.

But remember, this was 1968—the era of hardware myopia. There were some who said we could never succeed.

Others had tried and failed. “Why,” it was asked, “would Cullinet succeed?”

First, we had the belief that there is no substitute for superior products. When Cullinet introduced IDMS, it pioneered the concept of integration via an active dictionary-driven database management system. And we’ve achieved many other technical firsts since then:

The first back-end database machine prototype and distributed database system; the first, and only, teleprocessing monitor built for IBM computers in the last ten years; the first online Applications Development System (ADS/OnLine) for complex, high-volume applications; the first, and only, 4th-Generation Applications Software; the first transparent integration of personal computers with mainframe systems; the first implementation and full integration of database, applications, and information center/PC software, and much more.

More importantly, we also brought to the industry a standard of excellence and financial maturity. And a financial stability that is a matter of public record. A stability that enabled us to become the first computer software products company to be listed on the New York Stock Exchange, and to be cited for many of our achievements in growth and management by leaders from the business and financial communities.

As proud as we are of all these accomplishments, however, we are proudest of the special relationship that exists between ourselves and our customers. Cullinet has brought to the software industry a characteristic common to all successful companies: we are “user-driven.” We understand clearly that we are in business to serve the needs of our customers. And this understanding shapes everything we do.

It is this emphasis on customer requirements and satisfaction that has resulted—year after year, in survey after survey—in Cullinet’s top ranking in the categories of vendor support, documentation, training, and overall user satisfaction.

We have built an uncommon loyalty among our users because they understand that we truly care about them. It’s that simple.

John J. Cullinane
Chairman of the Board

These are five of the reasons why Cullinet is the leader and most respected company in the computer software industry.

1. Number One in Industry Sales

INDEPENDENT SOFTWARE VENDORS
Software News' Top 50 Independent Software Vendors

CULLINET SOFTWARE, Westwood, MA	$144,000
LOTUS DEVELOPMENT CORP., Cambridge, MA	140,000
MICROSOFT, Bellevue, WA	132,000
MANAGEMENT SCIENCE AMERICA (MSA), Atlanta, GA	120,500
APPLIED DATA RESEARCH INC. (ADR), Princeton, NJ	90,000
COMPUTER ASSOCIATES INTERNATIONAL (CAI), Jericho, NY	81,300
INFORMATION GENERAL, Woodland Hills, CA	74,000
DUN & BRADSTREET (D&B), Wilton, CT	70,000
UCCEL CORP., Dallas, TX	62,000

1984 U.S. Revenues ($000)

While Cullinet never expected or sought to become the largest software company in the world, it still is a significant accomplishment.

Source: Software News

2. Number One in DBMS Sales

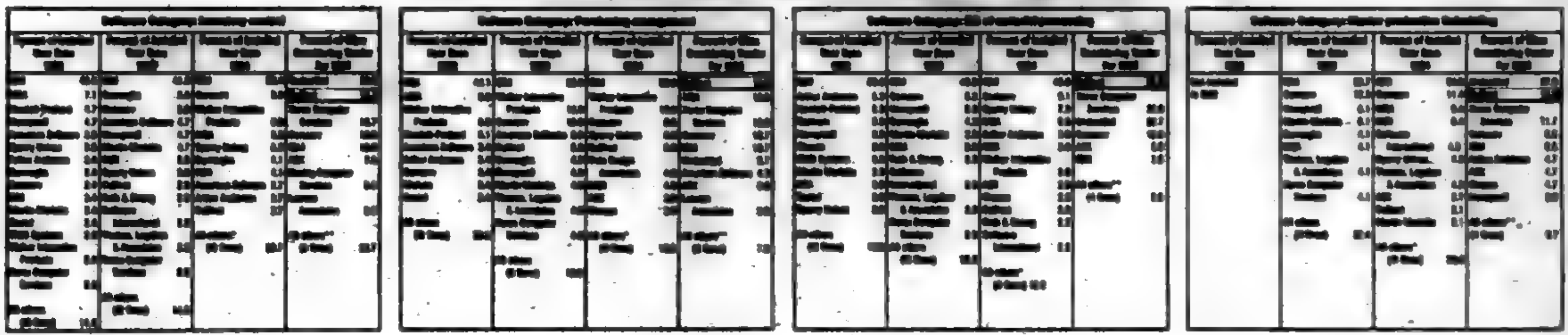
Intentions to Buy DBMS

	1983	1984	1985 (YTD)
CULLINET	173	206	148
IBM (IMS)	147	180	79
ADR	76	130	64
IBM (DB2)	2	47	50
IBM (DL/I)	158	140	49
IBM (SQL)	81	110	48
SAG	91	100	46
CINCOM	38	72	17
CCA	17	21	11

Buying preference for IDMS/R is increasing because as more buyers become more knowledgeable in database technology, they recognize the technical advantages of IDMS/R over competing products.

Source: Computer Intelligence Corporation

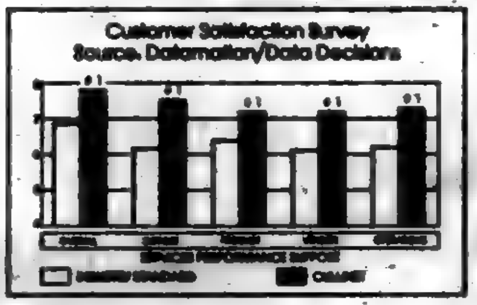
3. Number One in Manufacturing Applications



Source: Software News

Buyer surveys show convincing proof that Cullinet's 4th Generation manufacturing applications are the way of the future.

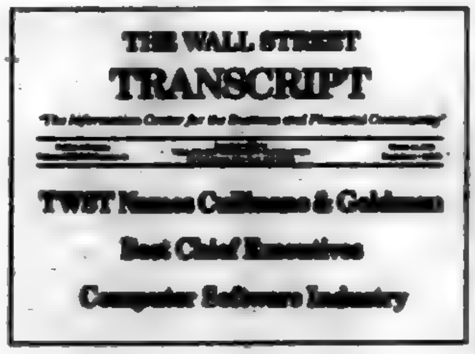
4. Number One in User Satisfaction



When it comes to vendor support, Cullinet is rated Number One year after year in every category.

Source: Datamation/ Data Decisions

5. Number One in Management



THE WALL STREET
TRANSCRIPT

TWST Names Cullinane & Goldman

Best Chief Executives

Computer Software Industry

Cullinet management has been consistently singled out by the computer and financial industries as the best. John Cullinane, Cullinet chairman, was named CEO of the Year in 1982 and Co-CEO of the Year sharing honors with Cullinet president Robert Goldman in 1984 and 1985.

Source: The Wall Street Transcript

The Leader in Information Systems Software

Cullinet

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Datavue runs the same programs as the IBM PC including WordStar™, Lotus 1-2-3™, Multi-Plan™, Super-Calc™ and all the rest. That means you can work on your IBM PC at the office; then take the same diskettes home with you to use on Datavue.

Built-in 5-1/4" drive and RAM drive software lets you swap 5-1/4" floppy disks between your Datavue and other PC's. You can expand Datavue's 2-drive system even further with an additional add-on floppy disk drive.

The small computer that's big on features.

Datavue features a detachable low-profile sculptured keyboard with that IBM-type touch and 10 function keys for special software. Its cordless infrared operation doesn't tie you down.

A full-sized 80 x 25 line display lets you run text or graphics. And six different screen palettes allow you to fine tune the greys and blacks according to the software you're using. If it's color graphics you're looking for, just plug an RGB monitor into the standard port.

And that's just the beginning of Datavue's expandability. Turn Datavue into a telecommunications device with a modem. Add 1.3 meg of power to run memory-intensive programs or an expansion chassis for a 10 megabyte hard disk and 3 standard IBM cards. The choices are yours.

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Quadram is always working to make a great computer like Datavue even better. Options include a long-lasting flourescent screen that helps you make the most of low-light situations.

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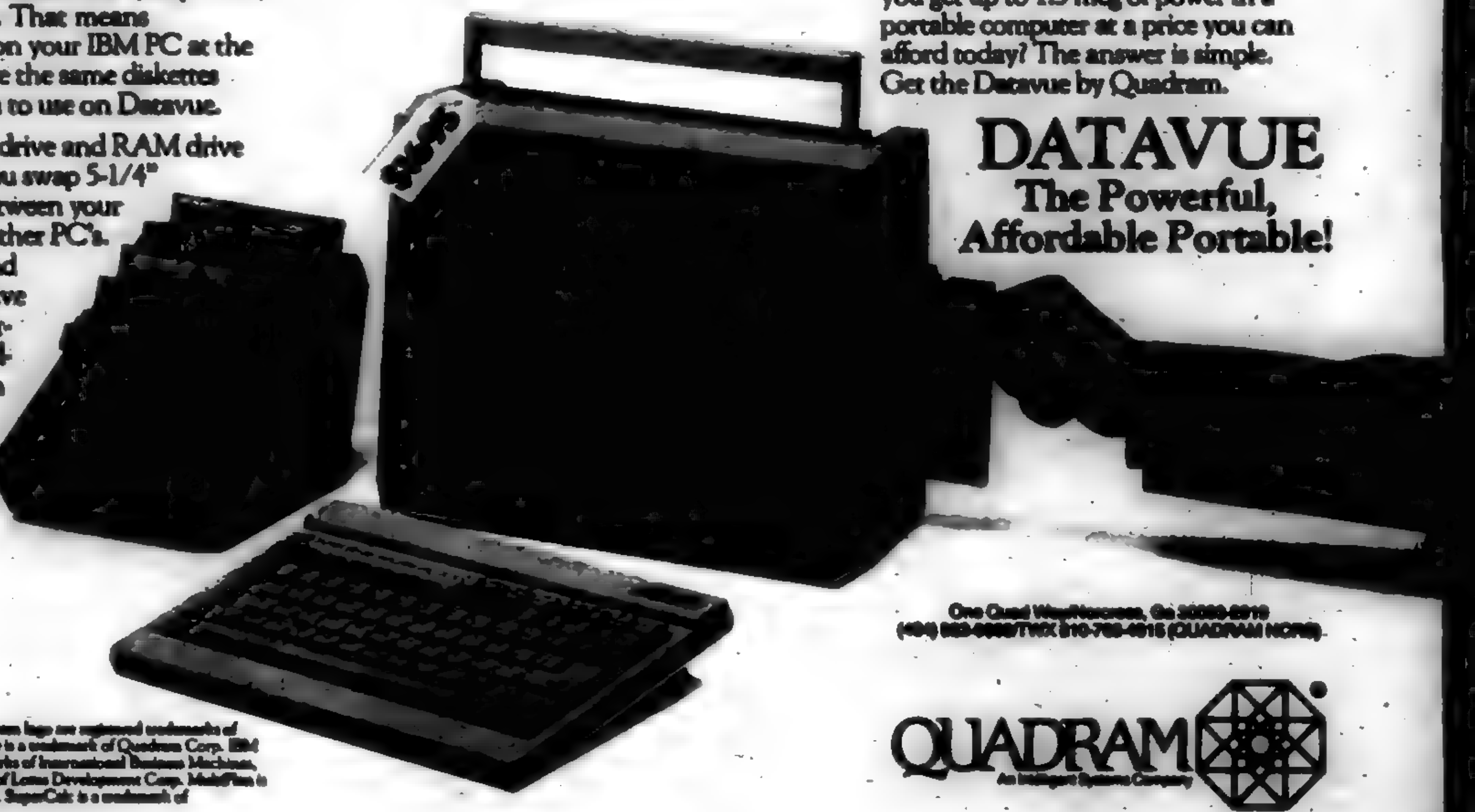

One Quad Way/Norcross, Ga [illegible]
([illegible]) [illegible]/TWX [illegible] (QUADRAM NCRS)

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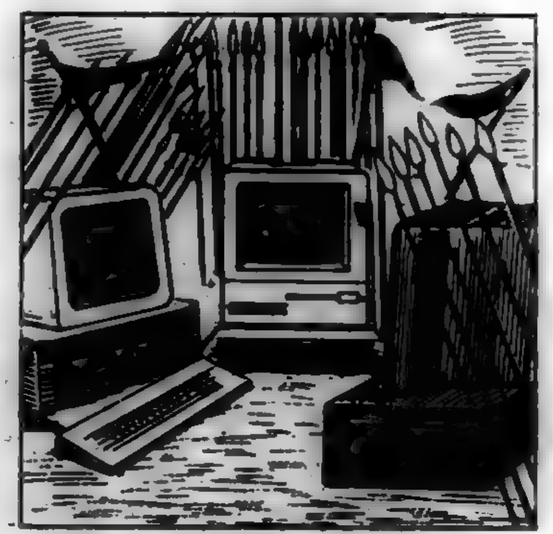


Trade wars

U.S., Japan and Europe man the tariff barricades

By Edward Warner

U.S. electronics firms are beginning to wonder whether international trade, once their golden goose, has become a carrion bird circling overhead. At home, their market share has been steadily eroded by less expensive, foreign-made products, particularly semiconductors and telecommunications equipment. Abroad, the U.S. manufacturers find their sales efforts stymied by state-run, foreign telecommunications monopolies and a thicket of regulations.

In 1985, with the U.S. trade deficit standing at $150 billion, $8 billion of it reportedly in electronics alone, the U.S. electronics industry cried foul. On the home front, the Semiconductor Industry Association (SIA) took Japanese semiconductor makers before a U.S. trade oversight agency and charged them with predatory pricing. On the foreign marketing battlefield, the Computer and Business Equipment Manufacturers Association (CBEMA) lent its support to legislation that would impose U.S. trade restrictions unless foreign telecommunications markets are opened.

"Home front." "Foreign marketing battle." These terms fit when applied to a dry topic like foreign trade because these trade battles are the economic equivalent of war. The losers have their casualties — the unemployed, the boarded-up storefronts; and the winners have their booming economies or protected industries. But, like any war in a world of intertwined relationships, it is hard to keep a trade war small. When the U.S. imposed the Smoot-Hawley Tariffs of 1930, worldwide retaliation resulted, and U.S. exports were reduced by three quarters — all at the start of the Depression. To restrain trade, it seems, is to invite retaliation and to set a forest fire when all one had wanted to do was light a match.

The potential for worldwide retaliation is what most worries the electronics industry, a field of business perhaps more international in its scope than any other. Digital Equipment Corp., for example, earns from 35% to 40% of its income from its foreign operations. Other U.S. firms, such as Atari Corp., conduct most of their manufacturing overseas; and still others, such as the numerous makers of personal computer expansion boards, rely on the same inexpensive Japanese memory chips the SIA decried.

And so it has come to be that only the hardest hit sectors of the electronics industry — telecommunications products and semiconductors — strongly support trade restrictions. But telecommunications and semiconductors are the very underpinnings of the industry, and changes in trading rules there will force changes industrywide.

To restrain trade, it seems, is to invite retaliation and to set a forest fire when all one had wanted to do was light a match.

Such changes are already afoot. Congress, under pressure from aggrieved industries and out-of-work constituents, is now considering a raft of trade restriction bills, most focusing on specific industries such as shoes or telecommunications. The industry-specific bills are said to have the greatest likelihood of passage because they represent what their proponents call a fine-tuning of trade law rather than a

ILLUSTRATION BY MARC TAFFET

revision.

Among the industry-specific bills that affect the electronics industry, the two that have the best chance for passage are in the U.S. House of Representatives, and both deal with with telecommunications, a trade segment in which the U.S. has reportedly plunged from a 1980 surplus of $1 billion to a 1984 deficit of $600 million.

One of the bills, introduced by Robert Matsui (D-Calif.), would require the U.S. trade representative, a U.S. Department of Commerce official who oversees trade matters, to spend six months assessing which of the U.S.' telecommunications trading partners have barriers against U.S. telecommunications products. The trade representative's report would go to the president, who would use the threat of tariffs and other presidentially imposed sanctions to negotiate an improved trading position with each offending nation. To speed approval in both chambers, the Matsui bill has a Senate counterpart, introduced by Sen. John Danforth (R-Mo.).

The Wirth/Florio bill

The other bill, introduced by Rep. Timothy Wirth (D-Colo.) and Rep. James Florio (D-N.J.), would also require the Commerce Department to conduct a six-month investigation of foreign trade inequities and place the negotiating and sanction-setting power in the hands of the president. But the Wirth/Florio bill, which is supported by the U.S. Chamber of Commerce, differs from the Matsui bill by giving the president more time to negotiate with an offending trading partner before he must set sanctions, said Bailey Spencer, an aide to Wirth on the House Subcommittee on Telecommunication, Consumer Protection and Finance.

The Wirth/Florio bill also differs in its inclusion of telecommunications services and in the means by which offending nations are identified, Spencer said. The Wirth/Florio bill, he added, has "no presumption up front that any country is acting in a manner that is unfair." The Matsui-/Danforth bill, Spencer charged, is specifically targeted at Japan.

The Matsui bill, however, has the support of the CBEMA because the bill covers the sales of foreign affiliates of U.S. firms, and the Wirth-/Florio legislation does not, explained CBEMA Vice-President Ted Heydinger. In any case, CBEMA's support may only be lukewarm. In August, the organization announced that it was "firmly opposed to current efforts to develop new trade barriers around U.S. borders."

In late November, the Wirth/-Florio bill was reported out of committee, and a House floor vote could come as early as January 1986. The Matsui bill, meanwhile, was still in committee.

While the U.S. telecommunications industry is pressing its battle for protection in the halls of Congress, the U.S. semiconductor industry is pleading its case before U.S. trade representative Clayton Yeutter, whose office oversees the administration of U.S. trade laws. In June, the SIA brought a complaint to the trade representative charging the Japanese semiconductor manufacturers with dumping their products below cost in the U.S. market. As evidence, the SIA submitted an analysis of the U.S. and Japanese chip markets — two sectors where it is losing ground — and a "smoking gun" memo, in which Hitachi Ltd. sales representatives were told to price their semiconductors 10% below whatever price the U.S. makers offer.

Action on the SIA's complaint appears likely in early 1986 due to the 1985 decision by the trade representative's office to impose deadlines in long-standing trade complaints. The deadline requires the parties to work out an agreement before a set date. If no agreement is reached, the trade representative's office can set trade restrictions against the foreign product.

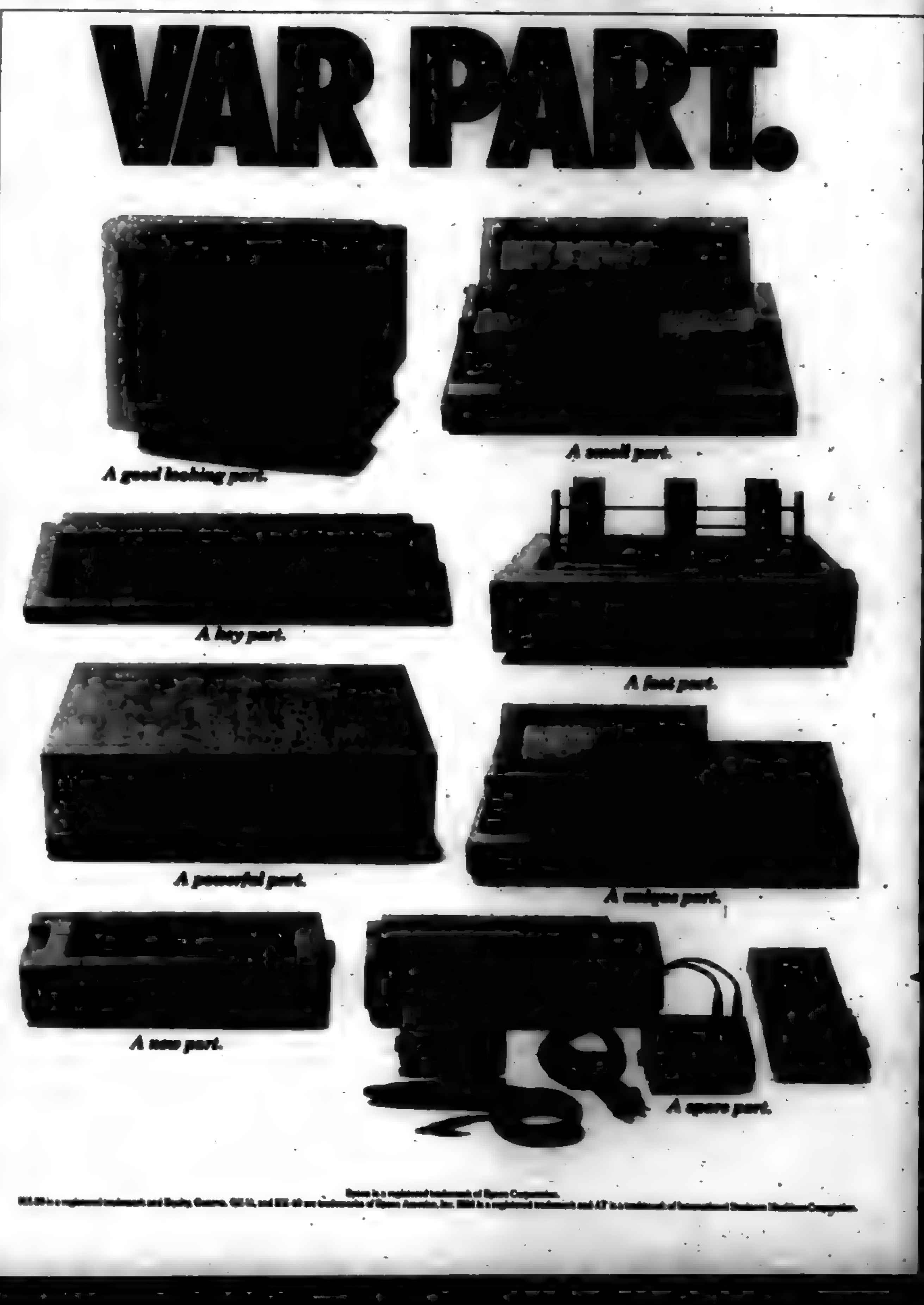
Given the choice of legislative action or case-by-case sanctions imposed by the Commerce Department under existing law, the Reagan administration prefers the latter. With support in Congress building for some sort of trade bill, Reagan — long a vocal supporter of free trade — initiated in August his own investigation of Japan, Taiwan and Brazil. The investigation of Japan does not concern electronics, but the investigation of Brazil does, focusing on alleged Brazilian restrictions on the importation of foreign-made computers.

Should the Reagan administration either force changes in the Brazilian import rules or impose retaliatory action, it will have taken some of the wind out of the protectionists' sails.

While the lawmakers and regulators wrangle over which, if any, restriction to impose, the best hope for improvement arose recently from outside governmental circles. The dollar is declining on the international money market, particularly against the Japanese yen. The weakening of the dollar against the yen means that more dollars will be required to buy Japanese products.

The weakening of the dollar also means that U.S. goods will be less expensive to foreign buyers. A weak dollar will make U.S. products, including telecommunications equipment, attractive to the Japanese, with whom we have our greatest trade deficit. If the yen stabilizes at 200 per dollar and West Germany's deutsche mark stabilizes at 2.4 per dollar, and comparable drops in other world currencies occur, the U.S. trade deficit will eventually fall to $50 billion, according to Rimmer de Vries, a senior vice-president at Morgan Guaranty Trust Co. in New York.

And all of that without one tariff enacted. ■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A small part.

A key part.

A fast part.

A powerful part.

A unique part.

A new part.

A spare part.

Europe wary of U.S. restrictions

By Andel Korvel
Computerworld News Service

PARIS — European government and business officials view with growing alarm U.S. efforts to wield trade restrictions as weapons of economic and diplomatic policy. But economic realities and fragmentation of the European market oblige them to act with reserve in calling for retaliation.

"Europe can afford a trade war only if it succeeds in integrating its internal market," said Ralf Garenc, information technology consultant at the Organization for Economic Cooperation and Development (OECD). "Under current conditions, European industry cannot afford U.S. retaliation," he said.

Because development and marketing technologies have proven to be so costly, national markets in Europe are too small to support competitive industries. As long as a unified European market remains a chimera, each country turns to the U.S. in search of a large market for its goods.

Europe's six main manufacturing nations — the UK, France, West Germany, Italy, Sweden and the Netherlands — have found that their exports of information technology equipment are growing at a faster rate than their domestic markets for such equipment. Computer equipment accounted for 40% of the $28 billion worth of electronic products exported by the European community last year, according to the OECD.

While the European economic community (EEC) says it is seeking out and removing trade barriers, protectionist sentiment appears to be gaining momentum in Europe. One of the European vendor's major complaints is with the subsidies given by some of their governments to the foreign firms that open plants or offices in their nation. European business is calling for a reduction in those subsidies because they direct money into the pockets of their competitors.

The protectionist fever is being fueled by Europe's $500 million trade gap with Japan, and EEC foreign ministers have asked Japan to increase importation of EEC goods.

Harsh economic realities, however, are dampening European protectionism attempts. Though the European community is hoping to unify the European market, it appears likely that, at least for now, Europe will continue to look abroad for trading partners before looking in its own backyard.

■

U.S. and Japan wrangle on trade

By Takahiko Kondoh
Computerworld News Service

TOKYO — High-tech discord runs deep between the U.S. and Japan, a situation eloquently illustrated by the lack of progress in U.S.-Japanese semiconductor trade talks late in 1985. During the two-day Tokyo meeting, U.S. and Japanese government officials agreed only in principle to defuse the semiconductor trade squabble.

While the two sides agreed to adopt what one called "a pragmatic approach" to settling the conflict, they remained divided over how to give U.S. semiconductor makers increased market access to Japan and over ways to develop "a long-term and cooperative relationship" between the two industrial powers.

The Japanese government, meanwhile, is worried that the semiconductor dispute will come to escalate into a trade dispute comparable to those that beset Japan's mighty telecommunications, computer peripherals, medical equipment and lumber products industries.

Hoping to assuage the trade friction, the government's Ministry of International Trade and Industry (MITI) has proposed minimum price ranges be set for Japanese chips entering the U.S. market. MITI also has reportedly sounded out Washington, D.C., on industrial cooperation between Japanese and U.S. chip makers to develop jointly 1M-bit memory and other next-generation chips.

The Japanese government has also offered to abolish tariffs on imported computers and peripheral equipment, beginning in April. The Japanese computer industry had opposed the proposal, claiming that Japan suffers a deficit in computer sales to the U.S. About $390 million worth of Japanese computers were shipped to the U.S. last year, while the U.S. delivery to Japan totaled $424 million.

Throughout last fall's trade talks between Washington, D.C., and Tokyo, U.S. negotiators claimed that U.S. semiconductor firms have only an 11% share of the U.S. market, while the Japanese have 17%.

Japanese government leaders and electronics trade officials, meanwhile, claim that no institutional barriers against U.S. chip vendors exist in Japan and that Japanese chip makers have been falsely accused. Said one MITI official, "The Americans are framing us."

Japan's Prime Minister Yasuhiro Nakasone is expected to make concessions within the year as the Japanese government seeks an end to the semiconductor dispute. Nakasone said, "As a country preserving free trade, Japan should be active not only to sell to foreigners but also to buy from them." ■

Korvel is Paris hub bureau chief and Kondoh is Tokyo bureau chief for the Computerworld News Service.

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Manufacturing Automation Protocol

GM test-drives a shop floor standard

By Paul Korzeniowski

Faced with formidable competition at home and abroad, General Motors Corp. took a close look at its manufacturing operations in 1980. The automotive colossus did not like what it saw. Devices, such as vision systems, numerical controllers and mainframes, operated in stand-alone fashion. Analysts have estimated that only 15% of factory devices talk to one another.

This lack of integration has prevented GM and other manufacturing companies from bringing into existence computer-integrated manufacturing (CIM), a scheme for increasing the productivity of U.S. manufacturers that was first proposed in the early 1970s.

> ***To perk up vendor interest in MAP, the automotive company flexed its purchasing muscle and announced it would only buy products for its factories that complied with MAP.***

GM realized that its continued success hinged on the ability to integrate the wide range of equipment housed at its factories. So, the company began to search for a means to tie various devices together.

Two years later, independent of GM, the International Standards Organization (ISO) began work on its Open Systems Interconnect (OSI), a seven-layer network model designed to connect various manufacturers' equipment. In theory, any product that adheres to the OSI model should easily work with any similar product, a CIM prerequisite.

GM became interested in the OSI model, so interested in OSI that GM established a task force to tailor the model to the factory. GM's version of the network model is called Manufacturing Automation Protocol (MAP).

To perk up vendor interest in MAP, the automotive company, one of the world's largest computer users, flexed its purchasing muscle and announced that it would only buy products for its factories that complied with MAP.

Not surprisingly, a number of vendors quickly fell into step. Large companies, such as IBM, Honeywell, Inc., Digital Equipment Corp. and Hewlett-Packard Co., pledged support for MAP. Small companies, such as Concord Data Systems, Inc. and Industrial Networking, Inc. — a joint venture between Ungermann-Bass, Inc. and General Electric Corp. — are positioning themselves primarily as MAP suppliers.

Users are also taking a close look at MAP. The MAP Users Group, sponsored by the Computer and Automation Systems Association of the Society of Manufacturing Engineers, has grown from 60 members at its initial meeting in June 1984 to its present 1,600 members.

GM has a staff of approximately 26 full-time employees and 10 contractors devoted to MAP. The staff should grow significantly in 1986. John Deere Co. and Kaiser Aluminum & Chemical Corp. have prototype MAP networks up and running.

Industry analysts forecast that the number of prototypes will dramatically increase in 1986. HP, IBM, Eastman Kodak Co. and GM are some of the companies planning pilot projects.

Despite all the progress, there are still

ILLUSTRATION BY KEN CONDON

many obstacles that MAP has to overcome. The prototype networks are very expensive and support only a very small proportion of MAP's potential capabilities. Design decisions have to be made because the OSI model supplies a great deal of flexibility. "For each of the seven layers, there are 20 to 150 options," noted Robert Blanc, director at the Center for Computer Systems Engineering at the National Bureau of Standards in Gaithersburg, Md. The model works much like a blueprint, and the MAP Users Group has to decide what type of houses it wants to build.

The model's first layer is the physical link; it is followed by data link, network, transport, session, presentation and application layers.

Acceptance of international standards consists of four steps. The first step, working papers, represents a rough cut in which all participants are expected to comment. Draft proposals forge a version that melds the initial comments. The third stage, draft international standards, signifies that the standard has basically been accepted, and only cosmetic changes will be made. The final stage is the international standard in which few changes are ever made.

OSI's first layer, the physical link, outlines how data should be sent over a transmission facility such as a coaxial cable or fiber-optic wire. The layer specifies four functions: how one device would be plugged into another; how electrical currents travel so that both sending and receiving stations understand the currents; what signals are necessary to establish a connection; and how data is packaged and sent from one device to a second.

The second layer, data link, commands the physical link in a manner similar to the way the brain moves arms and legs. The data link activates, deactives and maintains a link.

Layers 1 and 2 are based on the work of another standards organization, the Institute of Electrical and Electronics Engineers, Inc. This group has produced a series of local-area network standards with Ethernet probably the best known. MAP works with the IEEE 802.4 standard, a draft international standard that specifies how a 10M bit/sec. broadband token bus network should be constructed.

As one might expect, the lowest levels represent the most mature sets of MAP standards. Yet, significant changes to these levels will be made in 1986. MAP specifications will incorporate support for carrier-band transmission.

Carrier band is needed because many factories consist of small, enclosed work groups. For example, a group of machines may be dedicated to drilling a hole in a board and placing a peg in the board. Usually, these devices communicate only within their areas and do not need to be connected to a factory's principal 10M bit/sec. network.

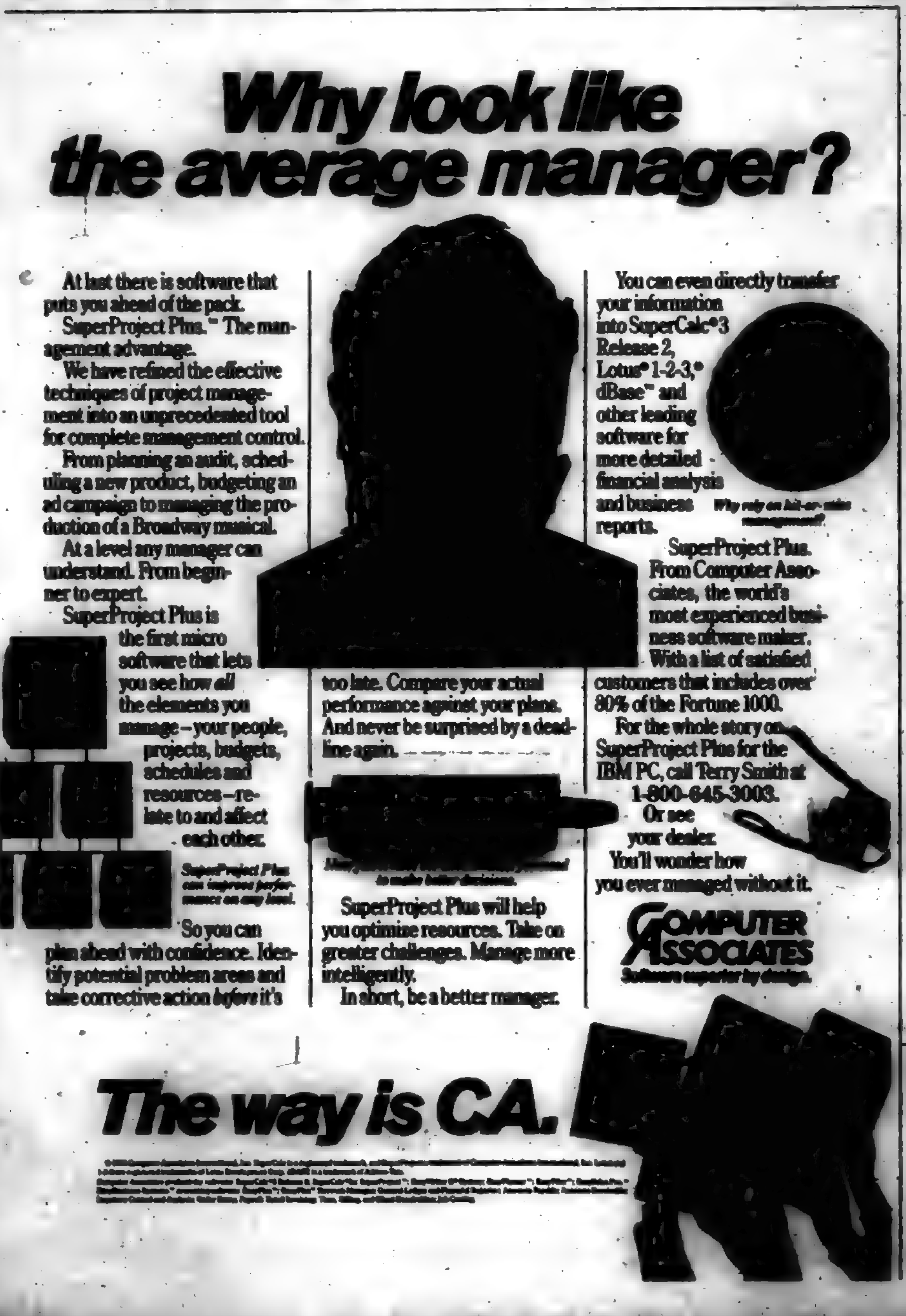
Supplying these devices with their own networks frees up the main network and supplies the smaller group with fast response time, which is needed to keep robots and other devices drilling the proper holes.

Addition to lower layers

Another addition to the lower two layers is a new method of signaling, called immediate acknowledgment. Whenever one MAP device attempts to communicate with a second, it transmits data as well as the necessary signals to establish a link. If there is a problem establishing the connection, the data is lost.

With immediate acknowledgment, data is not sent until both stations acknowledge that the connection has been made.

The third layer, or network layer, supplies routing translation capabilities between MAP networks. It should be noted that the third layer is only concerned with delivery of data. Once data arrives, applications may be unable to work with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it. Higher level layers have various responsibilities for translating data so it can be used with specific applications.

The ISO model specifies two types of connections for the net layer: connection oriented and connectionless.

MAP supports connectionless network service, an international standard. The alternative, connection-oriented service, works with a variety of networks more easily than connectionless networks.

However, easier connectivity comes with a price — lower performance. Gary Workman, a staff development engineer who coordinates a standards development team at GM, listed a number of performance issues that concern the third layer: How expensive is it to support intranetworking? Would MAP networks have to support both types of services? Should MAP simply supply gateways to other systems? Would support for the two services tax network performance?

MAP issues for 1986

In 1986, the MAP steering committee will discuss these issues; a decision concerning inclusion of connection-oriented service will not be made for at least a few years.

Level 4, the transport layer, supplies error checking schemes required in addition to those supplied in Layer 2. There are four classes of error checking schemes for this layer; all are draft international standards.

Class One represents the most rudimentary functions and Class Four the most complex.

A Class Four facility checks for out-of-sequence bits to determine if data was lost or defective packets of data were sent. The layer's flow control capability will hold onto data when it knows that more is coming. Once it gets that data, it passes the data to the next higher layer.

Layer 5, the session layer, establishes, manages and terminates sessions between two applications. Unlike the fourth layer, MAP has chosen to work with the simplest of the three ISO layer five options: basic combined subset, a draft international standard.

The sixth layer, or presentation layer, is the murkiest layer: MAP has not formally adopted any of ISO recommendations for this layer, which are draft international standards. This level is concerned with formatting files and application data so that it can be used by a variety of machines on a MAP network. This layer presents difficult technical challenges, for its protocols have to be able to format data for machines that may be based on 8- or 32-bit microprocessors. Although MAP has not adopted any of Layer 6's standards, some completed work by the ISO for this layer will probably be incorporated into MAP in 1986.

The seventh layer, the application layer, supplies a number of facilities that enable users to locate and move data through MAP networks.

Currently, MAP includes two of the many options that are available for this layer: Common Application Source Elements (CASE) and FTAM, a file access method.

CASE supplies a toolbox of functions so users can select or merge information. It also includes facilities for items such as identification numbers and passwords; FTAM moves information from one device to another.

Despite the relative instability of the various layers at this point, MAP seems to be gaining acceptance. MAP's only competition would come from vendors supplying proprietary factory networks. Two of the leading vendors in that market, Allen Bradley and Gould, Inc., said they will replace current offerings with MAP networks.

Vendors are busily working on products that they think will comply with emerging standards. "We should have a compiler for the sixth layer sometime in 1986," noted Harold Folts, executive director at Omnicom, Inc., a Vienna, Va., software and consulting firm. "We won't be the only vendor offering this type of product next year."

Yet, there remains some uncertainty for both vendors and users. To develop MAP products, vendors must fork over a great deal of money for research and development. A Siemens Corp. official noted that each of the 21 vendors at the Autofact '85 MAP demonstration spent $1 million designing its MAP product. Despite the cash outlay, equipment at the demonstration malfunctioned; files were lost and inventories were miscounted.

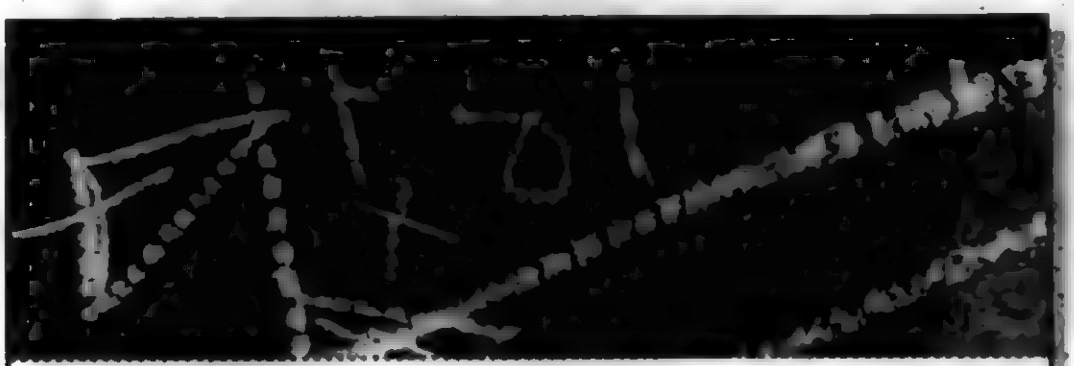
Vendors caught in catch-22

Also, vendors are caught in a catch-22. If they develop products and there is no MAP market or MAP standards change, they will not be reimbursed for their R&D investment. If they wait, competitors may be better able to deliver a product when the market emerges.

MAP represents a sizable investment for users as well. Because the products are in the first stages of development, they are expensive. International Data Corp. (IDC), a Framingham, Mass., market research firm, estimated that connecting a device to a MAP network costs $3,000.

Also, because there are so many options in each of the seven layers, users could be investing in equipment this year that would become obsolete the following year.

Because GM is driving MAP, some users are concerned that MAP will meet only GM's manufacturing needs. "General Motors has the money and the commitment to make MAP work in its factories," according to Kim Myhre, an IDC analyst. "I'm not sure that other companies have the resources to ensure that MAP works for them." ■



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View from Capitol Hill

Legislators add high tech to the agenda

By Mitch Betts

The politicos of Washington, D.C., hate to make predictions about legislation in the U.S. Congress. The reason is simple: The predictions are wrong about as often as weather forecasts are wrong, because the political winds of Washington, D.C, can change direction as unexpectedly as any other sort of wind.

But legislators and lobbyists will talk about those issues that "conventional wisdom" says will top Congress' agenda in 1986. (The appeal of attributing predictions to conventional wisdom is that if they turn out wrong, you can say that you never believed them in the first place.)

'Conventional wisdom' says that the 1986 agenda will feature three major high-technology issues: trade, taxes and computer crime.

Conventional wisdom says, according to interviews with several Congress watchers, that the 1986 agenda will feature three major high-technology issues: trade, taxes and computer crime.

Of course, the same topics were debated throughout 1985. But some final resolution of these issues is more likely in 1986, when Congress will be working hard to develop a favorable record for election campaigns in the fall. Recall, for example, that in the fall of 1984 Congress passed a big, popular anticrime bill, which included a provision against trespassing in government computer files.

"I think the things that are most likely to get legislative attention and action before the elections are those things that are either big sellers back home or those that are of such little interest back home that a congressman can do whatever he wants and not get any negative votes," commented Kenneth B. Allen, vice-president of government relations for the Information Industry Association (IIA).

One of the major issues affected by the 1986 congressional elections is what to do about the big U.S. trade deficit and allegations of unfair trading practices by Japan and other countries.

"I'm not sure what form it'll take, but the conventional wisdom is that there is enough momentum to pass a trade bill before Congress goes home for the elections," observed Ted A. Heydinger, vice-president for government relations at the Computer and Business Equipment Manufacturers Association (CBEMA).

The legislative proposals range from strong measures — a 25% surcharge on imports from certain trading partners — to milder actions, such as encouraging a new round of international trade negotiations.

CBEMA's position is to oppose import surcharges and other protectionist measures that would invite retaliation from important trading partners, and Heydinger noted that President Reagan has promised to veto such protectionist legislation.

Consequently, focus has shifted to several milder trade bills. For example, 26 senators — Republicans and Democrats — recently introduced a compromise bill called the Trade Enhancement Act (S. 1680). It has numerous provisions that strengthen existing trade laws, such as requiring the administration to act within 18 months if it finds that certain foreign trade barriers are unfair to U.S. interests.

Because of its bipartisan support, the bill may become the major trade measure in the Senate in 1986, according to Sen. George J. Mitchell (D-Maine). "I'd be willing to set aside some time . . . for action on the floor early next year," added Senate Majority Leader Robert Dole (R-Kan.).

Likewise, the multifaceted trade bills passed by the House Energy and Commerce Committee (H.R. 3131 and H.R. 3777) are likely to get attention from the House Ways and Means Committee early next year and then votes by the full House. It is too early to tell which of the many provisions in the House and Senate bills will prevail once the negotiations and votes are finished.

Debate over tax reform

The other broad issue affecting the computer community is the continuing national debate over tax reform, aimed at eliminating most tax credits and deductions in return for lower tax rates and a simpler tax code. In this context, the computer industry has been working hard to extend the federal tax credit for research and development, since it is scheduled to expire at the end of 1985.

The R&D tax credit has had its ups and downs in the House Ways and Means Committee, but it appears that an industry-backed compromise by Rep. J. J. Pickle (D-Texas) will prevail in the House. The compromise would extend the R&D credit for three years but cut its percentage from 25% to 20%.

CBEMA also was worried that R&D expenses would be taxed by a new minimum corporate tax — in that the minimum tax would be based on total revenue, rather than the present method of taxing revenue that remains after expenses have been deducted — but Pickle's compromise scuttled that proposal, to the relief of CBEMA lobbyists.

Extension of the R&D credit also is a top priority of the Association of Data Processing Service Organizations, Inc. (ADAPSO), according to Olga Grkavac, senior director of government relations. Moreover, ADAPSO hopes to overturn an Internal Revenue Service ruling that makes computer software subject to the personal holding company tax. "The most obvious vehicle for that [exemption bill] would be adding it to a comprehensive tax package," she said.

ADAPSO's other high-priority issue is computer crime and privacy. The fastest moving bill in this arena is the Electronic Communications Privacy Act of 1985 (S. 1667), which the association supports with a few clarifying amendments.

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>
> ***'You can no longer deal with computers totally separate from the communications links.'***
>
> — Kenneth B. Allen
> Information Industry Association

The bill applies the same privacy protection now afforded to telephone conversations to all sorts of electronic communications, while in transmission and while stored in a computer system.

At the same time, legislators on the House and Senate judiciary committees are pushing crime bills that would outlaw trespassing or altering data stored in private sector computers. It is not yet clear whether the electronic privacy and computer crime bills will be merged or passed separately.

Addressing this point in recent congressional testimony, ADAPSO spokesman P. Michael Nugent said, "I wish to make it clear that our support of electronic communications privacy legislation does not in any way diminish our support for computer crime legislation. We believe that in addition to legislation which recognizes and protects fully the privacy of

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Provisions: [illegible] any type of electronic communications, including data communications and electronic mail, while in transit or stored in a computer system. Law enforcement agents would have to get a special court order to intercept electronic communications.

Supporters: American Civil Liberties Union; Electronic Mail Association; Association of Data Processing Service Organizations, Inc.

Opponents: U.S. Department of Justice on grounds that the bill's provisions would hamper law enforcement.

Outlook: The bill has widespread and bipartisan support. However, it faces a few obstacles, including objections from the Justice Department, [illegible] by interest groups and perhaps a difficult merger with other computer crime legislation. Assistance legislation often [illegible] just before Congress recesses for election campaigns.

electronic data communications, there is also a need to provide private sector computer systems with criminal law protection against unauthorized computer trespass.

"These are two separate issues, however, and both require a legislative remedy," he testified.

The IIA, which represents on-line data base service vendors and some videotex firms, said it is another industry group that wants Congress to pass computer crime legislation, the IIA's Allen said. "We want to make sure that both the owners of the data bases and the vendors have an adequate degree of protection," he said.

The IIA also supports the general thrust of the Electronic Communications Privacy Act, Allen said. "As the technology has changed, you can no longer deal with computers totally separate from the communications links. We're very concerned that those data transmissions are also protected — not only protecting the vendors but also the people who are putting the data into the system," he added.

Elsewhere on the congressional agenda will be a host of lesser issues, which will get at least some staff scrutiny or public hearings.

Lobbyists interviewed by *Computerworld* cited the following issues:

■ The Federal Communications Commission will render a decision on loosening restrictions on the participation of AT&T and regional holding companies in enhanced business services. "Depending on what happens at the FCC, you're looking at least at more extensive oversight and then perhaps at some legislation," ADAPSO's Grkavac said.

■ Congress will continue to manage the electronic filing systems at the Securities and Exchange Commission (SEC), the Patent and Trademark Office and other agencies [CW, July 15]. "To the extent that there is little or no guidance governmentwide about these systems, the Congress will find itself in the role of answering policy questions that come up," the IIA's Allen said. "I suspect we'll see more congressional oversight as well as some policy guidance coming out of the Office of Management and Budget," he added.

■ The IIA will keep an eye on any amendments to the Freedom of Information Act to ensure that data base vendors can obtain government data through the act and also to make sure that the government does not carelessly release proprietary business data to competitors.

■ The transborder data flow issue is becoming an international trade issue as Congress and the administration investigate foreign trade barriers to data communications.

■ CBEMA has formed an environmental council, which in 1986 may take an active role in environmental legislation affecting the computer industry, such as the Superfund program for cleaning up toxic wastes.

■ The computer industry has called the Pentagon's new procurement rules too burdensome [CW, Nov. 18] and is lobbying to kill rules that would require them to turn over competitive pricing information.

■ Aware of the electronic interconnection of world securities markets, Sen. William Proxmire (D-Wis.), Rep. John Dingell (D-Mich.) and the SEC are investigating whether U.S. investors involved in the international markets are adequately protected from fraud.

While all of this activity goes on in the federal arena, the Data Processing Management Association will be focusing its efforts at the state level on such issues as VDT health standards and computer crime, according to Joseph E. Collins, governmental affairs manager.

"We want to be taking a more proactive stance on the issues and in government affairs," Collins said. ■

[illegible]

Outlooks '86

"Reduced instruction set computing, although it is an idea with merit, by no means offers the enormous advantages that some seem to attribute to it. Thus far it has not been significant at all in the marketplace. There are a few vendors with products that you could say offer RISC-like or RISC-influenced architectures, but they certainly are not pure RISC architectures. I don't think anybody will ever offer viable commercial systems based on pure RISC architectures. It raises a valid question about what ought to be an instruction set. It's kind of a corrective to the idea that you just keep throwing more and more things into the microcode.

"RISC was obviously much more talked about than implemented in 1985. As people start using it more in 1986, it will become obvious that it is not the greatest thing since [illegible]

[illegible]

"IBM is expected to announce a RISC-based workstation product soon. Hewlett-Packard Co. is betting the ranch on RISC. Ridge Computers, Inc. is shipping machines. But there is no RISC market, per se. RISC is a means toward an end, an approach that some vendors think will enable them to deliver computers at an attractive price. Like pipelining or cache memory, RISC will be something on the spec sheet, not a factor in a purchase decision.

"Throughput of useful work will be the determining factor in the debate between complex and reduced instruction set computers.

"In applications where absolute design correctness and bug-free instructions are essential, RISC may have an edge over complex instruction set machines. [illegible]

[illegible]

"Relational technology offers significant advantages in ease of use. There have, however, been problems, the most notable being relational's inability to handle high-performance critical applications. Unfortunately, most major corporations … require these applications. As much as the relational people would like to promote their systems as all-purpose, they have limitations in their design.

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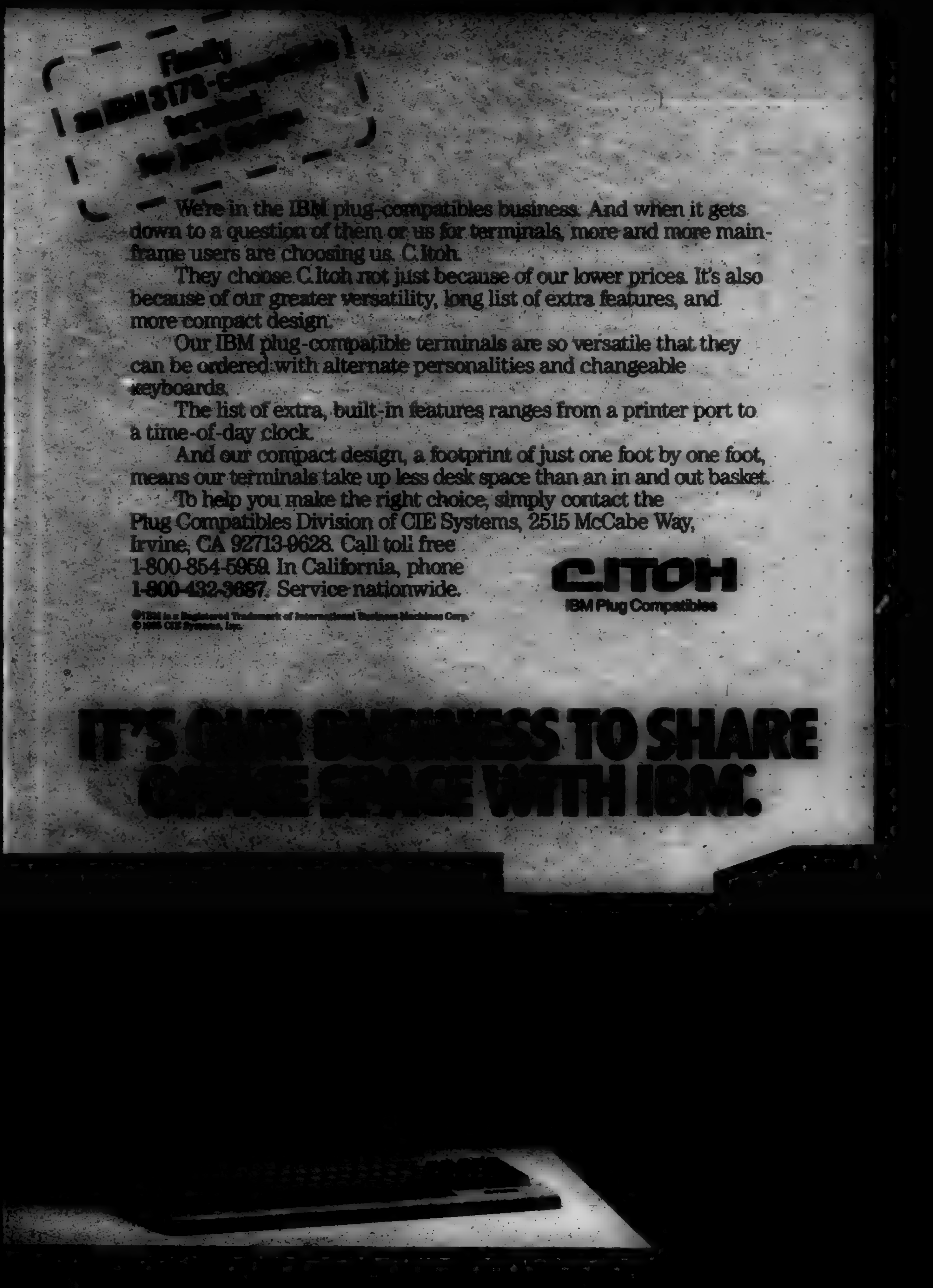

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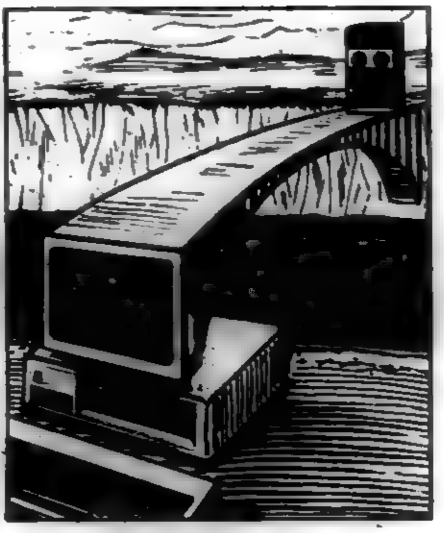
Micro-to-mainframe links



An uphill climb to a data access solution

By James Martin

Analysts and users agree that, despite numerous shortcomings, micro-mainframe link technology should begin approaching maturity, or at any rate adolescence, in 1986.

IBM's emerging LU6.2 protocol for the Personal Computer and its Token-Ring network are seen as two positive advances that could begin to change the shape of the micro-host industry by late '86. By most accounts, it will be a year of growth and transition for the industry as end users require more host information at faster speeds to complement micro applications.

Future Computing, Inc. of Richardson, Texas, is expecting twice as many terminal emulation boards — 410,000 — to be sold next year than were sold in 1985. International Resource Development, Inc. of Norwalk, Conn., expects sales of micro-mainframe link products, including software, modems and emulation boards, to total $450 million this year, tripling to $1.3 billion by 1987.

In the past two to three years, the capabilities of the personal computer have been enhanced by mainframe-link technology, combining stand-alone processing with access to host data and services. Businesses are finding a great deal can be accomplished on the micro without tying up the resources of the mainframe.

"Three years ago, a personal computer was somewhat rare in a corporation and was used in stand-alone mode all the time," said Hassen Baghai, senior manager for telecommunications and microcomputer services at McCormack & Dodge Corp. in Natick, Mass. "People are just now really beginning to understand how to integrate the personal computer into a network. They're also thinking about uploading, whereas before downloading was the only consideration."

David M. Fredenburg said his company "hardly ever buys a personal computer anymore without an emulation board. We find we can do a lot on the micro side without tying up the mainframe." Fredenburg is manager of product assurance and the data center at Simmons Precision, Vergennes, Vt.

Along with the projected rise in sales, the micro-mainframe link industry has seen an increase of vendors in its relatively short history. Digital Communications Associates, Inc. (DCA) of Alpharetta, Ga., is considered to be a leader in terminal emulation boards, up against IBM and its emulation products. Three California-based companies — AST Research, Inc., Irvine, Calif.; Forte Data Systems, Inc., San Jose, Calif.; and CXI, Inc., Palo Alto, Calif. — have been gaining ground in the market, among others. Additionally, traditional mainframe software vendors have begun addressing the market from their spectrum, with limited success.

> ***Businesses are finding a great deal can be accomplished on the micro without tying up the resources of the mainframe.***

Observers generally agree that a shakeout in the link industry is likely, given the increasing number of vendors using a "reinvent the wheel" approach. "There are a lot of 'me too' products out at the moment," observed

ILLUSTRATION BY MARC TAFFET

Naomi Kalmus, senior consultant with International Resource Development, Inc. "The lack of any real differentiation results from users and vendors not being clear as to what is needed most. Users just want to get to the data but don't always understand how, while MIS is often wary of allowing them access." Kalmus added that a consolidation of some vendors could occur, but declined to speculate which companies might be candidates.

The often conflicting needs of end users and MIS is representative of the problems involved in micro-mainframe technology and is said to be one reason the industry's development has been slow, analysts said. Some observers say they believe that not until certain MIS concerns are allayed will there be any real industry growth, while others believe links are only a temporary answer, with more advanced solutions supplanting emulation boards and software and coaxial cables in the future.

But, many agree that no matter what technology develops, much of the micro-host concerns must be worked out between MIS and end users.

At the heart of MIS concerns is the security of confidential information. The MIS department worries that end users could gain inappropriate access through links to proprietary data, which could jeopardize corporate information. A related concern is the protection of valuable mainframe data once downloaded to a vulnerable, portable floppy disk.

"I do feel that security concerns are definitely a barrier to the industry's technological advancement, which in turn limits the link users' ability to get information from the mainframe in a more timely manner," said Bill Golden, project manager/microcomputers, at Wendy's International, Inc. of Dublin, Ohio. "Our biggest concerns with links are unauthorized access and the issue of controlling information once it gets to the personal computer."

Golden said that when mainframe data is requested by personal computer users, the data is downloaded onto a disk by the MIS department and then handed to the user. "We don't permit any direct remote dial-up access or even a callback system," he added. "That mainframe information is worth more than the 95 cent disk."

Wendy's purchased terminal emulation boards to eliminate a single user from having to toggle back and forth from a personal computer to a 3270 terminal for multitasking applications. At present, only a few end users have read-only access to host information, Golden said. "The folks who are transferring information are getting [mainframe] data they would have access to anyway," Golden said.

While providing security, these processes are often slow and cannot always provide users with timely information. "Although we are not doing much direct file transfer now, logic would say we will evolve to that after some issues are worked out with security, policies and procedures and so forth," Golden said.

Golden said he does not foresee any technological solutions to the security problem forthcoming. "That doesn't mean there isn't a solution out there," he added. "It's a tough situation, but someone at some point in time will find a way of doing it."

Lee Doyle, communications analyst for the International Data Corp. (IDC) in Framingham, Mass., agreed that vendor attempts to solve security problems have been disappointing. "But it's largely a problem within the company itself of defining what information it has, who should have access and how the information should be distributed."

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>
> **'Security concerns are definitely a barrier to the industry's technological advancement.'**
>
> — Bill Golden, Wendy's International

The possibility that users can upload incorrect information after having manipulated it on the personal computer is also a concern. "With current technology, there is a lack of protection in uploading," said Philip Dorn, Dorn Computer Consultants, Inc., New York. "Don't put data back up there if it's wrong. There should be some system of checking and verifying the information before it is uploaded."

Security and data protection are but two MIS concerns in the micro-mainframe area. There are others:

- The delays and high costs of new technology. "There was a lot of hype about new micro-mainframe products in '83 and '84 with many of them not delivered until '85," Doyle said. There have not been any significant advances since, he added, with new releases in 1985 offering only "minor functional improvements."
- The complexity of technology. Many end users who could benefit from accessing data from the mainframe often do not have the time or the inclination to learn how to use complicated link packages and mainframe data bases, analysts agreed.
- Incompatible data formats. Some file transfer software programs allow movement of data on a per-file basis, but it often arrives raw and in need of additional processing.

In addition, there is almost no generality or compatibility among micro-mainframe links, Dorn said. "One

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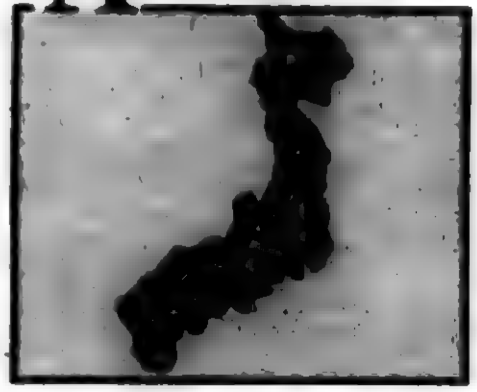

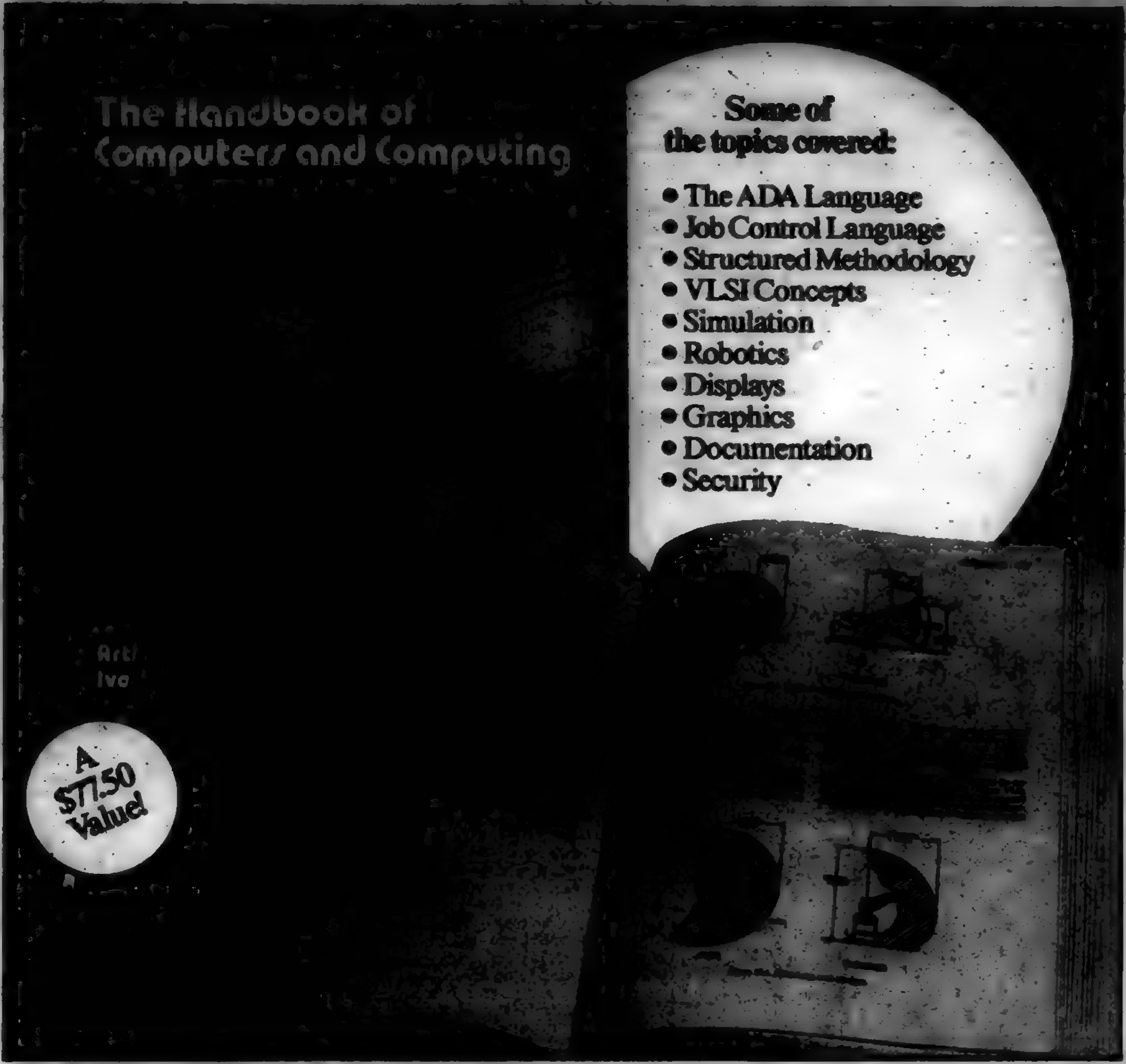

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needs to use link A for one purpose, B for a second purpose and C for a third. You really have to know what you're doing in advance."

■ The lack of any significant open architecture link. This has held some other potential link users at bay. Most systems are based on proprietary architectures in which a micro-host software link offers access only to data residing on that same vendor's mainframe software. An open architecture link would allow users to access information from other software programs as well, but analysts say they believe such a link is not likely soon, if at all.

■ The inability to use the microprocessor in tandem with terminal emulation. Much of the technology available turns off the personal computer processor while emulating a 3270 terminal, which underutilizes the personal computer. "There needs to be a way to communicate between the personal computer and the mainframe and still use the power of the personal computer," Doyle said.

■ Vague definitions of micro-mainframe links. Analysts agree that many vendors are touting micro-mainframe solutions while the actual products offered might be anything from a coaxial cable to a complex mainframe software program. This has created misunderstandings among users and, thus, some apprehension.

■ MIS and end-user uneasiness. According to Golden of Wendy's International, much of the technology is "still too new and a little scary. People make decisions based on what is known at the time, and while I might feel insecure about it, it seems the responsibility of vendors to take away that insecurity if they want to sell a product."

IBM's recent announcement that its LU6.2 protocol will be available at the personal computer level has created high hopes among users of micro-host links. IBM's Advanced Program-to-Program Communications (APPC) is said to offer program-to-program processing that will make full use of the personal computer as an intelligent terminal while connected to a mainframe. Finally, users and analysts hope LU6.2 will offer a solution to integrating distributed systems and will become the industry standard for communications.

It will take years, before the full benefits and effects of LU6.2 are felt. "There are not enough pieces yet of LU6.2 to put it all together," said Baghai of McCormack & Dodge. Its full potential will not be realized, he added, until it can be fully supported on IBM's Token-Ring network, which will support APPC.

LU6.2 is creating "a lot of consternation," Kalmus said, with potential users and vendors wondering if they should "go with the standard or wait it out and see what develops, how IBM promotes and supports it. People will be trying to work out new strategies and decide which products will best fit what the users want. I don't see any clear trend emerging until the end of the year."

Some say the advance of emulation products and LU6.2 will shift the role of the mainframe. "Most companies are moving toward the mainframe as data base machines, as a depository of information, rather than classic data processing machines, with the personal computer doing the legwork," said Fredenburg of Simmons Precision.

"Over time, I expect to see the mainframe become more of a file server and large data base server for a number of intelligent devices linked by a network, as well as controlling access to host data," Doyle said.

"With the development of LU6.2, the mainframe doesn't need to supply all the processing power, especially with the IBM Personal Computer AT and the Intel Corp. 80386-based machine that is supposed to come next year from IBM, at your desktop," Doyle added.

IBM's protocol is not expected to be the solution to all existing problems with micro-host communications, however. "As personal computers become more powerful," Kalmus said, "the focus will be on software development [to facilitate micro-mainframe communications]. Also, workstations in the future will come with some kind of micro-mainframe communications capability built-in. But most important, MIS has to decide how much data is going to be transferred, what kind of security will be needed and how to handle different people working on the same data base at the same time."

A direct micro-mainframe link will not necessarily be the end-all answer, Doyle said. "It might be more efficient in the future to have a third level of mid-range processing handling data requests between the PC and the mainframe."

Said Baghai: "I don't see the terminal emulation board as an absolute means of linkage two years from now. I think local-area networks will take over, with gateways to the host, providing a means of access to the mainframe data base from anywhere in the network."

But the biggest hopes are for LU6.2 and the Token-Ring network. "I do a lot of work with telecommunications and local-area networks," Baghai said, "and I'm really excited about tying all this together in a consistent method.

"There's a lot of faith in the token ring to tie in a lot of different systems that can carry on dialogues between various pieces of hardware. Now we're getting to the point that the tools are there for this to be a reality, and the costs can be justified. We are just now on the verge of having all the pieces together to make that happen, and micro-to-mainframe links are just one part of that overall picture." ■

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FORECAST

Semiconductors

Fear and loathing on the comeback trail

By Maura McEnaney

The semiconductor industry will long remember 1985, and most in the industry fervently hope that the depressing news of the year can be filed away as history.

At the outset, predictions from the Semiconductor Industry Association (SIA) said 1985 would bring 22% growth in sales. Twelve months later, more than 60,600 jobs had been lost. Holiday shutdowns, wage reductions and salary freezes became almost commonplace. Announcements of layoffs and quarterly losses among chip firms dominated the headlines. U.S. chip sales plummeted by 28%. The year 1985 was labeled the worst in the industry's history.

As 1985 progressed, some companies could hang on no longer. Among them was Mostek Corp. of Carrollton, Texas. Once labeled an "industrial darling" and a leader in the 64K-byte random-access memory (RAM) market, Mostek closed its doors in October. Weeks later, parent company United Technologies Corp. sold Mostek to Thomson S.A. of France for $71 million.

The industry was stunned. How could a year that started out looking so rosy end up to be such a bust?

In fact, as the year went on, more and more chief executives chimed in with the view that 1985 was worse than even the earlier recessionary busts of 1975 and 1981.

Executives at the nation's largest semiconductor firms admitted they were taken by surprise. Sales within the computer industry — which absorbs about 40% of chip sales — flattened out. At the same time, the executives said, a shortage of chips during the 1984 boom year caused end users to stock up on semiconductors. As fewer end products went out the door, inventories piled up. Demand dried up and prices fell. Through it all, Japanese competition escalated.

At the SIA annual forecast dinner, mournfully labeled "the last supper" by National Semiconductor Corp. President Charles Sporck, attendees were not looking for an explanation of the past but an answer to the pressing question, "How much longer could it all last?"

Industry forecasts for 1986 range from the SIA's optimistic 18% increase in worldwide sales over 1985 to a more moderate 9% estimate from Dataquest, Inc. in San Jose, Calif.

According to the SIA, 1986 will bring a dramatic turnaround in worldwide sales, as the excess inventories built up over the past year begin to dwindle. In October, the association predicted that worldwide chip sales for 1985 would total approximately $21.6 billion, well below the 1984 total of $26 billion. Sales should continue to increase 23% and 22.6% during the next two years, respectively, the SIA noted, bringing the industry up to $38.4 billion by 1988.

The semiconductor industry was stunned. How could a year that started out looking so rosy end up to be such a bust?

Results of fourth-quarter chip sales, due to be released in the next couple of weeks, could be an indication as to whether or not recovery is on the way. And by as early as October,

ILLUSTRATION BY ROB SAUNDERS

some hope appeared to be emerging.

The SIA's monthly measure of new orders hit the highest point in more than a year during November. The month's book-to-bill ratio of 0.9 indicated that for every $90 of new orders received, semiconductor manufacturers shipped $100 worth of chips. The November statistic exceeded an earlier high of 0.82 in October and a low of 0.65 in January. Current orders remained 21% below year-ago figures, the SIA said.

'Hope amidst the gloom'

According to Dataquest analyst Howard Bogert, the increased bookings bring forth "some faint glimmers of hope amidst the gloom," currently pervading the industry.

"It's hard to imagine it could get any worse," said Larry Hootnick, senior vice-president at Intel Corp., which this year announced approximately 2,300 layoffs. Further worldwide layoffs are also expected, pending fourth-quarter results, the company announced in the fall.

During the third quarter, Intel shocked industry watchers by announcing it would discontinue manufacturing dynamic RAM chips. The dynamic RAM market, pioneered by Intel and other U.S. chip makers, has been quietly absorbed by Japanese manufacturers able to produce the chips for less.

Even though U.S. firms had long been aware of the Japanese infiltration into the dynamic RAM market, industry observers were shaken by the Intel announcement.

"That was the final blow to us," Hootnick said. "It was a sad affair."

Talk to some industry veterans and they will tell you they have seen it all before. Semiconductors are a volatile market, they will say, quickly pointing to 1975. Then, like now, billings were down by 30% — but the market was one-tenth of what it is today. By 1982 the industry rebounded with the popularity of video games and the emergence of the personal computer. Recessions, those veterans will say, are just part of the business.

"The high peaks and the deep troughs will continue throughout the industry," according to Michael Kubiak at Kidder, Peabody & Co. Kubiak, formerly a member of the SIA's statistical team, said he believes 1986 is too early for a resurgence in the chip industry. Nevertheless, "the growth of the industry will continue through the end of the decade," he said.

Chip makers themselves tend to take a more realistic approach. "This is no longer a recession, it's a depression," said Edward Neubauer, senior vice-president for marketing at NEC Electronics, Inc., the U.S. subsidiary of Japan's NEC Corp.

New strategies for chip makers

The depression of '85 brought forth some new strategies from the chip makers, which hope that new products and increased research and development efforts will allow them to hold on to their dominant position in the erasable programmable read-only memory (EPROM) market.

"We are in a period of refocus now," according to Bob Andrews, director of new products at Zilog Corp.'s components division. Zilog, once a leader in the microprocessor market with its Z80 chip, has moved into other arenas, including embedded designs that can be used in products such as disk drive controllers. The company is also targeting the lucrative military market.

Although it is a subsidiary of a Japanese firm, NEC is not immune to the chip industry crisis. Japanese firms have felt the pinch of the worldwide semiconductor slump, but not as severely. Employment at Japanese chip firms dropped 5% in 1985 compared with 19% in the U.S. NEC would not announce year-end figures, but Neubauer said the firm expected to finish 1985 at about 27% below previous year sales.

"We will remain in the commodity dynamic RAM and memory market," Neubauer said. But the company will pursue what is known as the application-specific standard product market, where chips are made for specific products.

"Chip companies are adopting a narrower focus," Dataquest's Bogert said. "Instead of a mass market, they are looking for a boutique market for their chips."

> ***'It's hard to imagine it could get any worse.'***
>
> — Larry Hootnick
> Intel Corp.

Companies are also betting on product introductions to stir up business next year. At Advanced Micro Devices, Inc., which lost $15 million during the third quarter — a 136% change from the $42.1 million earned for the same period in 1984 — a succession of product rollouts is designed to increase visibility and lift spirits.

Still no layoffs

Although perhaps one of the hardest hit by the downslide, Advanced Micro Devices has adhered to a no-layoff policy. Shutdowns and pay cuts were implemented, however.

Launched in October, Advanced Micro Devices's Liberty Chip program unveils a new product introduction every week for a year. More than 63 different circuits — half of them proprietary products — will be introduced during the program, a company spokesman said.

But it is end-user products, and not new chips, that are key to the industry upswing, some say. "The saving of the semiconductor industry will have to emanate from the customer," NEC's Neubauer said. Just as video games and personal computers boosted the market in years gone by, the chip industry needs a driving force to keep it going. But according to Neubauer, "There is no product on the horizon today that can fill that void."

Cash in on R&D

This year NEC hopes to cash in on its ongoing R&D efforts, with the introduction of some 84 products. "The market is willing to accept new products now," he said.

The 32-bit microprocessor is one product on which many in the industry are willing to pin their futures. Although pioneered almost two years ago by Motorola, Inc., different versions of the 32-bit chip are on the drawing boards of most major semiconductor firms.

Intel's heralded announcement of its 80386 chip last summer had the industry buzzing with fervor about the prospects of the microprocessor. Zilog expects a 32-bit chip to be in production by 1986. NEC and Advanced Micro Devices also plan introductions of a 32-bit microprocessor sometime this year.

But bringing out a me-too product like the 32-bit processor could be detrimental to companies trying to hold the bottom line. "You have to consider the massive investment that will go along with bringing that product to market," Zilog's Andrews said. Intel's investment in the 80386 chip was estimated to be about $100 million.

No life jacket for industry

According to Michael Gross at the market research firm International Data Corp. (IDC), the growing popularity of 32-bit systems will not be the industry's life jacket. "AT&T's Unix is the most important component of the 32-bit system," not necessarily the chip that is used in that system, Gross said. "As Unix becomes the standard, the strategic value of the microprocessor itself will be diffused." Dataquest predicts the now minimal demand for the 32-bit microprocessor will begin to ramp up this year, but sharp volume will not occur until the late '80s.

"In 1989 we will probably hit volumes equivalent to what we're shipping today in the 16-bit market," Andrews said. For Zilog, the worst appears to be over. "We had our bottoming out during the first quarter of '85," according to Andrews, who expects a 7% to 10% industry growth this year. But, he said, "Even with an increase of 19% to 20%, you are going to have to ship 40% to 50% more product because of the decrease in selling prices."

> ***'This is no longer a recession, it's a depression.'***
>
> — Edward Neubauer
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Focuses are also changing at National Semiconductor Corp., which was pummeled by the industry downturn. The company lost $53 million during its first quarter ending in September, compared with a gain of $35.9 million in the same period a year ago. The company took 39 shutdown days and laid off more than 2,200 employees in 1985. Edward White, vice-president and analyst at E. F. Hutton & Co., predicted National Semi could soon announce losses of up to $41 million for the quarter that ended in December. White also estimated the company will lose $140 million for fiscal year '86 ending in May.

"We expect next year to be in the 10% to 15% growth range," said Gary Arnold, National Semi's vice-president of finance. "We started to see some improvement this fall as inventories reached zero in the user world." But what the future holds is still anyone's guess, Arnold noted.

"We're all heavily involved in R&D and are trying to bring in more unique designs that will create an insulation from the onerous market tactics of our competition," Arnold said.

Competition in this case does not come from other U.S. chip manufacturers, but from the East toward Japan, where much of the industry's hostility has been focused. Frustrated by what they called price undercutting and market flooding, the U.S. semiconductor industry is rallying around a cry for fair trade practices with Japan.

"Our industry is under siege," National Semi's Sporck told a San Francisco trade show audience in November.

According to Dataquest, the Japanese control 41.4% of the world's semiconductor market, while the U.S. holds 46.9%. Within the integrated circuit market, the U.S. holds a 55.2% share and Japan holds 37.5%, compared with the U.S.' 72.9% in 1977. "If current trends continue, the Japanese will easily be the world leaders in semiconductor and integrated circuit sales soon," Sporck told the audience.

In October, three chip firms — Intel, National Semi and Advanced Micro Devices — filed an antidumping petition with the U.S. International Trade Commission and the U.S. Department of Commerce against Japanese imports. The petition charged that the Japanese were selling EPROM chips at below manufacturing costs, thereby violating U.S. trade laws. According to the petition, 256K-byte EPROM chips sold for $17 each a year ago. In August, they sold for less than $4, well below what the Japanese claim is a $6 production cost.

The petition also asked that the U.S. impose import duties on Japanese manufactured chips.

In another complaint, involving Boise, Idaho-based Micron Technology, Inc., the Commerce Department last month found the Japanese were guilty as charged, recommending import surcharges for 64K dynamic RAMs sold in the U.S. A third ruling on a petition from the SIA has yet to be released.

"If the dumping cases are found to be valid, there may be tariffs on EPROMs and dynamic RAMs. However, that issue is being negotiated now," said Michael Maibach, government affairs manager at Intel.

Government aware of problem

Increased pressure from semiconductor executives has alerted the Reagan administration to the trade problems. And it appears as though the Commerce Department is willing to take serious steps to preserve the nation's leadership in the chip business. "The importance of semiconductors is not underestimated by government," according to NEC's Neubauer. "It's become the crude oil issue of the '80s."

The U.S. government is now preparing its own antidumping complaint against Japanese firms, accusing them of dumping 256K-byte dynamic RAM chips in the U.S. Plans of that complaint were learned in December while U.S. and Japanese governments were in the midst of semiconductor industry trade negotiations.

But trade issues are not the only global trend affecting the industry

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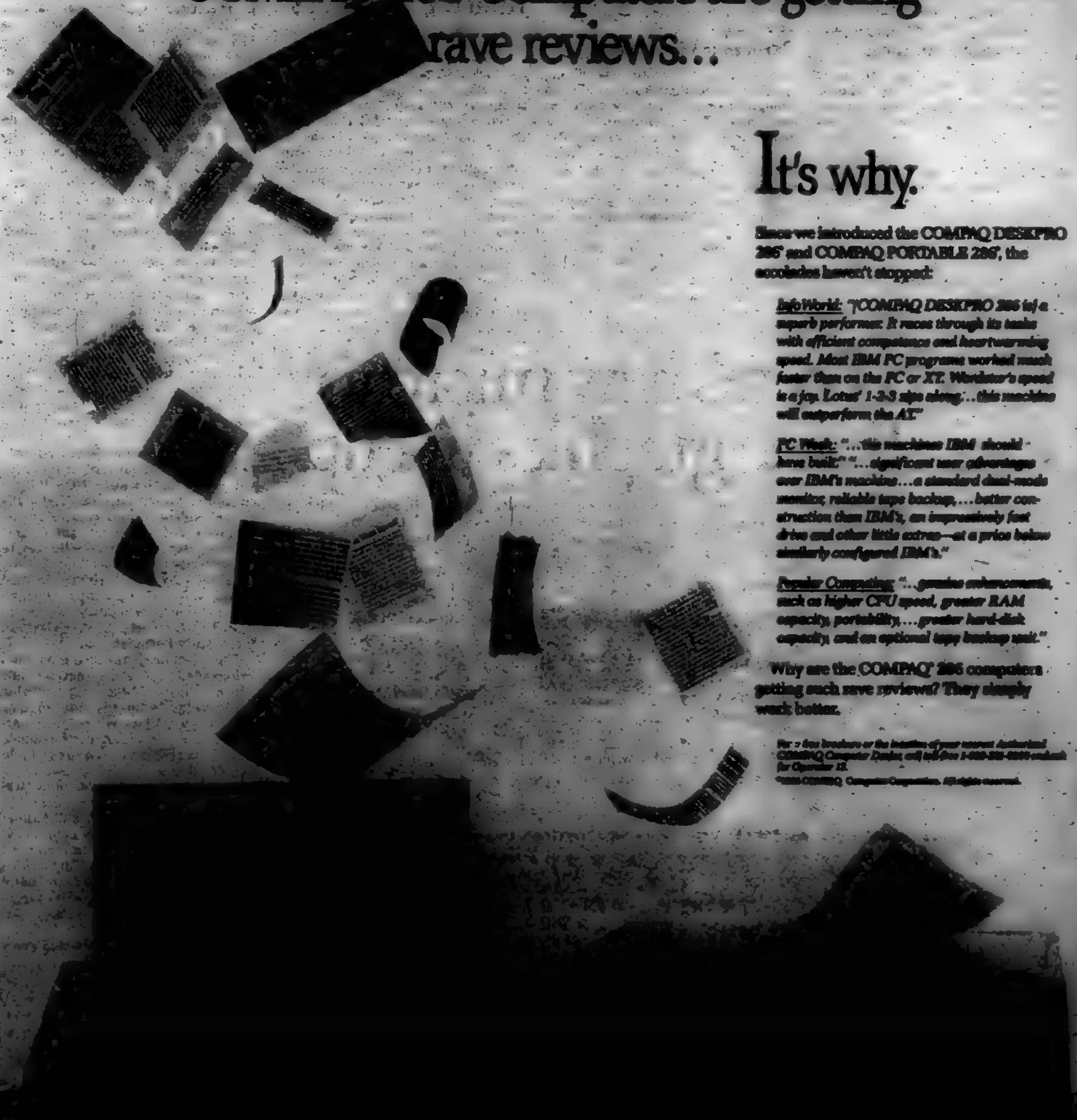

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today. According to IDC's Gross, "I believe the large consumers of the semiconductor parts over the next few years will increase their capacity to produce semiconductor parts."

Changing structure

Chip makers, too, are changing their structure. "Given the choice, the larger chip companies would prefer to be out of the memory business and have a collection of parts within their catalog," Gross said. But getting out of the commodity business is often a tough decision, simply because it represents about 60% of their business, he said.

Will there be more Mosteks? Gross does not think so. "Mostek was a pure memory business, and that is exactly where the industry has been hit the hardest."

To ensure survival, semiconductor companies need to create joint ventures with electronics companies, according to Gross. "Control at the end-user level is the key to success," Gross said.

Enough to keep a firm going

A single joint venture with one electronics conglomerate could be enough to keep a company going, he explained. "There really aren't that many electronics companies. Big companies are getting bigger. There might be 20 companies out there that consume 60% of the parts."

The year 1986 will certainly be a challenge to the semiconductor industry.

But vendors remain positive. NEC's Neubauer said he believes that, should all else fail, "We will have to work our way out of it — just like the old days."

Chip technology heartens makers

In and around Silicon Valley, semiconductor firms are looking at new technologies that they hope will spur the industry's resurgence.

Garnering the attention of industry vendors and analysts is the potential replacement of silicon chips with gallium arsenide, a crystalline substance that can increase the efficiency of chip transistors. Transistors built using gallium arsenide instead of silicon have a faster switching speed and use less power.

Companies are also putting more emphasis on a process called CMOS — complementary metal oxide semiconductor — which generates less heat and requires less power to run than widely used NMOS — N-channel metal oxide semiconductor — and bipolar construction processes.

"It's probably late to say that 1986 is the year of CMOS," said Andrew Rappaport, president of The Technology Research Group, Inc. in Boston. "It is very definitely the here and now."

Once thought to be slower than the more popular bipolar or NMOS circuits, CMOS has evolved to be a faster process, enough to take care of the majority of applications on the market today, Rappaport said. In the past, those circuits could not be built as densely or as easily as the NMOS or bipolar chips.

Although there has been some talk of a switch toward gallium arsenide chip construction, the technology is still in its early phases, according to Rappaport. "Gallium arsenide is where CMOS was 10 years ago. To make integrated circuits, you need to have high-quality consistent material. Gallium arsenide is not there yet." But, Rappaport said, "It is certain to play a role five to 10 years from now."

By 1990, National Semiconductor Corp. expects about half of its chips will be produced using CMOS. But according to Gary Arnold, National's vice-president of finance, gallium arsenide is still too far into the future. "It's too expensive and is limited to high-speed applications," he said.

"Obviously the trend toward CMOS will continue until it becomes the dominant technology in the industry," Advanced Micro Devices, Inc.'s Andy Rothman said.

This year may also bring new developments in user-programmable CMOS chips. User-programmable chips today primarily use bipolar technology. "1986 will be an important year for user-programmable CMOS," Rappaport said. The Technology Research Group estimates that the user-programmable CMOS chip market will grow from about $5 million in 1985 to about $25 million in 1986. Bipolar semiconductors now need more power and can only be programmed once. The CMOS chips require less power, they are more complex and can be easily reprogrammed to facilitate testing purposes.

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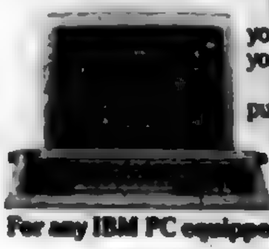

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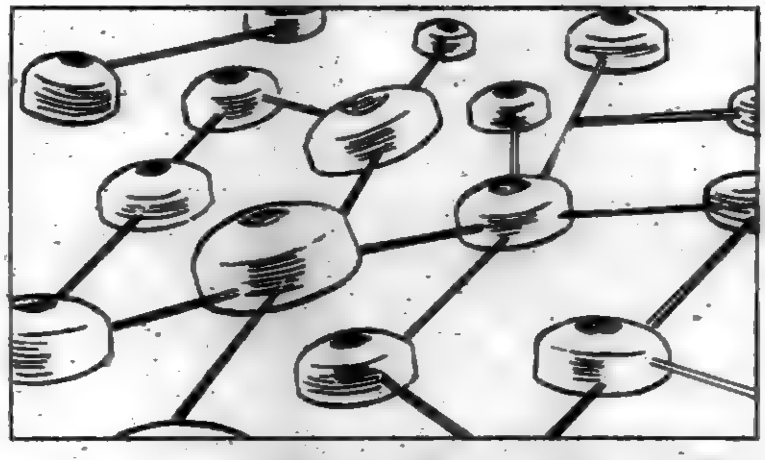

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Have users caught the fever?

By Eddy Goldberg

When it comes to applications software, the subject of integration raises eyebrows, interest and sometimes tempers. It never bores. Everybody has an opinion on integration and an increasing number of vendors are now offering integrated product suites. Yet integration itself is not defined in any clear and easy way. If users and prospective buyers feel lost, they are not alone. Even vendors are confused about how their competitors' products are integrated.

"Integration is one of those terms like fourth-generation language, distributed processing or artificial intelligence," said Frank Dodge, president of McCormack & Dodge Corp. "It has a thousand different meanings."

Three or four years ago, the major applications vendors promised to integrate their applications, and the rush to market began. As 1985 ended, most of them had their integration schemes in place and were delivering their product suites, either whole or in part. But since each vendor began the evolution toward integrated applications with a different product base, the result today is a number of different approaches to the challenge of integrating applications.

The vendors, however, do share some common traits. "Most vendors are trying to do two things: deliver tools to the end-user community and integrate their product lines more and more," said Joe Southworth, vice-president of the human resources, product planning and financial divisions at Management Science America, Inc. (MSA) in Atlanta. "Philosophically, we're all trying to reach that user community with integrated software."

When looking at applications integration, there are some fundamental issues to consider. Is a single data base management system (DBMS) required for applications to be tru'y integrated? Or, is it enough to integrate at the user level with common tools used across applications and simultaneous, transparent access to multiple data bases?

Do users really want an integrated, single-vendor solution or the flexibility to combine products from many vendors? Will users afraid of becoming locked in to one vendor spend valuable MIS time and resources building bridges and interfaces between different vendors' applications to keep their options open?

From where is the impetus for integration coming? Is it from vendors trying to sell more products? Or are these products a response to user demand for increased productivity and new ways of using information to gain a competitive edge?

> ***Since each vendor began the evolution toward integrated applications with a different product base, the result today is a number of different approaches.***

Any perceived similarities in the different vendor approaches to integrated applications are more from an end-user point of view than from an architectural or design approach. The outsides look more alike than the insides, observers have said. Yet, many feel that for most end users, this is enough. Dodge is one of them.

"One of the major areas of integration is for the user," he said. "If users see the same interface across different applications with the same kinds of screens, protocols and procedures, and if they can get at data bases from different applications in the same way, that is a degree of integration that is very important. Whether the internals of the programs allowing that to happen are identical, I don't think is an issue."

For example, MSA's approach to the challenge of integration is to unify its applications through a common user interface, a top-layer environment known as Information Expert, which the firm described as fourth-generation technology that uses expert system components. Despite the fact that its applications are not linked through a common DBMS, the company claimed there is no redundant data storage.

> **"A firm's history is an all-important factor when considering the pros and cons of the different vendors' approaches to integration.**

According to Dennis Vohs, executive vice-president at MSA, "We want a common tool to be used across applications, and Information Expert is our tool for report writing, screen generation, updating systems and linking mainframes to micros. Information Expert works at a top layer, but it's also deeply entrenched in the architecture. It can be used in a very complex manner by a software developer or in a very easy manner by a casual end user."

Vohs said that MSA takes the idea of cross-application data access across single-vendor lines. "M&D coined the term 'borderless retrieval,' but it worked only for their applications. What we're looking at with Information Expert is the ability to go across the border of an application, across a whole product line into another vendor's or a customer's own applications, as well as our own."

Where MSA's approach to integration is essentially a top-down approach, Cullinet Software, Inc.'s could be described as bottom-up. Some end users said they feel that for applications packages to wear the banner of true integration, they must be linked through a single data base management system, a la Cullinet.

In describing the path that Cullinet followed on its particular march toward integrated applications, company officials said they began with the IDMS DBMS and used the firm's Application Development System/Online development tool to build applications on top of the DBMS. More recently, Cullinet has acquired applications from other vendors and has on occasion even bought a vendor outright, as it did with Bob White Computing & Software, Inc. for banking applications.

Cullinet claims that all its applications tap into the same data source, and that the DBMS allows users to access the data easily. Every change made in the DBMS is reflected in all the applications, thus eliminating the problems associated with modifying a suite of applications to reflect changes in the type of data a company maintains or how it is used.

Software International Corp. offers its own version of integration, which one analyst described as falling somewhere between MSA's top-layer interface and Cullinet's DBMS-based approaches. Software International's recently announced Intelligent Architecture design seeks to extract all the nonapplication-specific code into shared modules, such as those containing teleprocessing monitor and DBMS logic, with common user-oriented functions, such as query and security, residing in a shared, top-level system manager.

Although it has not yet fully achieved this goal, Software International has made solid progress toward it and the company is working hard to realize its vision of integration.

Barbara Siebert, a senior MIS analyst at ASEA, Inc. in White Plains, N.Y., found Software International's Masterpiece product the best vehicle for integrating her firm's applications. However, it has not been installed at ASEA, so is not yet proven in battle. It is the newest of the vendor's offerings to enter the fray.

"We chose Masterpiece because we already had several Software International packages and were interfacing them to one another. Masterpiece will tie them all together," Siebert said. "All the I/O and peripheral operations will be separated from the actual data processing operations. This means you can adjust one portion without affecting another. Also, installing additional packages is very simple."

Looking ahead and echoing the words of M&D's Dodge and MSA's Vohs, Siebert said, "As far as I'm concerned, integration is the way to go. Many users have to use two or three different packages and need the ability to float in and out of them. By having a fully integrated system where your screens and data editing are similar, there is a lot less confusion. This is as important for users as it is for MIS."

However, as 1986 begins, no one vendor's approach to integrated applications has won the day. A firm's history is an all-important factor

If you market software, don't miss February's Computerworld Focus. We're turning the entire issue over to your business.
We'll start by taking a good hard look at software and giving MIS/DP professionals the answers they need for some of the toughest problems they face every day. Old problems and new. Like fourth generation languages. DBMS and applications packages. Artificial intelligence. Plus the very real problem of keeping up with user demand while shifting to new technologies.

We'll zero in on software maintenance.
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QUME QVT 101

when considering the pros and cons of the different vendors' approaches to integration. Which approach is best depends on a number of factors it can vary tremendously from one company to the next. The issue might more accurately boil down to which is most appropriate for a given company's needs. The decision must take the largest possible view.

"If you look at the evolution of applications within a large company, you see a very heterogeneous pattern," said John Dacey, vice-president of Systems Engineering, Inc. in Weston, Mass. "They are from different time periods, technology bases; some may date from the mid-1960s, some from last year; there is Cobol, fourth-generation languages and other software development tools like application program generators. How a company can tie some of these systems together to provide more high-quality information is a hard problem. One approach is to replace all the packages and buy a one-vendor solution."

Robert Swetavage, MIS manager at Racal-Vadic, Inc. in Milpitas, Calif., did just that. He chose Cullinet's offerings as the solution for his particular needs [CW, Jan. 28], replaced both his hardware and software and started from scratch. He now has seven Cullinet packages in production running on an IBM 4341 Model 12 and two more in test on an IBM 4341 Model 10. Swetavage stressed the need for a commitment from top management when considering integrating aplications and said there were other issues he had to consider besides just the hardware and software.

"You can rub up against the culture of the company. This has to be balanced against the benefits you see from integration. Is the culture of the company capable of absorbing an integrated environment? Some companies are too freewheeling, too independent to make it work properly," Swetavage noted.

"Also, you have to be dedicated enough to the idea to take it in steps. You need to understand the basic module, the company's needs and how it all connects. You can put your finger in one module and mess up another one," he explained.

Still, in Swetavage's eyes, the installation of the 4341s and the Cullinet software has been a success. "We began the process in summer 1982. We wanted the best software on the market. It was IDMS at the time, and I still think it's the best. The others didn't really have an integrated environment. They looked like they were written with bridges."

The final test will come in the next couple of months, when Swetavage implements a postinstallation evaluation to determine if the return measures up to his expectations and the vendor's claims.

> **‘Integration is sexy, but you have to question what value it will have within the business.’**
>
> — Daniel R. Pfau
> Index Systems, Inc.

Despite the ascendancy of integration to the level of buzzword, moving to integrated applications in large-scale systems is not always the best idea for companies, according to many industry experts.

The value of integration

"You have to start by looking at the business, at your objectives, and let that drive your decision whether to integrate," said Daniel R. Pfau, principal at Index Systems, Inc., a Cambridge, Mass., consulting firm. "Integration for integration's sake will not get you anything. Corporations need to look at what kinds of information need to be integrated and to look at where the value would be derived from integration. There's a danger from overintegrating, and you may end up in a technological quagmire. Integration is sexy, but you have to question what value it will have within the business," Pfau said.

While some firms are in a position to replace their current applications, other firms may want to keep what they already have and make it work together. "In many companies," Dacey said, "the applications packages are a mix of commodity, off-the-shelf types, while others are highly specialized. They look for tools that will bridge the different data bases. They'll look for a DBMS, or some way to integrate their disparate applications."

Jack Keen, principal consultant for Input, a market research firm in Mountain View, Calif., also warned the user to beware when considering the purchase of integrated applications. "There is always a fair amount of hype in the software market. The user's challenge is to get beyond that hype and understand first what it is to be integrated, and then how a product is to be integrated.

Keen noted,"The benefit of software integration is that it allows management to get a better payoff from its investment in automation. There is greatly enhanced productivity because the integration packages force the different departments to talk to each other; it forces standards."

"But not everyone should consider integration," he said. "Buying software to force those changes could be a mistake. Departments tend to be isolationist. Some corporate cultures have individual departments that are entities unto themselves and have

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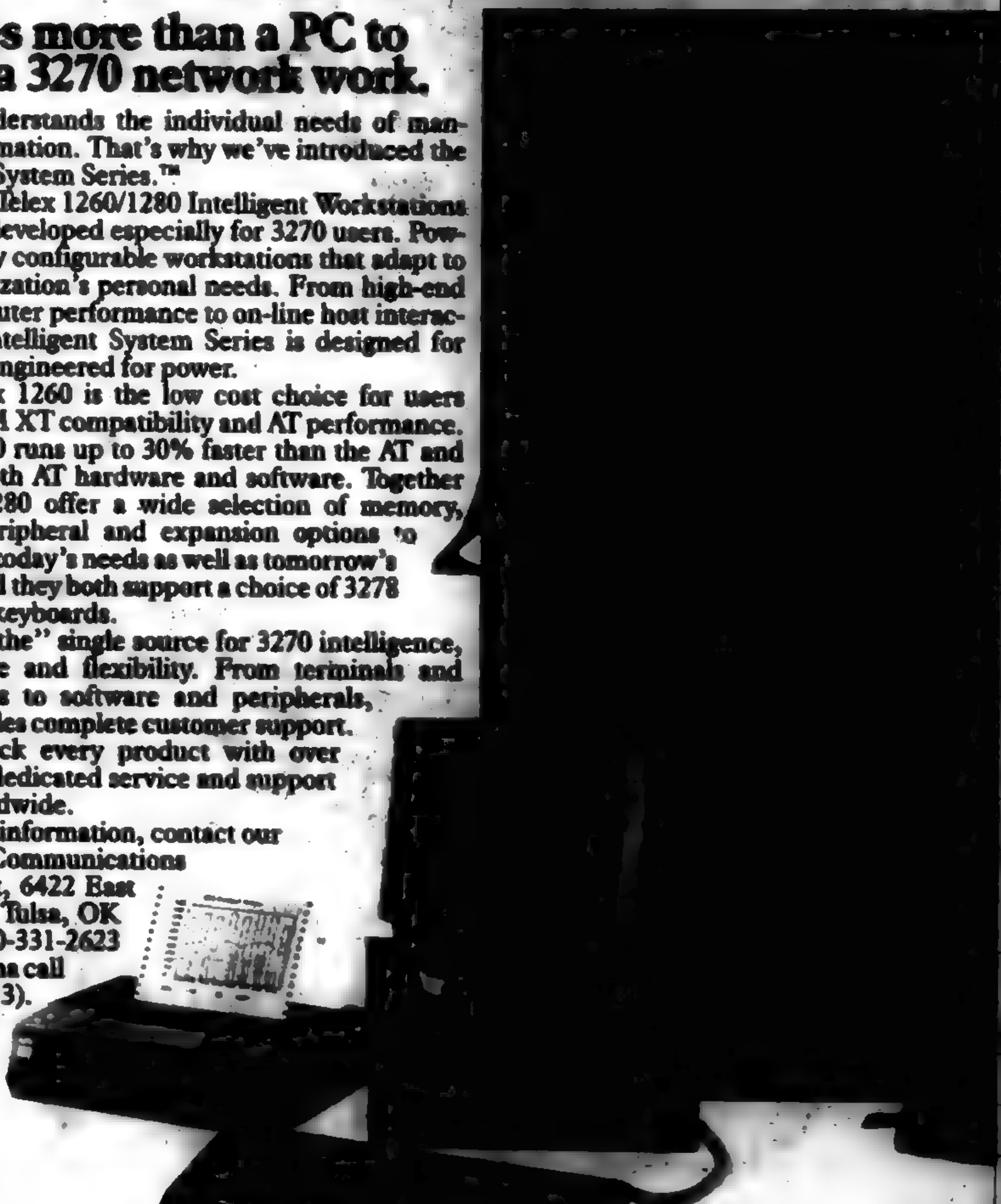

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been for decades. There can be tremendous resistance to sharing."

Keen said he thinks that vendors today are still doing more missionary selling than beating eager user converts away from their doors.

But he also pointed out that the vendors would not be enjoying their present level of success unless there was a real need on the part of users to integrate some of their applications.

End user as instigator

T. Capers Jones, chairman of Software Productivity Research in Acton, Mass., gives more credit to the end user as the instigator of the move to integrate applications. "There is more pull from users than push from vendors. The time has come for vendors to realize that most companies have multiple hardware vendors and software packages. The most urgent need is the ability to interchange data across hardware and software developed by different vendors."

So what do end users really want? Frank Dodge thinks he knows. "Users want a system that works. They want a support team so when they call up, they can get answers. They want it to be efficient enough on a machine so that they're not getting charged a lot of money by data processing.

"They want it to have a functionality but not be so flexible that it is too complex to use. Users want pretty straightforward stuff."

As to the question of which vendor approach best meets the needs of today's users, only time and the market will tell.

And whether the end users or the vendors are responsible for the current spate of integrated applications solutions, integration — like rock'n-'roll — is here to stay.

> ***'The time has come for vendors to realize that most companies have multiple hardware vendors and software packages.'***
>
> — T. Capers Jones,
> Software Productivity Research

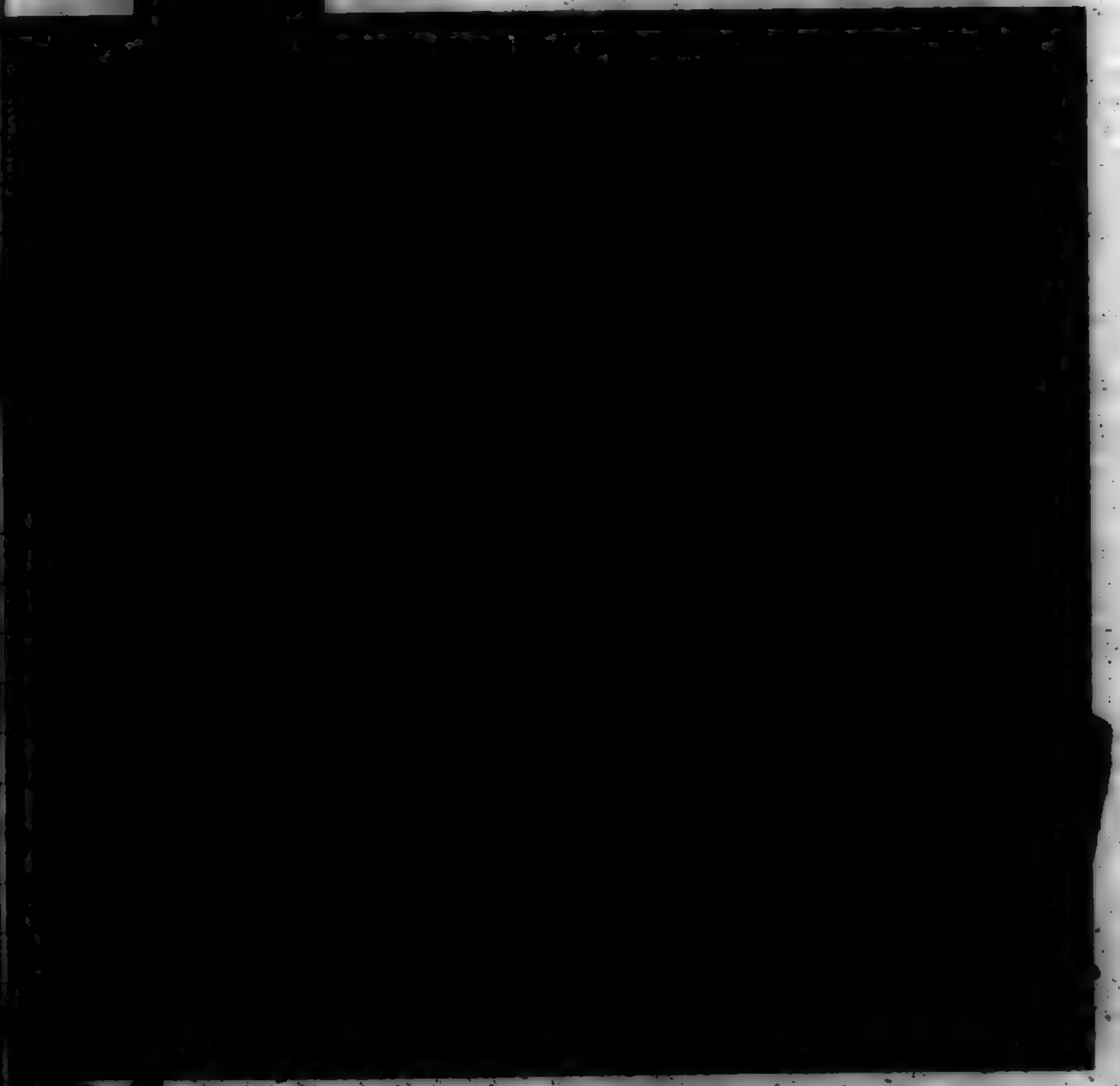
[illegible] *Technical Office Protocol* [illegible] *people look at IBM* [illegible] *But the* [illegible] *this year* [illegible] *in factories.*

"In 1986, the world is going to divide into opposing factions. IBM's Token-Ring announcement is not going to kill Ethernet, so there will be a definite Ethernet camp continuing as well as a Token-Ring camp developing. Vendors will work both camps. By the end of the year, the real interest will be in the factory automation market. MAP products will start to emerge as the area of high growth. There will also be a lot of people going into the business of building specialized servers — file servers, print servers, things like that."

— Ken Thurber, president,
Architecture Technology Corp.

"Not only is there a predictable crisis in developing new applications, but there's an emerging crisis in the replacement of aging applications that have fallen into decay. There are some new tools and technologies that are enabling programmer productivity to be improved, but technology transfer — the rate at which companies learn and adopt new methods — is not very good. If software engineering continues to be a back-burner activity, underfunded, undersupported, without proper attention or proper capital equipment, then the problem will fester for a long time.

"The offloading of professional software development onto end users is [illegible] *to the problem. There are many classes of software which end users will never be able to develop themselves. A* [illegible] *pilot will never write the software that interprets the radar* [illegible]



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A toast to invention

SOFTALK
John Gallant
CW Senior Editor

As one year ends and another begins, it may be refreshing to note that not all the programming gurus in the computer world are spending their time coding vital operational systems, and not every vendor is developing a spreadsheet clone or the umpteenth fourth-generation language.

What follows is just a small sampling of some of the less businesslike product announcements *Computerworld* has received. Whether these software offerings are still available — ah, the whims of the free market — is anybody's guess.

■ Don't pass up the only chance you'll get for the next 76 years to witness that glowing ball in the sky — yes, Halley's Comet. With the help of Sourceview Software International's Halley's Comet Locator ($49.50), you can pinpoint the comet by simply entering your latitude and date of observation. The software's star map will help you "catch the comet before it's gone."

■ This may be just a tad late, but Random House Software's HO! HO! HO! package might have made your Christmas complete.

For only $19.95, you could have hopped onto Santa's sleigh and flown through "five fun-filled Christmas adventures" in either the elf (beginner) or gnome (advanced) mode.

■ If it's more than just the Christmas story you're looking for, perhaps Bible Research Systems' The Word Processor package is for you. The package contains the entire text of the Bible, and the company even offers a series of related packages that allow the reader to search, display, print, cross-reference and record the Bible.

Bible Research Systems also markets The Greek Transliterator, which allows English-speaking users to "comprehend the original wording and messages of Greek literature."

■ Staying with the religious theme, Davka Corp.'s Bar Mitzvah Compu-Tutor ($49.95) is a "personalized study course" for bar and bas mitzvah training.

The package offers the complete haftarah Hebrew text and appropriate melodies along with a bouncing ball that helps students follow each syllable.

■ For those who've longed to coordinate the mayhem on the gridiron, Xor Corp.'s The NFL Challenge allows you pseudo-coaches to build a football team and develop a strategy with which to stomp the opposition.

■ If you've ever cursed those who hoard all the publications at work, Ebsco Industries, Inc.'s Routing package may be the answer to your prayers.

Routing ($435) lets you gain control over the circulation of periodicals within a company and gives you "flexibility in printing route slips."

■ Got a green thumb? Ortho Consumer Product's Computerized Gardening package ($49.95) "makes it easier for home gardening enthusiasts to keep their plants healthy and happy."

Naturally, the package runs on Apple Computer, Inc. machines.

■ What's your sexual IQ? Challenge Software's Sexware may help you find out. With more than 200 multiple-choice questions, "you and your friends will be amused and educated as you check out your sex IQ" for $39.95.

■ And finally, if the new year has you in a philosophical mood, MIT professor Kerson Huang has developed an on-line version of the venerable *I Ching*, one of the oldest books known to man. For $69.95, the user can consult the *I Ching* "as oracle."

Let's raise a new year's toast to innovation.

Prime unveils PL/I compiler

NATICK, Mass. — Prime Computer, Inc. has announced a full-function PL/I compiler that runs on its superminicomputers.

The product conforms to the ANSI X3.53 1976 and ISO 6160 standards.

Previously, Prime had announced its PL/I Subset G compiler. That product included most but not all of the ISO- and ANSI-specified functions. The new PL/I compiler is source and object code compatible with the earlier product. PL/I can execute PL/I Subset G code at faster speeds; in some cases, there is an 18-fold increase in execution, according to Prime.

The compiler works with Prime's DBG source-level debugger and provides call compatibility with Prime's Cobol 74, Fortran 77, Pascal and RPG-II. All Prime compilers share the same interface to the Primos operating system . The PL/I compiler includes extensions that make it compatible with IBM PL/I compilers that use SELECT and LEAVE statements.

A version of the product that runs on Prime's 2000 series of superminicomputers costs $4,000. A version for Prime's 9000 series sells for $7,000. For $65 a month, a user can take out an optional maintenance service.

On-line retrieval package debuts

GRANADA HILLS, Calif. — Sterling Software's Dylakor Division has introduced an on-line information retrieval package that works with IBM's IMS data base management system.

DYL-Inquiry/IMS enables a user to build and store various inquiry routines. Also, a user can use inquiry parameters with a number of applications. It enables a user to use all IMS capabilities.

The product supplies security procedures so that a systems programmer can limit files, records or fields that a user can access. It was designed for use in an information center environment.

DYL-Inquiry/IMS works with IMS/DC and IMS/VS and runs under IBM's TSO. It costs $40,000. Maintenance services are available for 10% of the purchase price.

INSTANT ANALYSIS

"Acquisitions are strange. It takes a while to learn how to do them well. I don't believe in loading on a whole bunch of packages every year just to widen your product line. That approach is not going to be very successful."

— Frank Dodge, president, McCormack & Dodge

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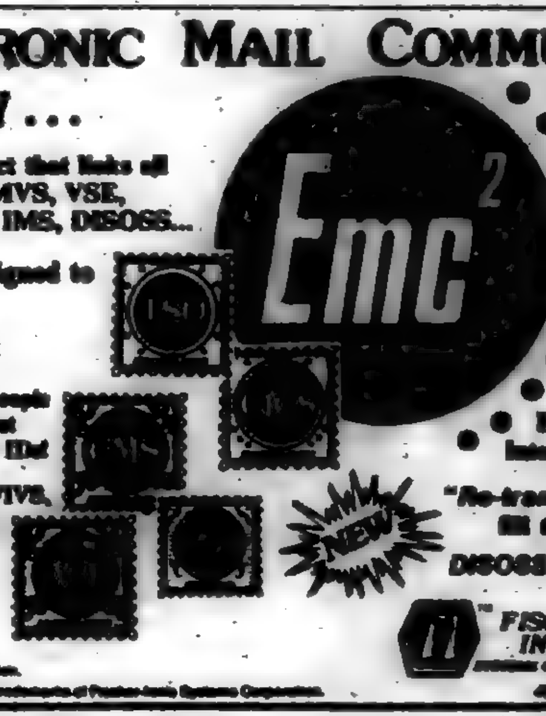

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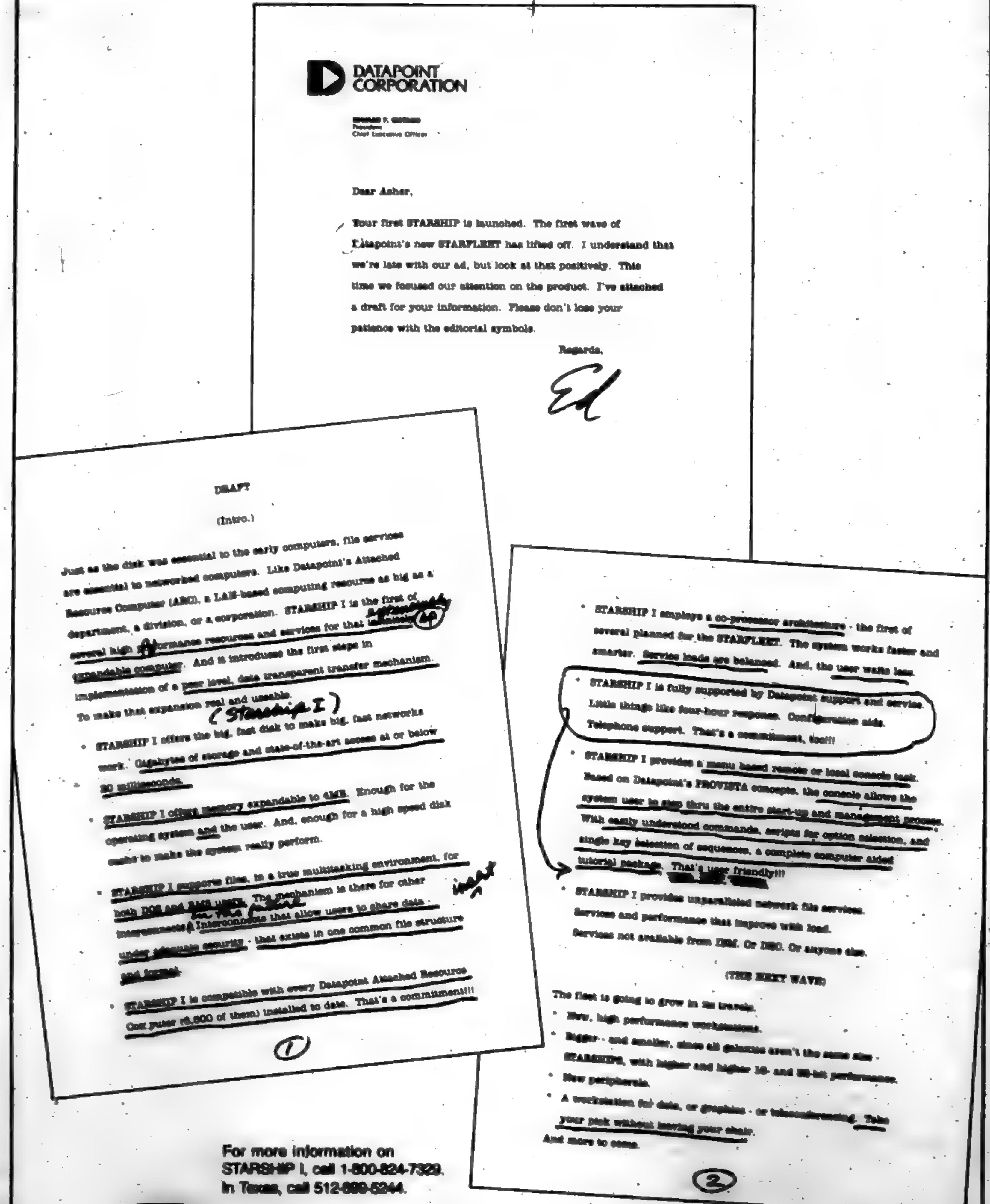

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MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Token of compatibility?

Let's start the new year on a note of mild speculation: Will IBM-compatible personal computers run without modification on the Token-Ring local-area network?

With hundreds of thousands of those micros installed in the large corporations that are now looking at the Token-Ring, this is not necessarily a trivial question. But because the Token-Ring comes from IBM and is currently in beta tests, it's impossible to get an official answer now.

Everyone agrees that the machines should run on the Token-Ring, and this may well be a total nonissue.

But maybe not. The last time IBM introduced a local-area net for micros, compatible systems weren't necessarily compatible. Compaq Computer Corp. — usually considered the standard-bearer in compatibility — had to revise the BIOS chip in its machines to accommodate IBM's PC Network.

A month ago I began calling various network gurus and industry executives to pose the question. The reaction was relatively uniform: After commiserating on the heavy burden of paranoia that journalists must carry through their lives, they all said: Why, yes, compatibles should run.

Of course, machines that should run frequently send computer staffs screaming over the edge into gibbering incoherency. And the experts did come up with several scenarios in which systems might not work on the Token-Ring.

"In our own experience designing cards for the IBM PC and AT, we find they don't always run on compatibles,"

See TOKEN page 97

Odesta adds Helix twists

Application environment available for Apple Mac

By Eric Bender

NORTHBROOK, Ill. — Double Helix, an application environment for the Apple Computer, Inc. Macintosh, was announced last month by Odesta Corp. The $495 package, an enhanced version of the Helix package first offered a year ago, will debut along with a runtime version.

Designed to exploit the Macintosh's graphics interface fully, the Helix family lets users handle applications building, data base management and other tasks through a set of seven basic icons and pull-down menus. Users can create applications by linking icons in a "visual flow chart," according to the company.

Based on a relational data base management system, Helix software lets users enter all data once and then use it anywhere in the system, with dynamic updating. Users may enter, query, edit and print information all from one window, without changing modes. "We wanted to avoid a modal environment; your head doesn't work in modes," commented Odesta President Daniel Chelfetz.

Scheduled for delivery last month to existing Helix users and for general availability this month, Double Helix adds passwords, custom menus, several global commands and the ability to use subforms (forms within other forms or lists within lists). Performance also has been optimized over that of Helix Release 2, Chelfetz said.

The package received good reviews from some analysts, although they suggested that its sales may be limited because it does not run on IBM micros. "It's a nice product, but they're stuck in a Mac-limited market," commented Michael Goulde of the Yankee Group in Boston.

Offering a runtime version was "somewhat apart from our original idea," Chel-

See ODESTA page 96

INSIDE

AST Research's add-in board combines features of four display adapters/97

INSTANT ANALYSIS

"AT&T has to decide how open the Starlan system is. They're doing very little to promote it as a standard."

— Gail James, CEO, Software Connections

Cygnet stays afloat by marketing separate Cosystem components

By Peggy Watt

SUNNYVALE, Calif. — After starting out at one end of the microcomputer market with its integrated voice/data workstation, the Cosystem, Cygnet Technologies, Inc. is chasing the other end of the rainbow by dismantling and selling the Cosystem concept piece by piece.

Cygnet's flexibility has kept the company afloat in a sluggish market, acknowledged Ken Dickens, marketing manager for the firm. Sometimes start-up companies "come up with grandiose plans and are not able to slow the engine" when the target market does not materialize, he remarked.

The $1,895, 2-year-old Cosystem is a telephone attachment for a Microsoft Corp. MS-DOS microcomputer system with software to integrate voice and data functions. Its features include a 1,200 bit/sec. modem, an on-line calendar, speed and redialing from a data base, a speakerphone and electronic mail between other Cosystems or to on-line services.

Today, the under-$100 component products are selling more widely and serve as an introduction to Cygnet as well, Dickens said.

"The decision was dictated by the condition of the market," said Federico Faggin, Cygnet founder and president. "It was not a difficult decision."

"The Little Black Book," released last April, was plucked directly from the Cosystem directory. Its data base of addresses and telephone numbers can be dialed by modem at the touch of a function key. The traveling computer user can also print out data base's contents, fold and cut on the

See CYGNET page 96

Computer Associates upgrades project management package

Superproject Plus adds analysis tools

By Peggy Watt

SAN JOSE, Calif. — Computer Associates International, Inc. this month will ship Superproject Plus, an upgrade to its year-old project management software, which allows users to tailor resource and task management features for many jobs.

The $495 package includes a resource calendar, reverse scheduling, sort-and-select codes for resource and task management, resource leveling with "what-if" analysis tools, and budget and cost management schedules, according to marketing manager Nancy Twomey.

Users can produce presentation-quality reports, create interactive Pert charts, graph the critical path method and trade data with other office programs like Computer Associates International's Supercalc3, Ashton-Tate's Dbase III and Lotus Development Corp.'s 1-2-3.

Superproject Plus' resource management section helps define resources, charts scheduling, graphs time-allocation needs and work hour assignments and can be graphed in Gantt displays. "You can take it to whatever detail you want," Twomey said.

"It's one awesome product," said beta tester Len Glauber, a project management trainer with AHRD Associates, Inc. in San Francisco. Glauber found the most noteworthy new features to be the capability to review multiple products, resource leveling and the package's report-generating ability, particularly the Select capability that controls report design.

Very few project management programs have anything comparable to Superproject Plus' individual resource calendar, which charts a worker's participation in multiple projects and the time spent on each and adjusts the assignments with each scheduling change, Glauber added.

The new release replaces both Superproject 1, released in December 1984, and Superproject 1.1, released in July. Users of Superproject 1 can upgrade to the newest release for $50 and the return of their original disk; 1.1 users can upgrade for free. Site licenses are available.

Twomey said that Computer Associates International is eyeing Fortune 1,000 businesses in a variety of fields, where Superproject has already made inroads "because absolute controls and reporting are generally applied in large organizations more heavily."

Besides serving a host of fields, the program can aid users of varying skills. Superproject Plus offers beginning, intermediate and expert modes, an optional 10-minute introductory "tour" and on-line Help.

The previous release was strong in stand-alone projects but "didn't give the real-life power for a resource management tool." Instead, it predominantly offered reporting and utility-related support, Twomey said.

The software runs on the IBM Personal Computer, Personal Computer XT and AT and compatible systems under IBM PC-DOS 2 or later releases. It requires 312K bytes of random-access memory and two disk drives.

Cygnet sells components

From page 95

dotted lines and slip the printout into a pocket-size black book for use without a micro.

Recent "Little Black Book" enhancements include a separately purchased file conversion program that accepts data from many other data bases and a label maker printing utility. The copy-protected "Little Black Book" sells for $49.95, and a non-copy-protected version costs $69.95. The Label Maker is priced at $29.95, and the File Converter costs $19.95.

Most recently culled from the Cosystem is Get, an electronic mail retrieval program that runs under most applications and logs on automatically to on-line services and flashes a "mail waiting" message for manual retrieval. Cygnet is still targeting corporate users and will tailor Get to retrieve E-mail from a business' internal system.

The program will sell for $49.95 for the first month after it ships in February, but Cygnet promises the price will remain under $100 after that initial promotion. Site licenses are also available.

While there are still salable features to be picked from the Cosystem, Cygnet officials said they are biding their time for the integrated telephone/computer system's heyday.

"The market in the last couple of years has simply slowed down for any personal computers," Faggin said. "The user community appears to be less interested in new things. There is a new class of users who are not nearly as proficient as the first."

Users also have difficulties in understanding the benefits of integrating voice and data, he commented.

Cygnet brushes off apparent competition like Rolm Corp.'s several voice/data systems and Compaq Telecommunications Corp.'s Telecompaq.

The Rolm instruments must be hooked up to a Rolm private branch exchange, Dickens pointed out. And the Telecompaq, "by having it all in one, does not take advantage of the installed base of computers," Faggin maintained.

The influx of local-area networks may also spur the Cosystem, as corporate users become accustomed to E-mail, the firm said. Cosystem could connect geographically separate offices that each have installed a net.

Faggin estimated it will take a year or two for the voice/data market to open "and probably years before the onset of a vigorous market."

At Cygnet itself, where all 20-some employees use have the Cosystem on their desks, "There's no such thing as a paper memo," he added.

Odesta adds Helix twist

From page 95

fetz noted. "The system should be flexible enough to change on a day-to-day basis."

However, the runtime version answers requests from applications developers, he said. The cost is $500 for 10 runtime packages.

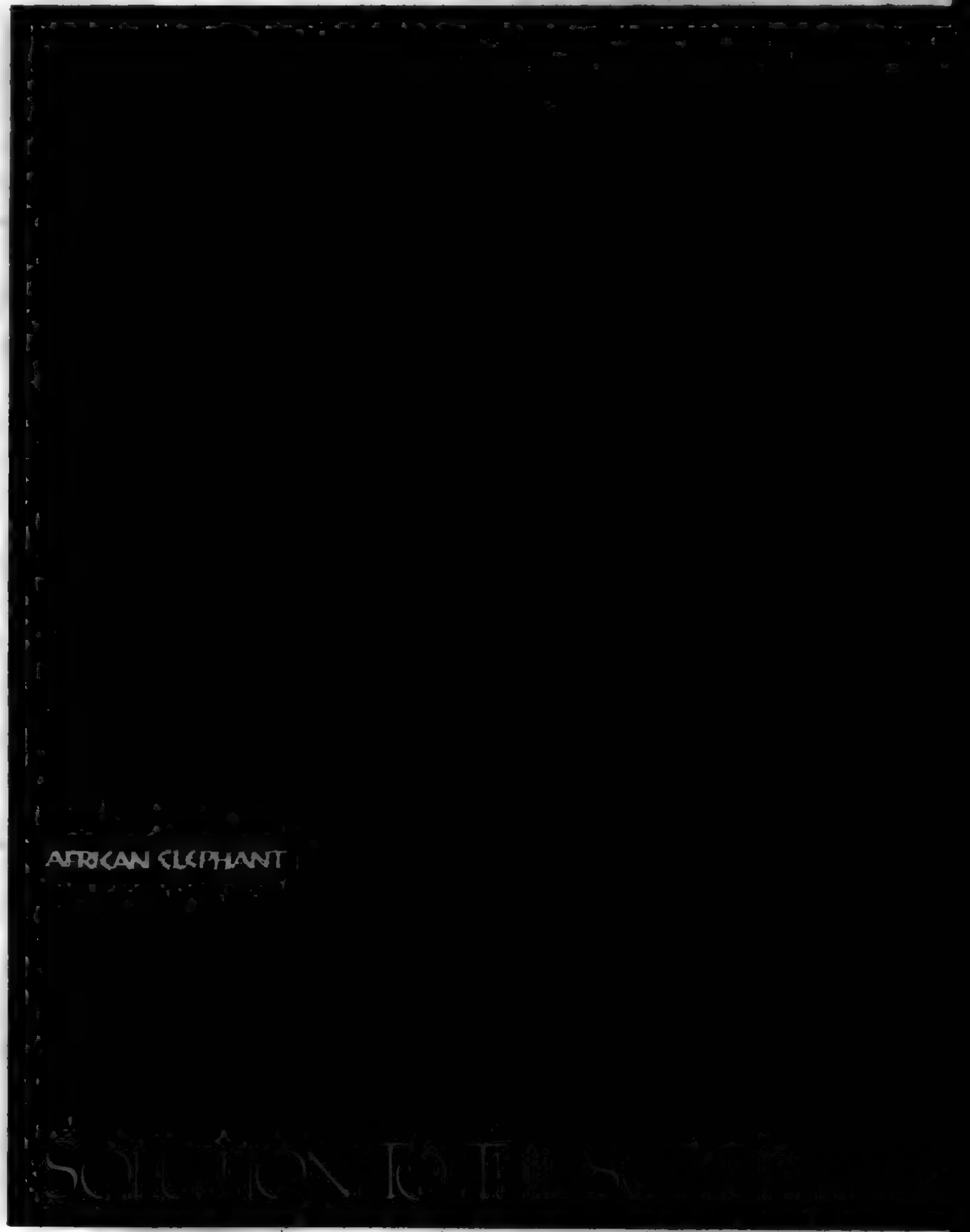
Veteran Helix user Gary Ingram of Nite and Day Power Technologies in Davenport, Calif., gave Double Helix a favorable review. "Double Helix gives the additional advantage of lists within lists and lets you know what options to select next," he noted. "It's also much, much faster than Release 2."

Ingram, a software consultant whose recent Helix jobs included one data base system that tracks a houseboat rebuilding project and another that supports billing for physicians, said the runtime offering is important for development.

"However, there's always somebody who wants something else, and you've got to go back," he said. "That's the beauty of Helix; you can change it."

Odesta will continue to offer the basic Helix package, which costs $395. An upgrade to Double Helix will be priced at $180.

The firm is finishing up work on a multiuser version, scheduled for demonstration this month and shipment in February, "which will run over Appletalk without any file server required," Chelfetz said.



AST micro adapter card bows

IRVINE, Calif. — A new add-in board from AST Research, Inc. combines the features of four display adapters to provide high-resolution graphics, sharp text generation and high-end color capabilities for users of IBM Personal Computers and compatibles, an AST company spokesman said.

The AST-3G single-slot adapter card is fully compatible with software written for the IBM Enhanced Graphics Adapter (EGA), the IBM Color/Graphics Adapter, the IBM Monochrome Display and the Hercules Computer Products, Inc. graphics card, according to Tony Paradiso, senior product manager for AST's personal workstation equipment group. The card also comes with a standard parallel printer port.

Scheduled to ship in 1986

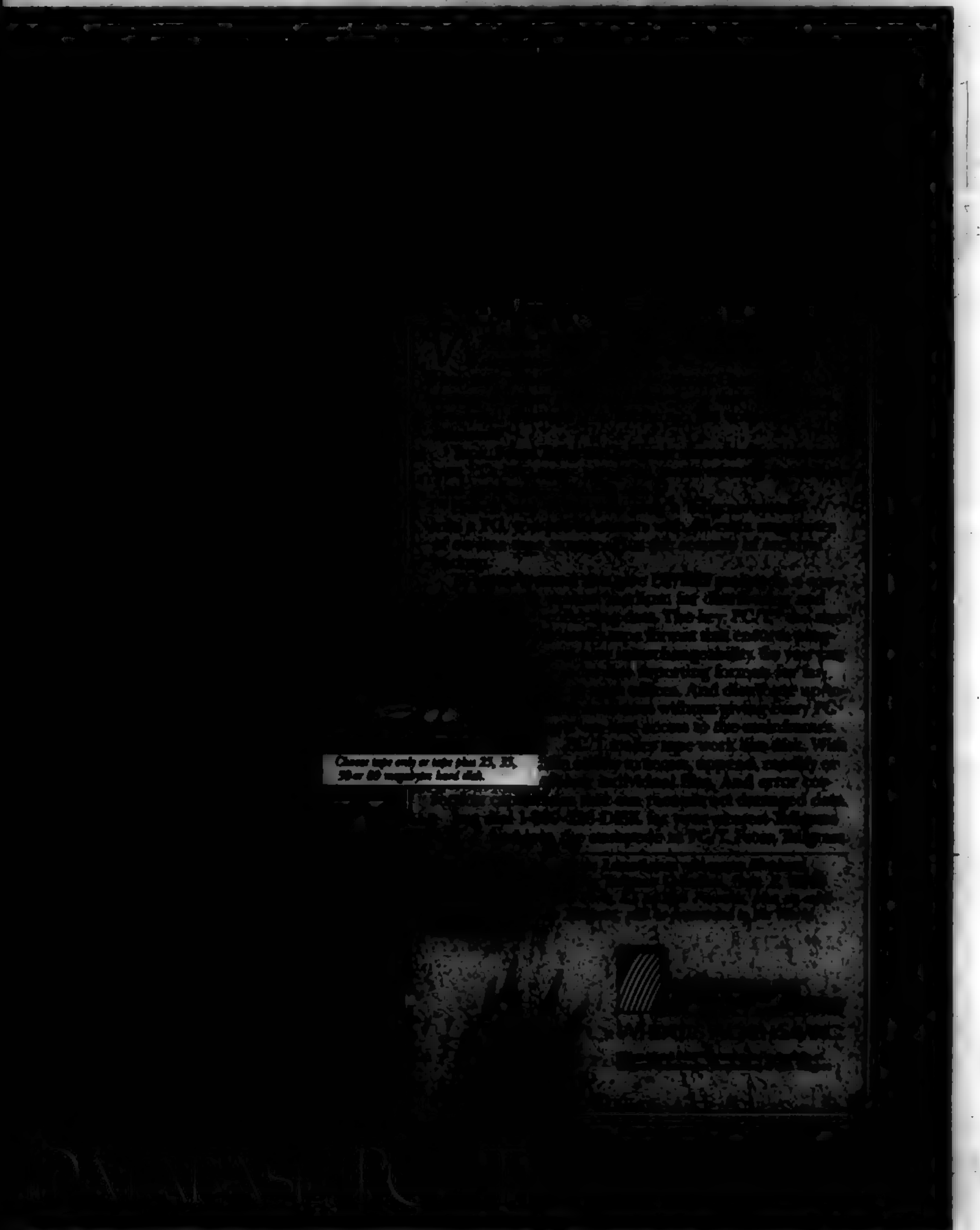
Scheduled to begin shipping in the first quarter of 1986 and priced at $600 fully configured, the AST-3G card is reportedly intended for use primarily with programs that employ both text and graphics images, such as Lotus Development Corp.'s 1-2-3 and Symphony.

The product will solve the problem of having to compromise text quality for color graphics capability, Paradiso claimed.

In addition to its parallel printer port and Hercules compatibility, both lacking in IBM's EGA card, the AST-3G sports another advantage over the IBM product, according to Paradiso.

The EGA card needs a piggyback board to upgrade its graphics memory from 64K to 256K bytes, but the AST-3G comes in either configuration and can be changed simply by switching chips.

Designed for the IBM Personal Computer, XT, AT and compatibles operating PC-DOS version 2 or above, the AST-3G reportedly works in conjunction with the IBM 5151 monochrome monitor, 5153 color monitor or 5154 enhanced color monitor as well as with compatible display units.



Choose tape only or tape plus 23, 35, 50 or 80 megabyte hard disk.

Token of compatibility

From page 95

commented Harry Saal, Nestar Systems, Inc. founder. "There are problems with bus timing and things like that."

"Theoretically they should work; the interface is clean," said Harvey Freedman, vice-president at Architecture Technology Corp. The only possible hang-up that comes to mind, he added, is that IBM and compatibles might want to hold the Token-Ring adapter program in different memory locations.

"It should plug and play, but we all know from the compatible world that you can have slight compatibility problems," said 3Com Corp.'s Howard Charney, senior vice-president and general manager of the network systems division. He emphasized, however, that he has heard of absolutely no difficulties to date.

"There are no known problems," said Lance Hansche, chairman of Phoenix Software Associates Ltd.

No one suggested that IBM would deliberately throw in a monkey wrench designed to keep compatible systems off the Token-Ring network.

"The people who are responsible for this product really would like to see it widely used," Saal said. "They would be very disappointed if it didn't work on compatibles."

However, almost no one expected that Big Blue made much of an effort to check it out.

"I doubt very much they would do that," Hansche said. "They would figure their only responsibility to the industry in general is to remain internally consistent."

Naturally, everyone made the somewhat disingenuous suggestion of asking IBM about all this. IBM, as usual, declined to comment in any meaningful way.

So there we have it for the moment: most likely, compatibles will run just fine on the Token-Ring. Well, it should turn out that way.

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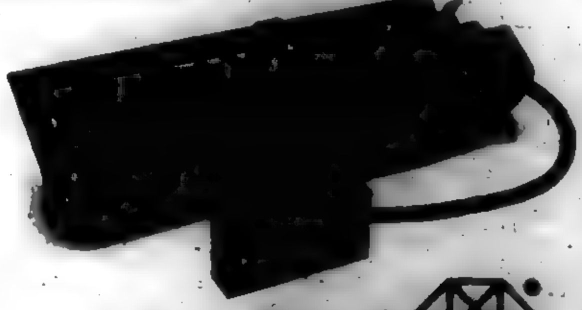

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COMMUNICATIONS

DATA STREAM
John Dix
and Paul Korzeniowski

Local nets top year-end trends

By the end of this new year, the installed base of personal computers will approach the number of all conventional display terminals in use. This fact, coupled with the need to provide terminal users with access to multiple hosts, is driving the development of local communications options.

Significant strides were made in the past year. A stellar example: 138,000 local networks were installed in 1985, a 35% gain over the previous year, according to Kim Myhre, director of communications research at International Data Corp., a market research firm in Framingham, Mass.

Some other 1985 developments in local communications are as follows:

- AT&T Information Systems and Northern Telecom, Inc., manufacturers of private branch exchanges, announced the ability to support IBM 3270-type synchronous devices, as did Sytek, Inc. and Ungermann-Bass, Inc., both manufacturers of broadband facilitywide local nets.
- Network management systems for local nets debuted, facilitating the often underestimated task of network maintenance, control and management.
- Larger capacity, more capable net servers bowed, some providing more than 1G-byte of hard-disk storage.
- Use of twisted-pair wire to support data terminal equipment was endorsed by IBM through a Cabling System enhancement.

Perhaps the most important development of 1985 in regard to local communications was the introduction of the IBM Token-Ring network. While limited to IBM Personal Computer support as introduced, it will be fleshed out this year to support many other devices. More importantly, the Token-Ring will galvanize the industry and create a standard that others can emulate and compete against on a feature-for-feature basis. Big Blue has knighted the concept, and now the fun will really begin.

AT&T starts construction of dedicated DOD network

By Bryan Wilkins

WASHINGTON, D.C. — AT&T has begun construction of a dedicated network that in the course of 10 years could cost $400 million and is being projected as a prototype of the dedicated networks it plans to build for corporate America.

The client in this first effort is the U.S. Department of Defense, which recently signed AT&T to a 10-year contract to construct the Defense Commercial Telecommunications Network (DCTN). The network will carry voice, data and video over an all-digital network.

The control of the network will be centered in AT&T facilities in Dranesville, Va., where a software-driven cluster of computers will dynamically route, select and perform network circuit management for the Defense Communications Agency (DCA), which will tie into the network from Arlington, Va.

The Network Control Center operations will be run on three AT&T 3B20 superminicomputers whose software has been reengineered from existing network management software used in AT&T's public network. DCA will not dynamically control circuit use but will be able to monitor network health, said Rich Adleman, head of the AT&T Bell Laboratories department that designed the network for DCA.

The network will consist of 15 nodes, each outfitted with an AT&T 5ESS, AT&T's newest central office stored-program switch. These nodes, which will be interconnected primarily with satellite links and some microwave shots, will support 150 DCTN user locations. Fourteen of the 5ESS switches will be located on U.S. military bases, and one will be partially used in the public net.

The network is slated to carry digitized voice traffic at 64K bit/sec. or 32K bit/sec. if bit compression is used. Data rates will range from 75 bit/sec. to 4.8K bit/sec. across the switched portion of the network, and on the reserved or dedicated portions the data will travel at 1.5M bit/sec.

Video communications key

An important feature of the DCTN network for DCA is its video communications, using bit-compression multiplexers to double channel capacity without degradation of signal. The DCA will be able to transmit video signals at 1.5M bit/sec., which will control costs for a service that requires large amounts of bandwidth. The video services will encompass conventional two-way point-to-point teleconferencing as well as point to multipoint. The DCTN teleconference service will give the controller the ability to select screens for display at all teleconference sites and also to bridge the audio feed from all points participating in the video conference.

Broadband digital encryption will be performed on the internodal links to secure the communications in the network.

DCTN will connect Defense Department installations across the U.S. and will cover 85,000 miles, AT&T said.

INSTANT ANALYSIS

"Users are more sophisticated than they have been. They want to buy solutions to problems, not the technology that makes the solution."

— Alan [illegible], director of the San Francisco office of Network Strategies, Inc., a communications consultancy

MCI challenges Megacom service

By Bryan Wilkins

WASHINGTON, D.C. — MCI Communications Corp. said last week it will introduce Prism I, a bulk calling option styled after AT&T's recently announced Megacom service. Prism I, targeted at companies with monthly telephone bills exceeding $12,000, will be priced 10% lower than AT&T's Megacom.

MCI said pricing for the service, if approved by the Federal Communications Commission, will be set at 16 to 28 cents per minute, with a monthly recurring charge of $1,000. MCI said these rates compare with AT&T's Megacom tariff of 18 to 35 cents per minute and a $1,200 monthly recurring charge.

MCI said the service is different from AT&T's Megacom in that the pricing is distance sensitive, meaning the customer will pay a flat per-minute charge based on its distance, compared with AT&T's tariffs, which specify mileage bands.

"With traditional WATS, many customers require sophisticated analysis of telephone traffic to optimize their savings. This is eliminated with Prism I," said Vorder Bruegge, MCI's senior vice-president of national accounts.

MCI Prism I will be available Jan. 1.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

Growing pains of disk capacity

Like the newborn child who is a sign that the family is prospering, the addition of new applications and new employees may indicate that a business is booming. But a new baby or new business can lead to an unexpected expense — adding a room to the house.

In the corporate world, that new room is often an addition to the DP center and is required not because the company needs more processing power but because its disk storage has outgrown the computer room.

Managing direct-access storage device (DASD) capacity was a key issue at a recent Computer Measurement Group, Inc. conference in Dallas.

Coping with DASD growth and managing existing disk capacity are likely to remain major concerns of all DP managers for many years.

Market research figures showing 40% to 50% annual growth in DASD capacity become frightening when a manager who already has 60G bytes of DASD looks at the $416,900 price tag on a 5.04G-byte string of dual density IBM 3380 Model E disk drives.

"There is a general trend out there as people get into capacity planning for DASD, and it is because most organizations are going to more and more on-line environments," noted International Data Corp. analyst Steve Josselyn.

Understanding business needs

Josselyn said that the challenge for managers is understanding the needs of their own businesses. "The whole organization has to realize, and is starting to realize, that there is a necessity not only to keep MIS informed of what they are doing, but for MIS' input. That way the user isn't just coming in and saying that he needs a string of 3380s and that he needs it right away," he added.

The question of how the spread of personal computers will impact the computer room further complicates the planning process. Few managers know how users of the personal computers being tied into their mainframes will use storage and host CPU power.

The need for the MIS manager to become involved in the business as a whole — a theme echoed almost daily in the corporate world — is best illustrated in capacity planning issues.

Managers who are concerned about the growing number of users with on-line access need to have a say when decisions are made about what type of access new classes of users will have. They also need to be involved in the planning process long before implementation of corporate expansions or relocations.

Surprises are the last thing managers need, particularly when each new box takes up valuable floor space, personnel costs and a healthy chunk of corporate revenue.

ETA sells unannounced unit

Group inks $20 million pact to buy supercomputer

By James Connolly

PRINCETON, N.J. — Although the product is not scheduled to be announced until the spring of 1986, the first ETA Systems, Inc. ETA 10-8 supercomputer has been ordered by the Consortium for Scientific Computing (CSC).

The consortium, which is establishing a federally funded supercomputing center, recently took the uncommon step of signing a $20 million contract to buy the long-rumored but unannounced system from ETA.

"Our application for our supercomputer center was specifically directed to ETA Systems, so we are just following through on the natural course of what was in the application and was approved by the National Science Foundation," CSC representative Charlaine Ewan explained.

Officials at ETA Systems, which was spun off from Control Data Corp. in 1983, said they expect to introduce officially the ETA 10 family in the spring of 1986 for delivery later this year.

According to ETA Systems, the ETA 10 line will allow use of up to 16 processors. Ewan said the consortium expects delivery of its ETA 10-8 in March 1987. That ETA 10-8 reportedly will perform up to 10 billion arithmetic operations per second.

Until that system is delivered, the consortium of 13 educational institutions will reportedly use an ETA Cyber 205 as the key system in its John von Neumann Center in Princeton.

The consortium is supported by five-year grants from the National Science Foundation and the state of New Jersey and is intended to support research for academic and commercial uses.

> ***The consortium took the uncommon step of signing a $20 million contract to buy ETA's unannounced system.***

INSTANT ANALYSIS

"The importance of capacity planning is directly related to the importance an organization places on computing."

— Fred Pirnum, senior vice-president for Humana Corp.

Ultimate 7000 superminis bow

By James Connolly

EAST HANOVER, N.J. — Ultimate Corp. has introduced its Ultimate 7000 series of 32-bit superminicomputers, based on Honeywell, Inc. DPS 6 minicomputer hardware and Ultimate's 15X coprocessor subsystem.

The series includes three systems, Ultimate Models 7000, 7200 and 7400. The 7400 supports up to 500 terminals, according to the company. The systems reportedly provide at least twice the performance of the existing Ultimate 6000 Series.

The systems are intended to provide computing power as current Ultimate users' companies grow and to help Ultimate compete for larger accounts, according to a company official. Customers reportedly can upgrade their existing Series 6000 to Series 7000 machines through board swaps.

A spokesman said the 7000 series is particularly suited for customers with heavy transaction processing requirements. The systems run the Ultimate operating system, Ultimate's SMA Standard version of Pick Systems Pick operating system.

The Model 7000 supports up to 250 users and features 4M to 8M bytes of memory, a 515M-byte disk drive, a 20-slot chassis and 32 ports. A basic configuration costs $310,000.

The Model 7200 features 4M to 8M bytes of memory, 40 slots, 96 ports and a 515M-byte disk drive. A basic configuration costs $545,000.

The Model 7400, which is a dual processor version of the Model 7000, features 8M bytes of memory, 40 slots, 128 ports and two 515M-byte disk drives. A basic configuration costs $545,000.

The company said the Model 7200 can be upgraded to a Model 7400. The systems will be available in April.

Philips Peripherals unwraps seven printers

By Donna Raimondi

SAN FRANCISCO — Philips Peripherals, Inc. has unwrapped six impact printers and one nonimpact printer.

Four of the printers were designed for use with the IBM Personal Computer, a spokesman said. The highest speed new printer, the GP 480 L, was designed for users who spool their printing and do not want contention problems.

The impact printer announcement included the following:

- The GP 480 L general office printer for minicomputers and microcomputers, which costs $2,795 and has 96 character designs and sizes. It prints up to 120 char./sec. of correspondence-quality text and 480 char./sec. at draft quality. In graphics mode, the printer features single-pass dot resolutions of 18 by 50 dots and up to 144 by 144 or 72 by 72 dot/in.
- The GP 300 LC dot matrix business or scientific printer, which costs $3,300. The printer runs at 120 char./sec. at letter quality and 300 char./sec. in draft mode and has a four-color ribbon and graphics capabilities.
- Four IBM Personal Computer-compatible printers for text and graphics, including the GP 150-PC ($1,700), GP 300-PC ($1,900), GP 300 L ($2,200) and GP 300 LC-PC ($2,800). The printers are based on the company's serial dot matrix technology.

The GP 150-PC prints at 120 char./sec. draft speed and 60 char./sec. letter-quality speed. The other three printers have speeds of 300 char./sec. in draft mode and 80 char./sec. in letter mode. The GP 300 LC-PC provides full-color capabilities.

Also announced was the Elphe 20 nonimpact page matrix printer that uses electrophotographic recording technology. It can print 20 page/min using cut sheet plain paper, transparencies or labels in a variety of sizes. The unit is suited for use in a clustered workstation environment, the vendor said. Base price is $19,800.

All of the printers are available with serial or parallel ports.

Performance Monitoring of Non-IBM Databases

COMPUTER INDUSTRY

ACTIVE ISSUES
Kathy Porteus

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CBEMA vs. deregulation

Industry group urges FCC to retain subsidiary rule

By Bryan Wilkins

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Cautiously optimistic, analysts await fourth-quarter results

Industry upturn strong, accelerating, some say

By Edward Warner
Computerworld News Service

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Without a capital spending tax break, however, Arnum said things could just as easily remain sour for the computer industry. He cited a June International Resource Development report in which major computer industry customers said they planned to keep their capital spending at 1984's level.

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CBEMA vs. deregulation

From page 105

enhanced services by regulated revenue from basic telephone service.

The FCC's new policy plan would permit telephone companies to offer data communications services, such as voice storage, protocol conversion and network terminating equipment at a customer's office, jointly with regular telephone service if there is sufficient competition within the region to be served by the new service. If there is not sufficient competition, the FCC would require an accounting regime to separate costs, but no subsidiary.

CBEMA calls the FCC proposal "impractical and unworkable" and said major questions have to be answered before it can be adopted. CBEMA recommended that the FCC "fine-tune and build upon the existing regulatory framework," keeping the structural separation of basic and enhanced services.

The association said the FCC would face the problem of assigning a regulatory definition to each new service proposed by a dominant telephone company, which in turn would affect how it would be regulated, maybe postponing the service itself.

Perhaps the most worrisome aspect of the proposed FCC ground rules is the practical issue of protecting customer proprietary information and interconnection to the local telephone facilities, CBEMA said.

Many computer companies are customers of the telephone company and need the local services to deliver their own services to the end user. "CBEMA submits that, as long as bottleneck facility carriers retain such special market power, additional regulatory protections . . . must be considered to ensure that the bottleneck facility be shared fairly," the association told the FCC.

CBEMA voiced concern about the disclosure of network changes, which affect the connection of equipment to the local exchange, to the telephone company's competitors. CBEMA's concern was mirrored in similar comments filed by the Association of Data Processing Services Organizations, Inc., the Independent Data Communications Manufacturers Association and IBM, all of which urged the FCC not to abandon the enhanced/basic definition for new services.

Notes: Xidex buys group

From page 105

indicted in connection with a federal contract [CW, Dec. 23], last month announced the creation of two management positions that will enable **Robert S. Wiggins**, Paradyne's **chairman, president and chief executive officer**, "to devote more time to strategic planning and defining the company's corporate growth objectives." **Jerry T. Kendall** was promoted to **executive vice-president and chief operating officer**, while **Chief Financial Officer Fred T. Melberg** assumed additional duties as **executive vice-president and chief staff officer**.

■

Xidex Corp. last month concluded an agreement to buy the magnetic media portion of the **Business Products Group of Control Data Corp.'s Peripheral Products Co.** for about $65 million.

■

In another sale, **California Devices, Inc.** announced it exercised an option to acquire **Storage Technology Corp.**'s wafer fabrication facility located in Louisville, Colo.

Stock market rings in 1986

From page 105

computer slump is ending, primarily because the news has stopped getting worse. However, Steve Milunovich, a technology analyst with First Boston Corp., says, "The fundamentals of technology companies haven't really changed even though the stocks are going nuts."

Milunovich says, "Orders need to basically improve" for the drive in technology stocks to continue. Linkas says he believes "a broad and sustained upturn in corporate profits — and hence demand for high-technology goods — looks probable in the second half of 1986."

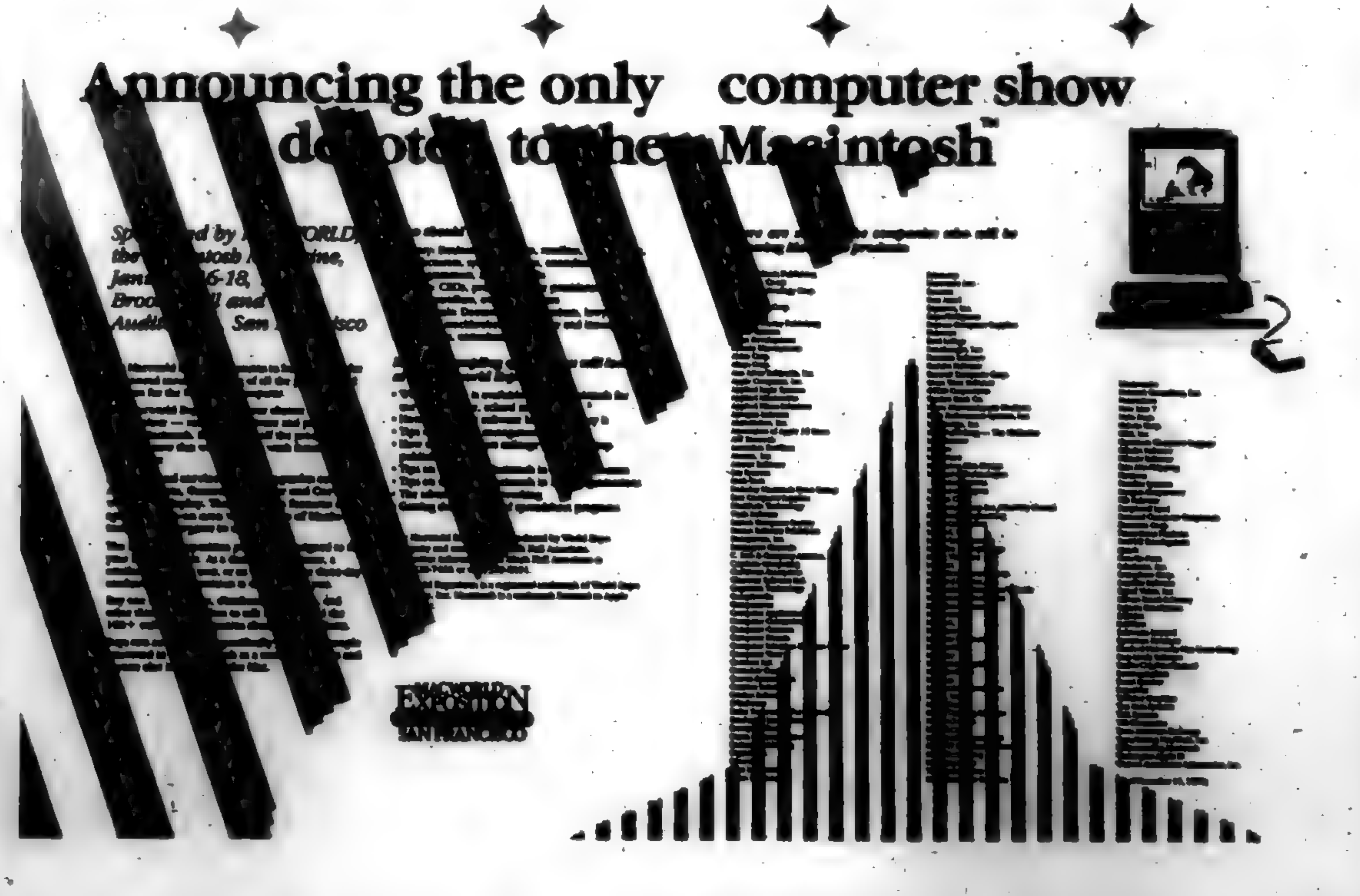
After several weeks of soaring prices, where are new investment opportunities to be found?

Michael R. Weisberg, director of technology research with Prudential-Bache Securities, Inc. maintains that "some of the companies that have already done well will continue to be the leaders in this rally." On Weisberg's list of strongest computer stocks are IBM; DEC; Tandem Computers, Inc. (over-the-counter — 31¾); Intergraph Corp. (OTC — 35¾); Computer Associates International, Inc. (OTC — 33); and General Motors Corp. E class (NYSE — 42). Weisberg adds, "If I were investing money right now, I'd be buying stocks."

Rich Edwards, an analyst with Robertson, Coleman & Stephens of San Francisco, contends the market will continue to be selective, favoring only certain technology issues. On his list are specialized firms that avoided the industry slump, namely Cray Research, Inc. (NYSE — 63¾); Stratus Computer, Inc. (OTC — 23); and Symbolics, Inc. (OTC — 13¾).

Edwards says companies like IBM and DEC, which are "coming off of a very strong new product cycle" are the likeliest candidates to score gains. On the other hand, he suggests, companies without new product lines, such as Hewlett-Packard Co. (NYSE — 36¾), have not performed as well.

Linkas of Goldman Sachs says he believes that smaller capitalization companies are "beginning to get included in the rally." He currently recommends General Instrument Corp. (NYSE — 17¼) as a second-tier technology stock that should perform well during the coming weeks.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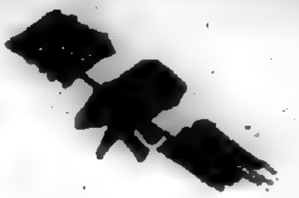

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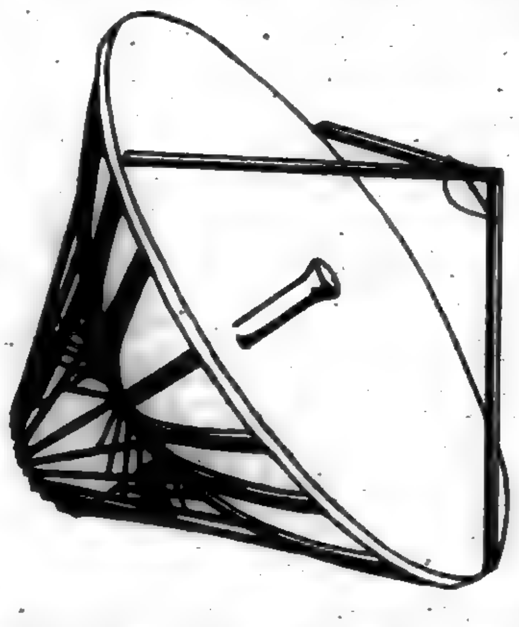

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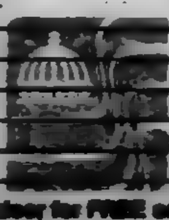

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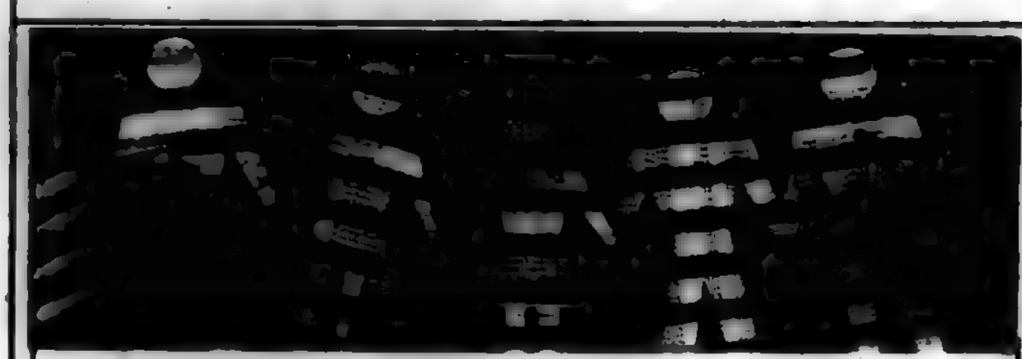

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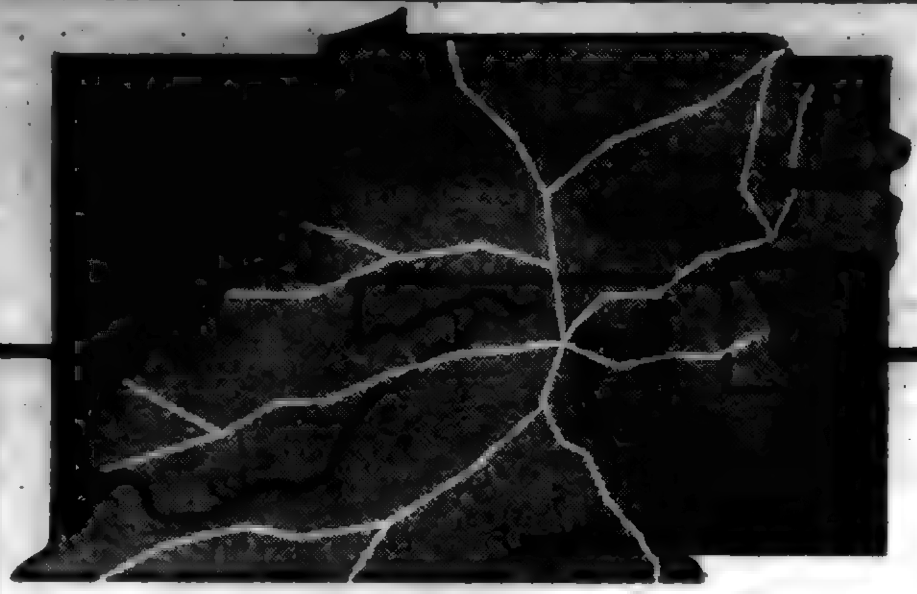

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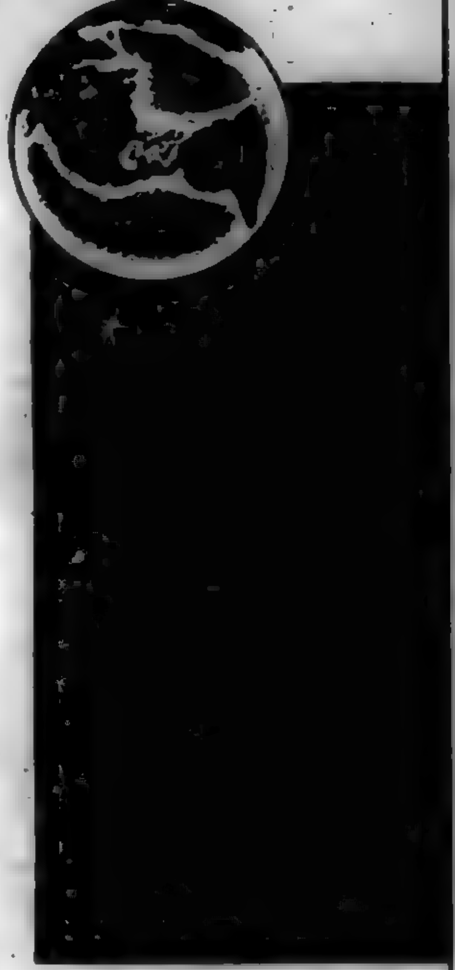

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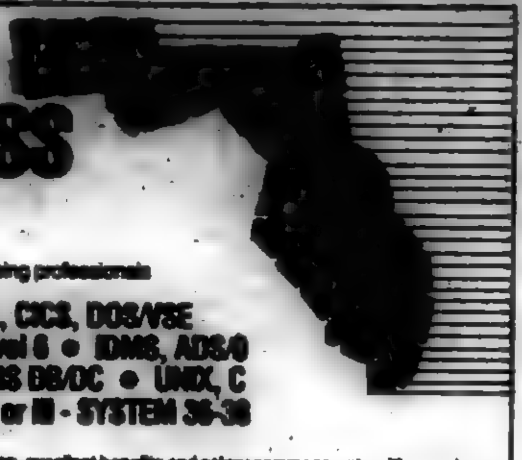

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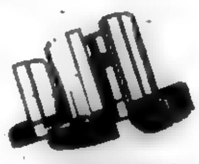

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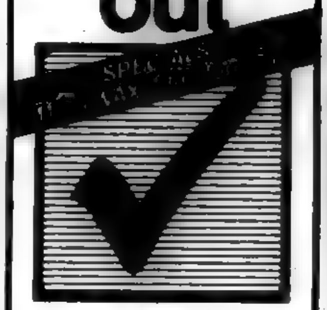

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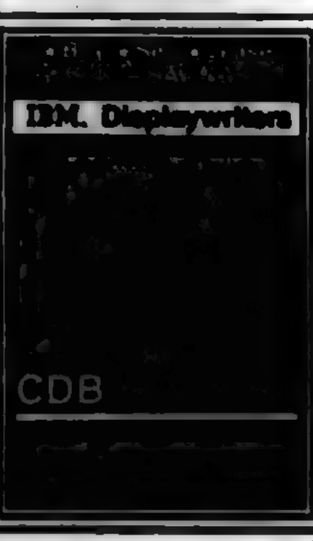

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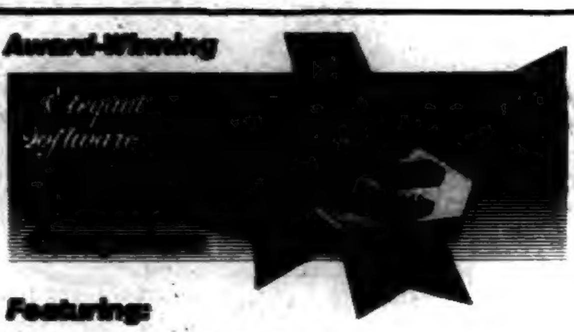

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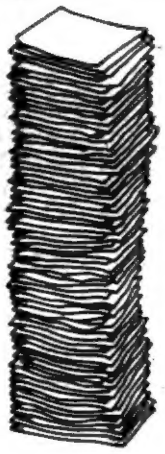

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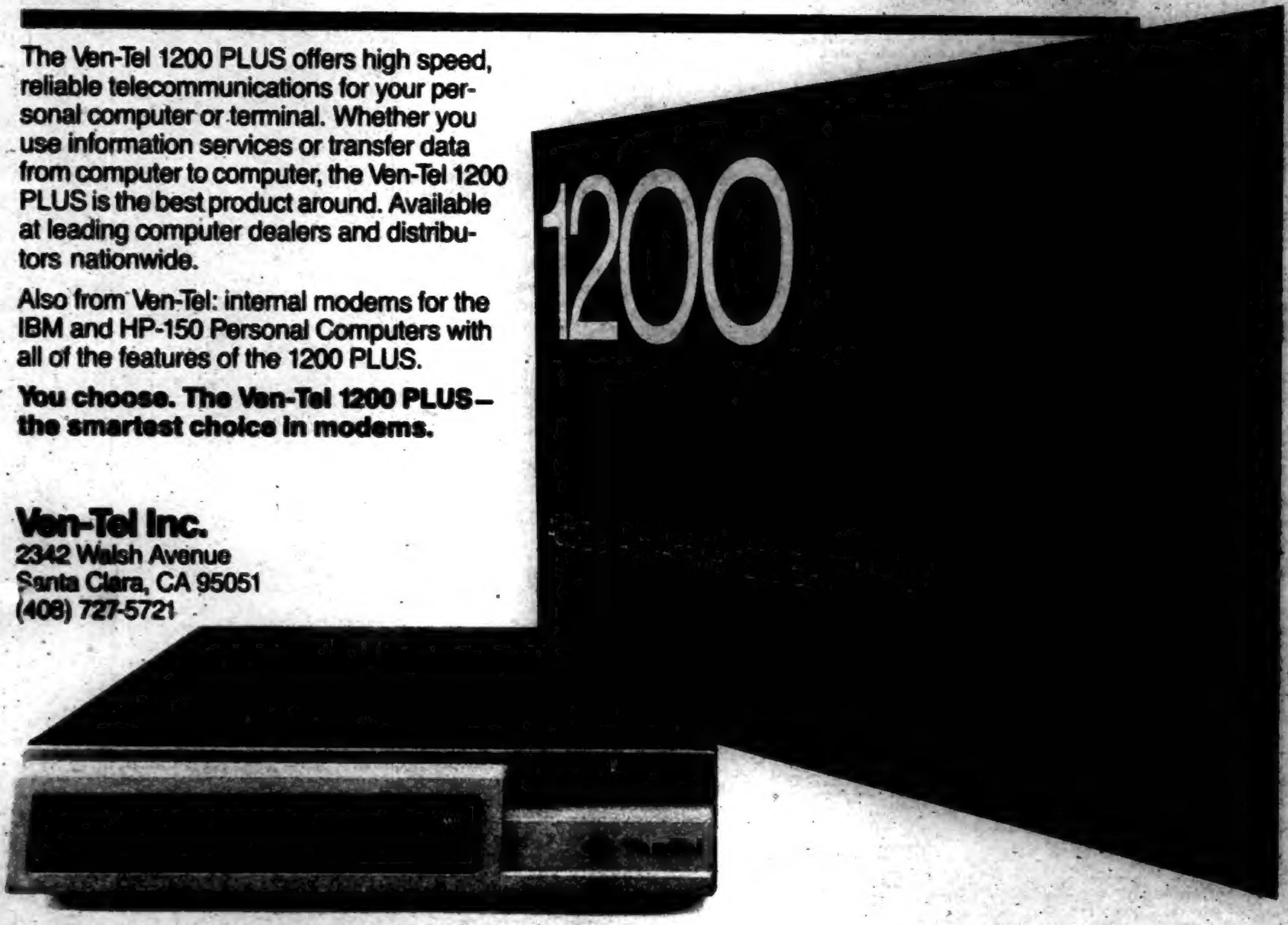

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